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Interest rate and Economic Growth as Determinants of Firm Investment Decision: An Investigation on BIST listed firms

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Abstract. This study aims to investigate the effect of political uncertainty as a determinant of investment decisions on investment decisions of firms. For this purpose, this study involves 147 BIST (Istanbul Stock Exchange) listed firms displaying activity in the industry sector between 2008 and 2013. Panel data analysis with relevant quarterly data was used to analyze the relationship between political uncertainty and investment decisions of firms. Analysis results have revealed a statistically significant relationship between investments of firms and the variable representing 29 March 2009 General Local Elections, 12 June 2011 General Elections and 12 September 2010 New Constitution Referendum as an indicator of political uncertainty. This verifies the argument suggesting an uncertainty due to elections may negatively affect investments of firms through inefficient capital allocation, and this can be said to provide a strong message with regard to important economic effects of political uncertainty.
Keywords. Political uncertainty, Elections, Firm investments.
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1. Introduction

An important way of investigating effects of political factors on real economic decisions is making use of political uncertainty and instability channels. Incentives and uncertainty are associated with a possible change in governmental policies. Effects of political uncertainty are better comprehended following the recent financial crisis and recession. A great uncertainty may be present regarding what governments will do to increase investments in the short-term and to develop an economic policy in the long-term (see also Unver & Erdogan, 2015). There is a discussion on whether such uncertainty causes postponements of investment decisions of firms and the fact that these firms will not make investments unless required financial regulations are made and uncertainty regarding macroeconomic policies are eliminated restrains a possible economic recovery. Many studies show that political uncertainty increases during national election periods. For instance, Bialkowskiet. al. (2008) has shown that

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market indexes are more variable during election periods, and Boutchkova et. al. (2012) has reported that sectors which are more sensitive politically have less estimated cash flows again during election periods. Mei & Guo (2004) have discovered that stock markets were more variable at the time of election during the 1998 Asia financial crisis period.

A number of recent studies (Baker et. al., 2013; Gulen & Ion, 2013; Julio & Yook, 2012, and Durnev, 2012) have attributed the decrease in investment expenses of firms during the global financial crisis to the rising political uncertainty. Among these studies, Julio & Yook (2012) and Durnev (2012) used presidency election, general election and local election periods as political uncertainty criteria. Baker et. al. (2013) and Gulen & Ion (2013) used the political uncertainty index developed by Baker et. al. (2013). This study uses a dummy variable representing 29 March 2009 General Local Elections, 12 September 2010 New Constitution Referendum and 12 June 2011 General Elections periods as an indicator of political uncertainty in accordance with Julio & Yook (2012) and Durnev (2012). In general, the elections are important for the stability of the political system. Additionally, a high electoral participation is an important indicator of the confidence of citizens in the democratic institutions (Yılmaz, 2013). A literature review did not return a study on firm-based effects of political uncertainty in Turkey on investment decisions of firms. The current study aims to fill a gap in the literature regarding how political uncertainty within the context of national elections affects investment decisions in terms of firms.

2. Literature Review

Uncertainty increases the value of waiting for investment according to the "bad news principle" of Bernanke (1983). An increase in uncertainty will cause a decrease in current investments if a bad outcome is likely. During national election periods, firms will postpone their investments in case a negative change occurs regarding macroeconomic, tax or monetary policies of the relevant country. However, sometimes election results can be viewed as good news regardless of the winner of the election. As an example, if the ruling government has fallen or insufficient, firms do not reduce their investments, thinking that election results would be better than the current situation. In this case, bad news principle is not important. Let's assume a firm is making a choice among projects for which positive results are expected and elections will somehow increase expected returns regardless of the election results. The firm may still postpone its investments since election results may change profitability rank of projects. Even positive changes may cause firms to postpone their investment decisions (Julio & Yook, 2012).

