

# Computing regression quantiles to analysis the relationship between market behavior and political risk

Yi-Hsien Wang · Jui-Cheng Hung · Yen-Hsien Lee ·  
Chung-Chu Chuang

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**Abstract** The modern tendency of Japanese politics-economy interaction has affected emerging countries. This article examines the influence of the House of Representatives sessions on returns to Nikkei 225. The conventional linear regression can only describe the impact of averages on returns, but cannot completely present all the possible relationships between the two. In order to avoid the restrictions of the above mentioned method, this article performs quantile regression to analyze the influence of the House of Representatives sessions on the returns of Nikkei 225. Meanwhile, quantile regression provides a more complete description of analysis on relationships between stock market behavior and parliament effects.

**Keywords** Parliament effects · politics-economy · market behavior · Quantile regression

## 1 Introduction

According to the classifications by [Clark \(1997\)](#), the risks resultant from political actions can be divided into specific political behavior (discrete) and constant political behavior (continuous) based on the occurrence status. Specific political behavior includes announcements of major policies such as levies, nationalization and currency depreciation, as well as the specific impacts caused by strikes, boycott and terrorist attacks. Constant political behavior

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Y.-H. Wang (✉) · J.-C. Hung  
Department of Banking and Finance, Chinese Culture University,  
55, Hwa-Kang Road, Yang-Ming-Shan, Taipei 11114, Taiwan, ROC  
e-mail: holland@mail2000.com.tw

Y.-H. Lee  
Department of Finance, Chung Yuan Christian University, No. 200, Chung Pei Rd.,  
Chung Li 32023, Taiwan, ROC

C.-C. Chuang  
Graduate Institute of Management Sciences, Tamkang University, 151 Ying-chuan Road, Tamsui,  
Taipei 25137, Taiwan, ROC

occurs continuously or in cycles and creates continuous impacts on finance and economy. For example, the government agencies implement the monetary policies under the macro monitoring of a central bank based on considerations of macro economy. Major reformations or legislation processes on society and politics are also examples.

The Parliament is the only legislative institute in Japan. The Japanese parliament consists of the House of Representatives and the House of Councillors. Both houses have their own speakers and vice speakers. A speaker is in charge of meeting agendas and represents the House. Speakers and vice speakers are elected among members of parliaments. Their tenure is the same as members of parliaments. Parliaments serve the following major functions: reviews of budgets and other financial policies, appointment of Prime Minister, acknowledgement of treaties, proposals of amendments to the Constitution, impeachments of Supreme Court, hearing of reports on national affairs, diplomatic relationships and financial reports. During the legislative process, the same bill is reviewed independently by the two houses. One house makes a decision and the decision is then confirmed by the other, in order to ensure the robustness of the decision-making process. If the bill passed by the House of Representatives is objected by the House of Councillors, it can still become a law if it is approved by at least two thirds of the members of the House of Representatives. However, the decision from the House of Representatives holds final when it comes to budgets, treaties and naming of Prime Minister if the two houses disagree. In other words, the House of Councillors is nothing more than a rubber stamp.

The study on the correlation between political events and stock markets has a long history (Agmon and Findlay 1982; Aggarwal et al. 1999; Buchinsky 1994; Diamonte et al. 1996; Lobo and Tufte 1998; Tirtiroglu et al. 2004; Wang and Lin 2009; Wang et al. 2010). The relevant studies center on elections. For example, Lobo (1999) found that there are indeed risks to the returns on US equities during the presidential elections and mid-term congressional election periods, particularly mid-term congressional elections. Pantzalis et al. (2000) validated that when the countries with a lower degree of liberty in politics, economics and press hold elections, the stock markets exhibit significant positive excess returns. When the current leader fails the re-election, the excess returns become even more significant.

However, the relevant studies over the recent years centre on the validation of efficient market hypothesis (Herron et al. 1999; Herron 2000). Gemmill 1992 found that in the 1987 UK Parliament Election, the polls before the election and FTSE100 were highly correlated. When the polls indicated that the Labor was likely to win, FTSE100 fell. On the other hand, if the polls suggested the Tory was likely to win, FTSE100 rallied. The subsequent studies further examine the correlation with polls (Gwilym and Buckle 1994; Herron 2000).

