

# A Dynamic Panel Data Analysis on the Corporate Social Responsibility (CSR) Activities Mitigating the Negative Impact of Customer Complaining Behavior on a Firm's Performance

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This study attempts to reveal the negative effects of customer complaints on a firm's financial performance and, by using empirical analysis, to find out whether a firm's Corporate Social Responsibility (CSR) activities can reduce the negative impacts of those complaints. For this purpose, we collected panel data on 49 companies in the financial industries. Records of consumers' complaints to financial firms were used as a measure for customer complaints, and the amount of donations in the firm's individual profit and loss statement was used as a measure for the firm's CSR activities. For the firm's performance, we used the Return on Assets (ROA). Using these panel data, we conducted a dynamic panel model analysis to reflect the unique characteristics of the firm in the model. We found that customer complaints do act negatively on a firm's performance, but we also confirmed that a firm with bigger invests in CSR activities, the less adversely customer complaints affect the firm's performance.

Key Words: Customer complaining behavior, CSR, Firm performance, Dynamic panel analysis

## 1. Introduction

The importance of customers' satisfaction and dissatisfaction has always been highlighted by marketing academics. Research on customers complaining behavior can be divided into three areas. First is the definition and measurement of customer satisfaction and

dissatisfaction. The second is about antecedents, consequences, and moderating variables of customer satisfaction and dissatisfaction. The third is about the impacts of customer satisfaction on corporate performance (Lee, 2000). Much academic research has been focused on this third area by both domestic and foreign scholars (e.g., Park and Kim, 2003; Anderson, Fornell, and Mazvancherly, 2004; Gruca and

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Rego, 2005). Comparing with the research on the relationship between satisfaction and firm's performance research on the relationship between customer dissatisfaction or complaining behavior and firm's performance is relatively sparse with exception of Luo's studies (Luo 2007, 009).

Extant literature shows a significant relationship between customer's word of mouth and firm's performance. Studies show that negative information had a greater influence on the customer's purchase decisions than did positive information (Mahajan, Muller, and Kerin, 1984). That is, what dissatisfied customers say about the product or service have much more influence on potential customers than do the opinions of satisfied customers. Also, dissatisfied customers who disparage or complain about products or services can affect the seller of the product or service as well. To fill the vacancy caused by customer defection, firms try harder to attract new customers, which costs much more than keeping old ones does (Goodman, 1999). As a result, customers' negative opinions and the defection caused by customer dissatisfaction can harm a firm's performance by reducing potential customers and increasing expenses.

To maintain the performance of a firm, it might be most important to keep its customer satisfied. However, since dissatisfied customers can still exist, firms are trying to reduce the negative image caused by customer complaints. CSR activities can be one example. According to previous research, CSR activities allow

firms to create a positive reputation and brand image. If a firm is in state of crisis caused by negative information about the firm, CSR activities can protect it from the influence of negative information (Yoon and Cho, 2005). In other words, CSR activities can offset the adverse effects of customer complaints on the firm's performance. Therefore, we will empirically examine the negative effects of customer complaints on a firm's performance and demonstrate the moderating effect of CSR activities in offsetting those negative influences.

We will use Arellano-Bond estimation, which is a generalized method of moments estimation, for the dynamic panel data of customers' complaining behavior. The estimation also incorporates unobserved company effects for the panel data of customers' complaints.