Studies on the theoretical aspect have discovered an uncertain relationship between uncertainty and investment whereas many empirical studies have found a negative relationship between them (e.g. Leahy & Whited, 1996; Guiso & Parigi, 1999). Bloom et. al. (2007) have shown that uncertainty reduces eagerness for investment in presence of investment opportunities. Besides, Bloom et. al. (2007) have shown that the effect of uncertainty on extent of investment is sensitive to different modeling hypotheses [such as Hartman (1972) and Abel (1983)] and the effect of uncertainty on eagerness for investment in presence of investment opportunities is strong against various hypotheses such as adjustment costs, convex marginal product of capital, and time-varying uncertainty (Bloom et. al. 2007).

Badertscheret. al. (2013) have studied on whether irreversible variation among sectors affects the relationship between presence of public-owned corporation and investment sensitivity of private companies. Corporate investment decisions are characterized by partially depending on its degree of irreversibility in that at least,

investment expenses have been partially lost and therefore, if realized, they cannot be recovered without any cost (Pindyck, 1991). When investment decisions become irreversible, uncertainty makes firms more cautious and direct them to a wait-and-see strategy thus decreasing investment sensitivity to investment opportunities (Bloom et. al. 2007; Julio & Yook, 2012).

As a type of uncertainty, political uncertaintyhas an important effect on corporate investment behavior. Political uncertainty may increase expected costs and decrease long-term investments and outputs (Jeong, 2002). Political uncertainty which can be expressed as political risk include thatthe possibility of expropriation or fund losses arising from political interference (Emir & Kurtaran, 2005). Particularly in developing countries, typical investors react to policy changes and refrain from increasing their investments unless the uncertainty of which rationality stems from a policy reform is eliminated (Rodrik, 1991). Theoretical model and empirical findings of Pastor & Veronesi (2013) have shown that political uncertainty reduces value of protections provided by governments for markets and this causes more fluctuations in share prices. Julio & Yook (2012) have discovered that corporate investments were reduced by 4.8 % during election years compared to periods with no presidency elections. Durnev (2012) has reported that share prices liven up more during election years and this causes corporate investment to be insensitive to share prices. Furthermore, election uncertainty leads to inefficient capital allocation and jeopardizes corporate performance. Using Economic Policy Uncertainty Index of Baker et. al. (2013), Gulen & Ion (2013) have discovered that a high level of economic political uncertainty reduces corporate investments.

Many studies show that policy uncertainty increases during national elections. For instance, Bialkowskiet. al. (2008) has shown that market indexes are more variable during election periods, and Boutchkovaet. al. (2012) has reported that sectors which are politically sensitive have less estimated cash flows again during election periods. Mei & Guo (2004) have discovered that stock markets were more variable at the time of election during the 1998 Asia financial crisis period.

3. Methodology and Data

This study has benefited from panel data analysis to determine the presence of and if any, the direction and extent of a statistical significant relationship between political uncertainty and investment decisions of firms. Panel data combine time series and horizontal cross-sectional data, and consist of data sets regarding the same units with different time intervals (Baltagi, 2005; Hasio, 2002). The method of estimating economic relations using cross-sectional series with time dimension is called the panel data analysis. Therefore, panel data analysis allows investigation of the relationship between variables of many firms or firm groups for a given period.

This study investigates the effect of political uncertainty on investment decisions of BIST listed firms displaying activity in the industrial sector. In estimation of the effects in question, quarterly panel data series of Turkey for the 2008:1-2013:1 period were used. This study uses asset growth rate, fixed asset growth rate, tangible fixed asset growth rate, and inventory growth rate representing the investment of each firm as dependent variables. Election data used as a representative of political uncertainty were provided from High Council for Elections, data regarding firm-specific variables were provided from Public Disclosure Platform, and macroeconomic data were provided from Central Bank of Turkey.