Also, the relevant studies mostly focus on the verification of the existence of US presidential election cycle. Researches find that there are indeed greater excess returns in the third and fourth year (presidential election years). The average returns are negative during the second year (Niederhofer et al. 1970; Allivine and O'Neil 1980; Huang 1985). Meanwhile, Foerster (1994) found that the US presidential election cycle does not only have influence on the US stock market, but also impacts the Canadian and other foreign markets. Foerster and Schmitz (1997) suggested that there are significant negative returns during the second year after the US presidential election compared to the first, third and fourth years after the election. As far as other sampled countries are concerned, there are also significant negative returns on their stock markets during the second year after the US presidential elections. However, the first, third and fourth years report significant positive returns.

In terms of stock market preferences, market experiences show that the Wall Streets always react positive to the winning of the Republicans (Herbst and Slinkman 1984; Huang 1985). Niederhofer et al. (1970) found that the winning of the Republicans exhibits better

stimulus effects on the US stock market over the short term (Reilly and Lukseitch 1980; Hobbs and Riley 1984). However, in terms of long-term political performances, the market reports significant and positive excess returns due to the economic performances of the Democratic presidents (Lobo 1999; Johnson et al. 1999; Santa-Clara and Valkanov 2003).

In addition, subsequent studies examine the influence of different types of political behaviours or political events on stock markets. Kim and Mei (2001) observed the political events such as the responses of HK Hengshen Index when Hong Kong was returned to China in 1997, human rights issues and the consent by the US government for China to enjoy most favourable country treatment. The impact of negative political events is indeed more significant. Nippani and Medlin (2002) investigated the responses of Dow Jones, NASDAQ and S&P500 to the 2000 US presidential election and the resultant delay of the winner. They found that the above markets in the US are efficient markets and the delay creates negative impacts on the markets. Given the increasing sophistication of quantitative models, this model applies a quantile regression model to examine the operations of parliaments on stock market returns over the long haul.

This article attempts to investigate the influence of parliament sessions on the returns of Nikken 225. Meanwhile, this article analyzes the difference in the parliament effects on the returns of Nikken 225 in both bull and bear markets. It is hoped that the research finding can serve as a reference to investors for their long-term investments. This article is organized as follows: Sect. 1 gives an overview; Sect. 2 discusses data and methodology; Sect. 3 provides the empirical results of Politics-economy Interaction. The final section provides the conclusions.

## 2 Data and methodology

### 2.1 Data description

This article samples the daily closing Nikkei 225 from January 4, 1984 through January 31, 2007 from Taiwan Economic Journal. There are a total of 5,679 observations. During the sampling period, the House of Representatives held a total of 66 sessions, including 23 ordinary meetings, 35 extraordinary meeting and 8 special meetings. Please refer to the official website of the House of Representatives in Japan for sessions and meetings throughout the years.

### 2.2 Methodology quantile regression

The dummy variables were embedded in linear regression specifications of stock return under micro data as follows:

$$R_i = X_i' \beta + u_i, \quad i = 1, 2, \dots, n, \quad (1)$$

where  $X$  is the vector of covariates,  $u$  is the error term and  $\beta$  is the vector of parameters. The vector  $X$  contains the determinants of stock return, including Parliament effect. Equation 1 was solved by quantile regression (Koenker and Bassett 1978; Buchinsky 1998; Koenker and Hallock 2001; Chen et al. 2007). Let  $\theta$  be a real number in  $(0, 1)$ , and the  $\theta$  th conditional quantile can be expressed as

$$R_i = x_i' \beta_\theta + u_{i\theta}, \quad \text{Quant}_\theta(R_i | x_i) = x_i' \beta_\theta, \quad (2)$$

where  $\text{Quant}_\theta(R_i | x_i)$  denotes the conditional quantile of  $R_i$  conditional on the regressor vector  $x_i$ .  $\hat{\beta}_\theta$  is estimated by minimizing the asymmetric weighted sum of absolute deviation.  $X'_i \hat{\beta}_\theta$  approximates the  $\theta$  th conditional quantile of  $R$ .  $X'_i \hat{\beta}_\theta$  characterizes the behavior of  $R$  at the left (right) tail of the conditional distribution while  $\theta$  is close to zero. When  $\theta = 1/2$ , Eq. 3 corresponds with the objective function of Least Absolute Deviations estimation (LAD), so  $X'_i \hat{\beta}_\theta$  defines the “center” behavior of  $R$ . The first order condition of Eq. 3 is