## II. Theoretical Background

### 2.1 Customer Complaining Behavior

#### 2.1.1 Antecedents of Customer Complaining Behavior

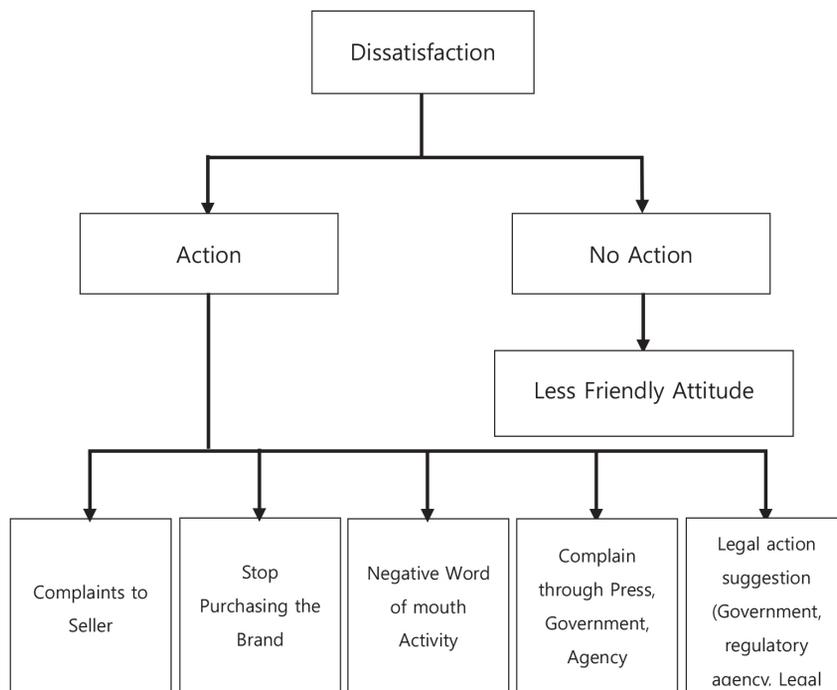
Customers usually undertake post-purchase evaluation of their purchases and then decide whether they are satisfied or dissatisfied. When satisfied, they will continue to purchase the product or service and state good opinions about it. On the other hand, if they are dissatisfied, they will switch to another brand

or express negative opinions to release their dissatisfaction (Lee, Ahn, and Ha, 2010). Also, those who are dissatisfied will offer negative opinions or engaged in various types of complaining behavior (Yi, 2000). Hirschman (1970) argued that dissatisfied customers choose their complaints from three options: 'Exit', 'Voice' or 'Loyalty', 'Exit' refers to dissatisfied customers who end their relationship with the firm or reduce the amount they purchase. 'Voice' refers to giving negative feedback to the firm, wanting to change the unsatisfactory product or service, and informing third parties about their dissatisfaction. 'Loyalty' refers to customer's keeping the relationship with the firm

but giving no other feedback, hoping that the firm will serve better product or service in the future.

### 2.1.2 Definition and type of Customer Complaining Behavior

The definitions of "customer complaints" differ in the studies, but normally it can be defined as "action taken by an individual which involves communicating something negative about a product or service, either to the firm manufacturing or marketing that product or service or to some third-party organization" (Jacoby and Jaccard, 1981, p. 6).



Source: Hawkins, Del, David L Mothersbaugh and Roger J. Best (2007), Consumer Behavior: Building Marketing Strategy, McGraw-Hill Irwin, 10/e, p.652

<Figure 1> Types of Customer Complaining Behavior

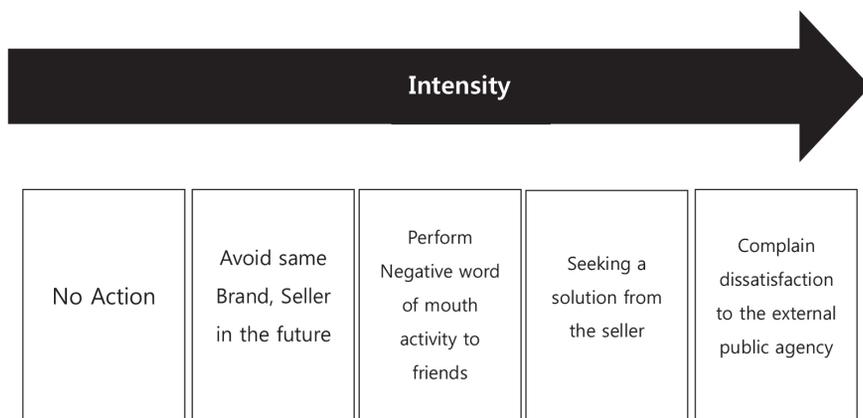
When customers feel dissatisfied with their product or service, they will first decide whether they will complain or not. Even if they do not do anything that does not mean their dissatisfaction has gone away. They will instead be unfriendly toward the firm itself or the product or service. If the customer decides to complain, he or she can complain to the firm or the seller of the product or service and stop buying from that shop or brand. Customers can also express negative opinions to their friends and, even more, to the press or, if the damage from a dissatisfying experience is serious, they can report and appeal to a government regulatory agency.