The static model that was built based on models used by Wang et. al. (2014), Munoz (2013), Badertscheret. al. (2013), Gulen & Ion (2013), and Julio &Yook (2012)] in their studies is as follows:

$$INVEST_{it}=\alpha_t+\beta 1 POLITICALUNCERTAINTY_{it}+\beta 2 FIRM_{it}+\beta 3 MACRO_{it}+u_{it}+\varepsilon_i \quad i = 1, \ldots, N;\ t = 1, \ldots, T \qquad (1)$$

In models, i and t denotes country and time periods respectively and εi denotes the error term. $INVEST_{it}$ is a dependent variable and this study uses asset growth rate, fixed asset growth rate, tangible fixed asset growth rate, and inventory growth rate representing the investment of each firm as dependent variables. *POLITICAL UNCERTAINTY*$_{it}$ represents *ELECTION*, *ELECTION 2009*, *ELECTION 2010*, *and ELECTION 2011* variables respectively. $FIRM_{it}$ variable represents Tobin Q value, asset profitability rate (ROA), following Baltacı (2014), Erkoçak & Çam (2015) indicators for probability in a firm, ROA. We use also net profit variance over five years; firm sales size, leverage rate, and cash flow variables which are included in the models as firm-specific variables, whereas $MACRO_{it}$ represents economic growth and real interest rate variables which are used in the models as macroeconomic variables.

This study uses asset growth rate, fixed asset growth rate, tangible fixed asset growth rate, and inventory growth rate representing the investment of each firm as dependent variables. Independent variables used in the study are political uncertainty variables, firm-specific variables and macroeconomic variables. Table 1 shows definitions regarding dependent and independent variables used in this study.

Table 1.*Variables*

Dependent Variables	Definition	
Firm Investment Variables *(INVEST)*	ΔAK	$Assets_t$ – $Assets_{t-1}$ / $Assets_{t-1}$
	ΔDV	Fixed $Assets_t$ – Fixed $Assets_{t-1}$ / Fixed $Assets_{t-1}$
	ΔMDV	Tangible Fixed $Assets_t$ – Tangible Fixed $Assets_{t-1}$ / Tangible Fixed $Assets_{t-1}$
	ΔS	$Inventories_t$ – $Inventories_{t-1}$ / $Inventories_{t-1}$
Independent Variables	**Definition**	
Political Uncertainty Variables (*POLITICAL UNCERTAINTY)*	ELECTION	The dummy variable representing 29 March 2009 General Local Elections, 12 September 2010 New Constitution Referendum and 12 June 2011 General Elections. 1 was coded for election periods and 0 otherwise.
Firm Specific Variables *(FIRM)*	TOBINQ	[Total Liabilities + (Number of Shares * share price) / Total Assets]
	ROA	Net profit / Total assets
	VNKM	Net sales variance based on periods consisting of five quarters
	SIZE	Natural logarithm of net sales representing firm sizes
	LEVERAGE	Market based leverage rate: [Total Liabilities / Total Liabilities + (Number of Shares * share price)]
	CASH HOLDING	Current Assets / Short-term Liabilities
	SALES GROWTH	Net Sales – $Net\ Sales_{t-1}$ / $Net\ Sales_{t-1}$
	CASH FLOW	[(Profit before interest and tax + Depreciation – Financing expense – Tax) / Total Assets]
Macro Economic Variables*(MACRO)*	ECONOMIC GROWTH	Economic growth rate
	REAL INTEREST RATE	Weighted average of interest rates applied for commercial credits given by banks - inflation rate

4. Results and Discussion

Empirical results of the study can be handled in two parts as general statistics regarding variables and panel regression analysis results.

4.1. General Statistics Regarding Variables

Before reviewing panel data estimation results of the model, some descriptive statistics of dependent and independent variables used in panel data analysis are provided in Table 2.