$$\frac{1}{n} \sum_{i=1}^n (\theta - 1/2 + 1/2 \text{sign}(R_i - x'_i \beta)) x_i = 0. \tag{3}$$

where  $\text{sign}(\lambda) = I(\lambda \geq 0) - I(\lambda \leq 0)$  with  $I(W)$  the function of event  $W$ . Equation 3 is not differentiable at  $R_i = X'_i \beta$ . Then, in Eq. 3, Linear programming is used to demonstrate that, under some regularity conditions, asymptotic distribution of  $\hat{\beta}_\theta$  can be expressed as  $\sqrt{n}(\hat{\beta}_\theta - \beta_\theta) \xrightarrow{W} N(0, \Psi)$  (Koenker and Bassett 1978; Koenker and d'Orey 1987; Chen et al. 2007). In Eq. 5,  $\Psi$  is the asymptotic covariance matrix:

$$\Psi = \theta(1 - \theta) \left( E[f_{u|X,\theta}(0|X_i) X_i X'_i] \right)^{-1} E[X_i X'_i] \left( E[f_{u|X,\theta}(0|X_i) X_i X'_i] \right)^{-1} \tag{4}$$

The bootstrap method of estimation error is the most appropriate method in the expansive process of quantile regression (Efron 1982; Chen et al. 2007). Hence,  $n$  observations are drawn from all samples of  $X$  and  $R$  to compose a sub-sample of  $X^*$  and  $R^*$ , and  $\hat{\beta}_\theta$  is estimated by bootstrap method. This process is repeated  $V$  times to obtain the bootstrap estimates collection  $\hat{\beta}_{\theta j}^*$ ,  $j = 1, \dots, V$ . The asymptotic covariance matrix is estimated as

$$\hat{\Psi} = n \left\{ \frac{1}{V} \sum_{j=1}^V (\hat{\beta}_{\theta j}^* - \hat{\beta}_\theta) (\hat{\beta}_{\theta j}^* - \hat{\beta}_\theta)' \right\}. \tag{5}$$

In this study, STATA 8.0 software was used to compute the estimator of  $\hat{\beta}_\theta$  and to estimate asymptotic covariance matrix  $\Psi$  using bootstrap method.

### 3 Empirical analysis of politics-economy interaction

Table 1 lists the daily statistical data for Nikkei 225 stock index during the sample period. Figures 1 and 2 show the trends and returns of Nikkei 225 stock market, respectively.

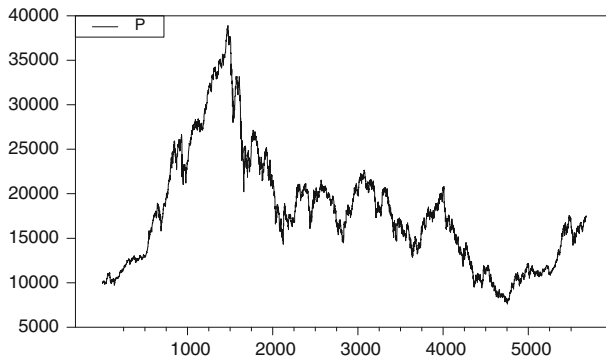
The mean of Nikkei 225 stock returns (0.0235) did not significantly differ from 0 at the 5% level. The Nikkei 225 stock return series data were significantly skewed to the left and significantly excess kurtosis. The skewness and kurtosis measurements significantly differed from normal.