Day and Landon (1977) argue that the intensity of customer complaints varies by the type of action. Performing no action or avoiding the same product or service in the future implies the lowest intensity. Expressing negative word of mouth to their friends is next,

and the highest intensity is found when dissatisfied customers complain to an external public agency, not the seller.

### 2.1.3 Customer Complaining Behavior and Firm's Performance

Customer equity theory (Blattberg and Deighton, 1996) can be used to explain the relationship between customers' complaining behavior and a firm's performance. They consider customers, not the product or services, to be the main source of a firm's benefit and a financial asset that requires proper measurement and management. This theory suggests that a firm's customers, especially the satisfied ones, are valuable intangible assets. Without them, firms will not get any bigger customer equity, which can be defined as a comprehensive concept that includes customers' positive opinions and their relation-



Source: Palph L. Day and Laird Landon, Jr.(1977), "Toward a Theory of Consumer Complaining Behavior", In Consumer and Industrial Behavior, Arcide, Jagdish N. Sheth, and Peter D. Bennett, eds., New York: Elsevier North-Holland, p.432

<Figure 2> Intensity by type of Customer Complaint.

ship with firms, not only the financial benefit from them (Dorsh, Carlson, Raymond, and Ranson, 2001). Therefore, if there are more negative opinions about the firm from the customers, a firm's asset will be reduced, which decreases future cash flow (Blattberg and Deighton, 1996; Gupta, Lehmann, and Stuart, 2004; Rust, Lemon, and Zeithaml, 2004). Also, many of those customers who have been dissatisfied will move to a firm's competitors at their next purchase. When firms fill in the gap created by defecting customer by attracting more new customers, this will require much more costs than keeping old customers would (Goodman, 1999). Empirical studies on the effects of customer complaints on corporate performance show that they negatively affect corporate image, repurchase intent, and a firm's idiosyncratic stock returns (Luo 2007, 2009).

In general, the negative opinion, a type of customer complaint, will reduce not only the repurchase intent of the dissatisfied customer, but also the purchase intent of potential customers. Dissatisfied and defected customers cause a tremendous additional cost for attracting new customers. Also, customer complaints that taint corporate and brand image will adversely affect customer loyalty.

## 2.2 Firm's CSR Activities

### 2.2.1 Definition of CSR Activities

In recent years, corporate social responsi-

bility activities have received significant attention from marketing academics and practitioners. Customers' awareness of and reaction to a firm's CSR activities are increasing and affect customers' purchase decisions (Luo and Bhattacharya, 2006). Reflecting this phenomenon, the amount that firms spend on social responsibility activities is increasing every year. According to the national survey released in 2012, the total expenditure on social responsibility activities by firms was 3 trillion, 1241 billion won, which is approximately an 8.7% increase over the 2 trillion, 8735 billion in 2010 and a 17.8 % increase over the 2 trillion, 6517 billion in 2009 (Jung, 2012).

The concept of a firm's corporate social responsibility was first introduced in 1930, but not as the sort of concept or discussion that we now have until 1950. Bowen's work (1953) is considered the pioneering book that discusses the issue of CSR (Carroll, 1999). Bowen set forth an initial definition of the social responsibilities of businessmen as "It refers to the obligations of businessmen to pursue those policies, to make those decisions, or to follow those lines of action which are desirable in terms of the objectives and values of our society." Also, Carroll (1979) categorized CSR into four areas: economic responsibility, legal responsibility, ethical responsibility, and philanthropic responsibility; and argues that firms should try to carry out these four responsibilities in order to become a "good citizen" firm.

### 2.2.2 Firm's CSR Activities and Performance

The relationship between a firm's CSR activities and its performance seems to be inconsistent in the literature. Research about the negative effects of CSR activities argues that, because of excessive spending on CSR activities, a firm's financial performance can be reduced, which can cause organizational conflicts when it interferes with a firm's ability to pursue 'profit maximization' (Friedman 1970). In contrast, a resource-based view (Barney, 1991) and institutional theory (DiMaggio and Powell, 1983) support the theoretical basis of the claim that a firm's CSR activities will affect its performance positively.