Table 2. *Descriptive Statistics*

Variables	Obs.	Mean	St. Dev.	Min.	Max.
ΔAK	3087	0.485	15.527	-1.00	48.87
ΔMDV	3087	0.523	15.214	-2.32	18.11
ΔDV	3087	0.389	28.553	-1.00	28.83
ΔS	3087	0.293	38.59	-1.01	9.99
TOBINQ	3087	5.204	35.412	0.098	45.11
ROA	3087	0.008	0.216	-8.447	1.855
VNKM	3087	5.528	98.775	0	2430.72
SIZE	3087	7.955	0.887	4.792	10.672
LEVERAGE	3087	0.653	0.258	0.001	1,000
CASH HOLDING	3087	3.620	87.308	0.005	4851.58
SALES GROWTH	3087	0.434	15.127	-0.691	8.13
CASH FLOW	3087	3.268	21.865	-15.424	321.719
ECONOMIC GROWTH	3087	0.011	0.090	-0.141	0.170
REAL INTEREST RATE	3087	0.107	0.045	0.002	0.187

As it can be seen in Table 2, firms within the sample have made investments with a rate of 48.5 % in terms of total assets, 52.3 % in terms of tangible fixed assets, 38.9 % in terms of fixed assets, and 29.3 % in terms of inventories on average. Mean TOBINQ of assets of these firms which is known as book value of assets of market value is 5.2. Besides, average return on assets of these firms is 0.8 % on average, leverage rate is 65.3 % on average and net sales growth is 43.4 % on average.

4.2. Panel Data Analysis Results

Static panel data results are given below. The decision on whether random effects approach or fixed effects approach will be used in the analysis has been given based on results of Hausman (1979; 1981) test.

Table 3. *Results of Investment Model with Alternative Dependent Variables*

Dependent/Independent variables	Model 1a Δ AK	Model 1b Δ DV	Model 1c Δ MDV	Model 1d Δ S
ELECTION	-0.2278*	-0.2271*	-0.2265*	-0.2317*
	(0.1359)	(0.1359)	(0.1361)	(0.1359)
TOBINQ	0.0093***	0.0098***	0.0085***	0.0098***
	(0.0029)	(0.0031)	(0.0032)	(0.0026)
ROA	0.0361*	0.0360	0.0338*	0.01692*
	(0.0415)	(0.0418)	(0.0418)	(0.0340)
VNKM	-0.0001*	-0.0012	-0.0021	-0.0023
	(0.8153)	(0.8416)	(0.0441)	(0.0315)
SIZE	-0.2357***	-0.2378***	-0.2384***	0.2301***
	(0.1052)	(0.1051)	(0.1049)	(0.1064)
LEVERAGE	-0.8415***	-0.8478***	-0.8357***	0.8561***
	(0.3949)	(0.3952)	(0.3954)	(0.3964)
CASHHOLDING	-0.0003	-0.0003	-0.0004	-0.0003
	(0.0006)	(0.0006)	(0.0005)	(0.006)
SALESGROWTH	0.0016	0.0016**	0.0018*	0.0017
	(0, 0017)	(0, 0124)	(0, 0016)	(0, 0016)
CASH FLOW	0.0095***	0.0084***	0.0095***	0.0095***
	(0.0039)	(0.0038)	(0.039)	(0.039)
ECONOMIC GROWTH	0.4972	0.5005	0.4977	0.4986
	(0.6167)	(0.6168)	(0.6165)	(0.6168)
REAL INTEREST RATE		-4.3059**	-4.8213*	-6.3829*
		(2.1844)	(2.1484)	(2.2696)
FIXED	2.8735***	2.8864***	2.8893***	2.8383***

	(0.8279)	(0.8269)	(0.8258)	(0.8336)
R2	0.041	0.048	0.045	0.045
Wald Chi2 Test	35.12	35.21	35.33	34.60
Wald Chi2 Test probability	0.0002	0.0002	0.0002	0.0003
Hausman Test	56.63	56.41	56.40	55.94
Hausman probability	0.0000	0.0000	0.0000	0.0000
Baltagi-Wu LBI	2.024	2.024	2.025	2.025
Number of Observations	3087	3087	3087	3087
Number of Groups	147	147	147	147

Notes:*, **, *** show statistical significance at a level of 10 %, 5 %, and 1 %respectively. Values in brackets show standard errors.