Table 2 indicates that Japanese parliament sessions were significantly and negatively related to Nikkei 225 stock returns. Table 2 shows that the estimate values of parliament

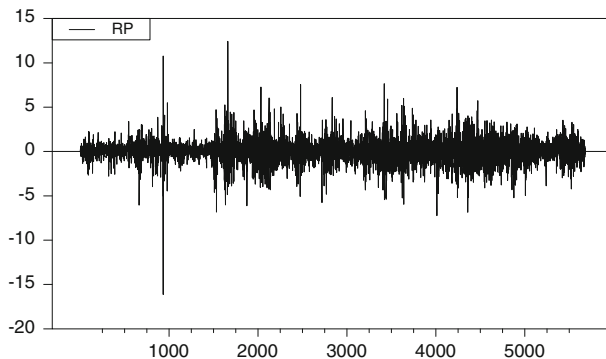
**Table 1** Basic statistic for Nikkei 225 stock returns

Mean	0.0099**	Std. Dev.	1.3684**
Maximum	12.4278**	Minimum	-16.1375**
Skewness	-0.1214**	Kurtosis	7.5519**

Notes: \*\* Statistical significance at 1% level



**Fig. 1** Graph of Nikkei 225 stock index



**Fig. 2** Graph of Nikkei 225 stock returns

**Table 2** Effect of Politics-economy interaction in Japan

Quantile	Variable			
	Parliament effect	Bear market effect	Interaction effect	Intercept
Q(0.1)	-1.2243***	-12.6777**	2.0906***	-9.0277**
Q(0.3)	0.3452***	-7.5833***	0.2729***	-2.0474***
Q(0.5)	-0.1655***	-5.0715***	0.0771***	1.8865***
Q(0.7)	-0.2529***	-3.0924***	-0.9236***	6.4197***
Q(0.9)	-0.0778***	-1.8496***	-2.2169***	16.2593***
Least-square	0.0045***	-5.9624***	-0.4161***	2.6417***

Notes: The percentage in the bracketing  
 \*\*\* (\*\*) Statistical significance at 1% (5%) level

effects at 0.1, 0.3, 0.5 and 0.9 quantiles report a negative correlation below the 1% significant level. However, the estimate values of at 0.7 see a positive correlation. This may be due to the beginning of reforms by the Government after the economic bubble burst. At this juncture, investors held high expectations of the government and hoped that the government could create positive catalysts. But the ruling party provided national major policies that may be discussed in parliament sessions and the competition among the parties promotes

economic development. Furthermore, Parliament lack reformative motive and interest group operate behind the scenes. Thus, the outcome of the related bill does not allow investors to immediately estimate the straightforward impact on the stock market, and then the unobvious trend constitutes a future of uncertainty (Lin and Wang 2007). These phenomena generated economic performance during parliament session is not as good as the expectation of investors result in reduce Nikkei 225 returns and build the conservative investment portfolio.

Moreover, there is a significantly negative correlation with the Nikkei 225 returns in bear markets. The economy is gloomy in bear markets and investors lose confidence in the markets and become risk averse. At this juncture, demand may fall below supply so that investors are not willing to invest at high prices. As a result, transaction prices may significantly fall below reasonable prices and the returns become negative. Similarly, during the bull markets, investors assumedly become careless. Comparison of time of parliament session with periods when stock returns in the bull market are at the tenth percentile (30, 50, 70 and 90%) reveal a 1% significant negative correlation, which is sufficient evidence of parliamentary policy seems able to stop the fall of the stock market immediately despite parliamentary activities indeed negative cause stock market behavior.

In Japan's history of politics, there are indeed very few true statesmen. The poor performances of recent Japanese political leaders have led to the public's disappointment on those in power. Many people believe that the increasingly poor quality of politicians is caused by those hereditary politicians who inherit the family's election sites, visibility and funding to easily become parliamentary members without any qualification for politicians at all. Coupled with frequent replacements, hereditary politicians are seen as irresponsible. The change of prime ministers attending international summit meetings each year has also damaged the international image of Japan. The Cabinet members are mostly hereditary, and the Cabinet is often critically termed as "the Cabinet of Dandies". The Liberal Democratic Party has 40% hereditary politicians, which has often been the target for the opposition parties. The background of political family is not a desirable condition since a fine politician can be cultivated. However, Japan lacks training and development for politicians. Many young parliamentary members have no local experience, are temporarily assigned to run for elections. They rely on the power of the party leaders to win the elections, yet their lack of experience is exposed only after entering the Parliament. "Why aren't there convincing politicians in Japan?" Tosho analyzed, "The real change of Japan's politics is not about changing the prime ministers or the ruling parties. People are looking for true leaders, and the basis for judging a true leader is the language expression." "It is seen from the complex honorifics used by the Japanese that its language structure reflects the hierarchical social structure highlighting the subordinate-superior relations. Japan labels itself as a democratic country, yet has been lingering on the top-to-down form. In the past, people were passive and they looked way up at politicians and bureaucrats."