The resource-based view emphasizes internal resources and competence as factors explaining the competitive advantage and performance of the firm (Barney, 1991). According to the theory, if a firm's internal resources are valuable, rare, and hard to imitate, a firm can have a continuous competitive advantage and high performance. This firm's internal resources would be both tangible, such as financial resource, real estate resource, and equipment resources, and intangible, such as management know-how, human resources, and the positive reputation of the brands and the firm. The firm's positive reputation formed by CSR activities is a valuable intangible resource that other competitors cannot imitate or replace, and a firm can achieve better management performance than its competitors through the CSR activities (Branco and Rodrigues, 2006).

In addition, according to the institutionalization theory, when a firm tries to secure such organizational legitimacy, it will receive less social regulation and get permission for business activities more easily (Chui and Sharfman, 2011). There are two types of organizational legitimacy: pragmatic and social. The latter is important for firms to survive and develop in the long term (Suchman, 1995). From this point of view, a firm's CSR activities can be regarded as an effort to secure corporate social justice (Chui and Sharfman, 2011), and therefore firms can be sure of continuous development and survival when they perform CSR activities.

Following the mixed theoretical perspectives empirical analyses also show mixed results on the relationship between CSR and firm's performance. Among recent studies, some studies reported positive impact of CSR on the firms performance (e.g. Oh, Cin, and Lee, 2016, Cavaco and Crifo, 2014; Byun, Kim and Nam 2013; Kim, Choi, 2011; Jang and Choi 2013) but some reported negative results (e.g., Wright and Ferris 1997; Barnea and Rubin 2010). While studies mentioned above investigated the main effect of the CSR on the firm's performance, our study focuses on the moderating role of the CSR on the relationship between customers' complaining behaviors and firm's performance.

### 2.2.3 Firm's CSR Activities and Customer Complaining Behavior

What type of efforts will firms make to reduce the negative effects of customer complaining behavior on their performance? Firms normally use a customer service center to hear and solve customers' dissatisfactions. However, because 96% of dissatisfied customers do not actually complain, one complaint received at a customer service center represents 25 dissatisfied customers (Band, 1991). Recent study also showed that only 9.5% of dissatisfied customer showed active complaining behavior (Gal and Doron, 2007). Therefore, a firm's actions to solve the complaint delivered to the service center solve only part of the customers' dissatisfaction and cannot reduce the negative effect of their complaints on the firm performance. Thus, firms try to prevent the negative effect of customer complaining behavior on its performance in various ways. One way is by forming a positive reputation and brand image by CSR activities.

The impression formation theory (Asch, 1946) can explain that a firm's CSR activities can offset negative effects of customer complaints on its performance. This theory also argues that if a person has already made an impression on an opponent, the opponent will perceive the person only in terms of information that is consistent with the existing impression, even if he or she hears contradictory information. Therefore, if firms put a positive image in the minds of customers through CSR activities in

advance, that can reduce the negative impact of customer complaints on their performance in the future.

Research has shown that a firm's CSR activities play a positive role in shaping the brand and firm's image and effectively respond to negative publicity (Yoon and Cho, 2005). In addition, the firm's CSR activities affect consumers' attitudes toward the firm and its brands more than corporate advertising does, which is the traditional method of promotion (Yoon and Suh, 2003). Thus, when negative word of mouth generated by customer complaints is communicated to potential customers, if the firm has established a positive reputation by its CSR activity in advance, that may lessen the adverse effects of negative information on its performance.

## III. Setting hypotheses

We will examine whether customer complaints have a negative effect on a firm's performance or not. If customer complaints increase, 'customer loyalty', one of the firm's intangible assets, decreases, which eventually decreases future cash flow (Gupta, Lehmann, and Stuart, 2004; Riley, Pearson, and Trompeter, 2003; Singh, 1988). Customer equity theory explains how a reduction in customer loyalty negatively affects a firm's performance. The theory suggests that customers, especially satisfied customers, are valuable intangible

assets for the firm. Without a satisfied customer base, firms cannot have a larger customer equity. According to this, more negative voices from customers indicate that customer dissatisfaction is increasing, and the more that loyal customers shrink, the more that will reduce the future cash flow (Gupta, Lehmann, and Stuart, 2004; Riley, Pearson, and Trompeter, 2003; Singh, 1988).