Hypotheses in Hausman test are in the following form:
H_0: $E(\varepsilon_{it} \ |X_{it}) = 0$ effects of cross-sectional data and time series are random
H_1: $E(\varepsilon_{it} \ |X_{it}) = 0$ effects of cross-sectional data and time series are fixed

The following tables show results of the Hausman test which was conducted to investigate whether the difference between fixed effects model estimators and random effects model parameter estimators is statistically significant or not. A probability of less than 5% that was obtained as a result of Hausman test statistics indicates that random effects model would not be suitable and instead fixed effects model should be preferred. As a result of Hausman test statistics, fixed effects model was preferred for all models. Besides, since an autocorrelation problem was encountered for all models, AR(1) process was executed and autocorrelation was eliminated from the models.

Table 3 shows outcomes of the investment model with alternative dependent variable. Analysis results show that for all four models (Model 1a, Model 1b, Model 1c and Model 1d), political uncertainties affect firm investments negatively and statistically significantly at a level of 10 %. Based on this result, it is possible to say that firms behave more cautiously in making use of investment opportunities during election periods, and they postpone or modulate their investment decisions until uncertainty with regard to elections is eliminated. This validates the political uncertainty hypothesis and it is also consistent with the "bad news principle" of Bernanke (1983) in that uncertainty increases the value of waiting for investment. An increase in uncertainty will cause a decrease in current investments if a bad outcome is likely. As suggested by Bloom et. al. (2007) and Julio &Yook (2012), when investment decisions become irreversible, uncertainty makes firms more cautious and direct them to the "wait-and-see" strategy thus validates the argument that this reduces investment sensitivity to investment opportunities. Such negative effect has been observed in all alternative investment models. In other words, it is possible to say that during election periods, firms reduce their total assets, tangible fixed assets, fixed assets and inventory investments which is also consistent with findings of Julio &Yook (2012), and Durnev (2012). A similar result was observed by Gulen & Ion (2013) who used the political uncertainty index instead of elections.

All model outcomes show that *TOBINQ* and *CASH FLOW* variables affect firm investments positively and statistically significantly. These results mean that firms with investment and growth opportunities make more investments. This is supported by studies of Wang et. al. (2014), Badertscheret. al. (2013), Gulen & Ion (2013), Julio & Yook (2012), and Durnev (2012) who obtained similar results.

In most of the models, the firm's net profit margin variance (*VNKM*) variable which was included in the models as a measure of firm uncertainty is shown to affect firm investments negatively and statistically significantly. These results

indicate that the high level of profit uncertainty or in other words uncertain future of firm profits or the involved risk reduces firm investments. This shows that firms postpone their investment decisions under uncertainty. In other words, this finding indicates that firms lacking profit with a steady trend reduce their investments. Likewise, Leahy & Whited (1996), Guiso & Parigi (1999), and Gulen & Ion (2013) have discovered a negative relationship between firm level uncertainty and investments.

All model outcomes show that rate of return on assets (ROA) which is used in this study as a measure of firm profitability affects firm investments positively and statistically significantly. This means that firms with a high level of profitability tend to make more investments. Based on this result, it is possible to say that firms use an important portion of their profits in financing their investments, which is also validated by similar results found by Badertscheret. al. (2013), and Gulen & Ion (2013).

Analysis results indicate that the *SALES GROWTH* variable which is used in most of the models in the study representing sales stability and demand level expected in the future affects firm investments positively and statistically significantly. Based on these results, it is possible to say that firms increase their investments when they have steady sales or an expected future demand is present; in other words, they increase their investments relying on cash flows they will obtain from their sales. Wang et. al. (2014), Badertscheret. al. (2013), Julio & Yook (2012), and Durnev (2012) have obtained a similar result.

All model outcomes show that the *SIZE* variable affects firm investments negatively and statistically significantly. These results can be interpreted as follows: Big firms make less investment since they have reached their optimal sizes, whereas small ones make more investments so as to take advantage of their optimal scale sizes. That is to say, firms which have reached an optimal size have the opportunity to make production with a lower unit cost taking advantage of their scale size at optimal production amount. Firms which desire to make use of this opportunity can be expected to make more investment. We consider the fact that firms without economies of scale make more investment as a rational behavior. A similar relationship was found by Badertscheret. al. (2013), Gulen & Ion (2013), Julio & Yook (2012), and Durnev (2012).