"However, such relationship is gradually changing. The ruling and the ruled are no longer in a leader-member relationship. They are building a relationship of partners. The way of communications is not vertical but horizontal, and the language expression on policies has become a necessity for successful politicians". In addition, the relationship between the officials and the public has gradually become equal, and Japan's influence in the international arena is diminishing. The main reason is the lack of capable political leaders and failure of cultivating leaders. The patrimonial politics is culture-related as Japanese people cherish heritage without rebellious spirit and prefer stability to competition. They like to act in group, and will feel a sense of insecurity if separated from the group.

There are many unspoken rules in Japanese society, in politics and business alike. Most people support the candidates according to the orders of the organizations they belong to, even if the hereditary parliamentary members do not run for the competition. This is the main

concern of the Liberal Democratic Party. Under such political structure, there may be many people who would like to break the hidden rule.

Japan's hereditary politics is not an established system, but hidden rules, which are familiar to those who have some understanding of the Japanese politics. The hidden rules are originated due to the "three musts" in the Japanese Diet Election: (1) recognition or visibility; (2) election funding; (3) electoral supportive group. The constituent parliamentary members' elections in Japan often value not the policies, but the "likes or dislikes" toward the candidates, and the derived interests. Therefore, some local organizations and groups become the "electoral supportive groups" of the local constituent parliamentary members. Due to the long time operations in the local levels, parliamentary members can be well funded by enterprises and receive high visibility. The "three musts" thus become the "private properties" of the parliamentary members, who are often not willing to leave the "three musts" to successors who are unrelated to them. Therefore, their relatives surely become the successors of the "treasures". In particular, the Liberal Democratic Party pretends not to see the such transfer of political resources, resulting in increasingly common hereditary phenomena that become a major feature of Japanese politics.

However, in an open society, a political party, in particular, a party of the general public should be open. Nevertheless, the Liberal Democratic Party sets a high entry barrier to non party members. People with no relatives serving in the Diet have no chance in the political circle. In reality, such a closed political party claiming to be open cannot lead to public coherence, and the representation of the people by a closed party is obviously restricted. The author has met many outstanding young Japanese who are willing to enter politics, but are simply discouraged by the high barriers. In Japan's ruling party, in particular, the top level cadres mostly came from rich or powerful families, and never knew the hardships of life and sufferings of the common people. The core members of the party cannot think and act like the people. Such a hereditary and closed party surely is unable to represent the public and serve the public.

Patrimonial politics results in lack of individuality and charismatic leaders, and the party is filled with pay-check politicians who do not understand politics and have no political ideals. However, backed up by their families and supportive groups, these people enter into Japan's political circle. Lacking policy-making capacity, the hereditary politicians have to rely on bureaucrats, thus, politicians, bureaucrats and enterprises form an interest entity that impedes the innovation of systems. To win the corporate donations and votes, politicians along with bureaucrats prioritize investment, subsidize sunset industries, protect industries doomed to fail in globalization, and develop a favorable tax regime for large enterprises. Such political choice not only squanders budget, but more importantly, loses the future potentials for Japan. To strengthen the group authority, the bureaucrats create types of administrative rules that undermine the vitality of market economy and restrict the development of productivity.

#### 4 Conclusion

Stock market behavior is the exhibition of the national economy, and in the fact that it speculates economic future. It generally responds to latest information that positive stock returns are expected following the high expectations of reformative financial and economic policies in parliament sessions. Thus, this article applies a quantile regression model to validate whether the stock market behavior of Nikkei 225 are subject to the influence of the House of Representatives sessions. To investors, investment risks can be divided into system risks and non-system risks. Political risks are one of the important factors of system risks. However,

the assessment scope of political risks is rather wide, complex and highly uncertain. In Asian, the modern tendency of Japanese politics-economy interaction has affected other emerging countries (Lin and Wang 2007; Kim 2009). The result of this article provides that Japanese politics-economy relationship will face problematic interaction following the investors make decisions quickly without foresight that there is no need to overvalue the parliamentary effect.

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