All model outcomes show that the *LEVERAGE* variable representing the capital structure of a firm affects firm investments negatively and statistically significantly. This result indicates that firms with a high leverage and therefore a high level of financial risk behave more cautiously in making use of investment opportunities. When firms which have reached an optimal capital structure level make investments through getting into debts, resource cost increases and earnings per share reduce. This negative situation means that such firm could not make use of the positive effect of leverage and therefore it suffers from adverse effect of leverage. Based on this point, for firms with a high level of getting into debt or in other words, for firms which finance their existing investments through more loan capital instead of their equity capital, intensive usage of loan capital in their new investments may decrease investment efficiency. This expectation applies for firms within scope of the sample in this study. Wang et. al. (2014), Badertscheret. al. (2013), and Durnev (2012) have obtained a similar result.

A statistically significant relationship between the *CASH HOLDING* variable which was used in the study as a measure of cash policies of firms, and firm investments could not be determined in any model. This shows that the expectation regarding firms holding more cash resources will make less investment is not satisfied.

This result also shows outcomes of investment model with macroeconomic control variable. According to analysis results, a statistically significant relationship between the *ECONOMIC GROWTH* variable and firm investments could not be determined. However, a negative and statistically significant relationship was found between the *REAL INTEREST RATE* variable and firm investments. Based on this, it is possible to say that since a decrease in borrowing rate of interest reduces resource cost, firms consider the decrease in real interest rates as positive in terms of making use of investment opportunities, and they increase investments. Since an increase in real interest rates also increases investment costs, it is possible that firms tend to postpone investments since firm decision makers have a concern about not achieving the rate of return they expect.

5. Conclusion

Although there are many studies on relationship of political factors with real economy, asset prices, capital markets and financial risks, only a few numbers of studies have investigated the effect of political uncertainty on investment decisions of firms. The contribution of this study can be summarized as follows: A literature review did not return a study on effects of political uncertainty in Turkey on investment decisions of firms in terms of firms. The current study aims to fill a gap in the literature regarding how political uncertainty within the context of national elections affects investment decisions in terms of firms.

This study aims to investigate the effect of political uncertainty on investment decisions of firms. For this purpose, this study involves 147 BIST listed firms displaying activity in the industry sector between 2008 and 2013. The relation between these variables have been analyzed using panel data analysis with relevant quarterly data which take time dimension of the series into account along with their cross-section dimension. This study has benefited from panel data analysis to determine the presence of and if any, the direction and extent of a statistical significant relationship between political uncertainty and investment decisions of firms. This study uses asset growth rate, fixed asset growth rate, tangible fixed asset growth rate, and inventory growth rate representing the investment of each firm as dependent variables. Independent variables used in the study are political uncertainty variables, firm-specific variables and macroeconomic variables.

Analysis results indicate that political uncertainties affect firm investments negatively and statistically significantly. Analysis results have revealed a significant relationship between investments of firms and the variable representing 29 March 2009 General Local Elections, 12 June 2011 General Elections and 12 September 2010 New Constitution Referendum as an indicator of political uncertainty. Based on this result, it is possible to say that firms behave more cautiously in making use of investment opportunities during election periods and they postpone or modulate their investment decisions until uncertainty with regard to elections is eliminated. This validates the political uncertainty hypothesis. This result is also consistent with the "bad news principle" of Bernanke (1983) in that uncertainty increases the value of waiting for investment. An increase in uncertainty will cause a decrease in current investments if a bad outcome is likely. As suggested by Bloom et. al. (2007) and Julio & Yook (2012), when investment decisions become irreversible, uncertainty makes firms more cautious and direct them to the "wait-and-see" strategy thus validates the argument that this reduces investment sensitivity to investment opportunities. Such negative effect has been observed in all alternative investment models. In other words, it is possible to say that during election periods, firms reduce their total assets, tangible fixed assets, fixed assets and inventory investments which is also consistent with findings of

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