The TARP (Technical Assistance Research Programs, Inc.) research by Goodman (1999) showed that dissatisfied customer deliver negative words of mouth to an average of 8 to 16 potential customers. Since such negative information affects purchase decisions twice as much as positive opinions do, negative opinions have more power than positive opinions. In addition, 50 to 90 percent of dissatisfied customers switch to competitors, and the expense to keep those customers will cost twice to ten times more than attracting new customers. Also, Luo (2007, 2009) investigated the effects of customer complaints on the market value of firms by using customer-complaint records of airlines and stock prices of the firm. Luo suggested that customer complaints can cause negative effects on idiosyncratic stock returns and reduce the market value of the firm.

*Hypothesis 1: Customer complaints will have a negative impact on a firm's performance.*

We will investigate whether a firm's CSR activities moderate the negative effects of customer complaining behavior on its performance.

If such a negative impact can be offset by effort and investment in CSR activities, the latter, like managing customers' complaints, can be another way to moderate the deterioration of a firm's profitability.

The rationale for the moderating effect of CSR firms can be found in the 'impression formation theory' (Asch, 1946). This theory suggests that people can create a wide range of impressions with only a little information. Even if there is contradictory information, people tend to consistently perceive the opponent only in terms of the earlier information. Therefore, if firms plant positive images of itself and to its brands in customers' minds, even if the customers hear other opinions about the firm in the future, they will still tend to evaluate the firm positively instead of listening to the contradictory information. So if firms give positive impressions about themselves to customers through CSR activities, they will be able to prevent customers from creating negative impressions.

Based on the impression formation theory, Till and Nowak (2000) suggested that CSR activity can create positive impressions about the firm and its brands, and so can promote purchases by customers and be a way to handle negative publicity efficiently. Yoon and Suh (2003) conducted research comparing the effects of corporate advertisement, the traditional method of promoting a corporation, and the effects of CSR activity on the attitudes of customers toward the firm and brand. They found that CSR activities are more effective

in forming positive attitudes toward the firm and brand than corporate advertisement does. Also, Yoon and Cho (2005) showed that customers' positive attitudes toward a firm can offset negative impacts from negative information. In conclusion, if a positive reputation has been set through a firm's CSR activity, it can reduce the impact of negative opinions.

*Hypothesis 2: A firm with more engagement in CSR activity will have less negative impact of customer complaining behavior on the firm's performance than do the firms with less engagement in the CSR activity.*

## IV. Research Method

### 4.1 Operational definition of variables

#### 4.1.1 Independent Variable

##### 4.1.1.1 Customer complaining behavior

If a customer who purchases a financial product has a dispute, such as over mistreatment or unfair losses, with the financial institute, the customer can appeal to the Korean financial supervisory service. We will measure customer complaining behavior using the dispute cases published by the dispute resolution committees of the Financial Supervisory Service in S. Korea. These data can be more objective than surveying past customers' complaining behavior since surveys can contain

distorted or misplaced information. However dispute cases are the data received and recorded from the financial firms in Korea by a systematic procedure. Customers appeal to the government agency when their dissatisfaction is intense (Day and London, 1977): so the number of disputes recorded by the financial supervisory service can capture a high intensity of dissatisfaction and complaining behavior.

However, such customer complaints might not affect a firm's performance in the given year. Rather, it might take some time to affect a firm's profitability, in that the negative information takes time to spread to other customers and eventually affect a firm's profitability. We measure the number of disputes in the previous year ( $t-1$ ) for the customer complaining behavior.

##### 4.1.1.2 Firm's CSR activity

In this study, CSR activities will be measured by the donation amount of the companies. Some of previous studies about the relation between CSR activity and firms' performance used KMAC's (Korea's Most Admired Companies) quotient to estimate a firm's CSR activities (e.g., Byun, Kim, and Nam, 2013). However, these measured values are very likely to contain the interviewee's subjective opinion and so lack objectivity. In order to secure objectivity, several studies measured the degree of a firm's CSR activity by using the corporate donation amount (e.g., Kim, Chung, and Choi, 2013; Seifert, Morris, and Bartkus, 2003; Navarro,

1988).

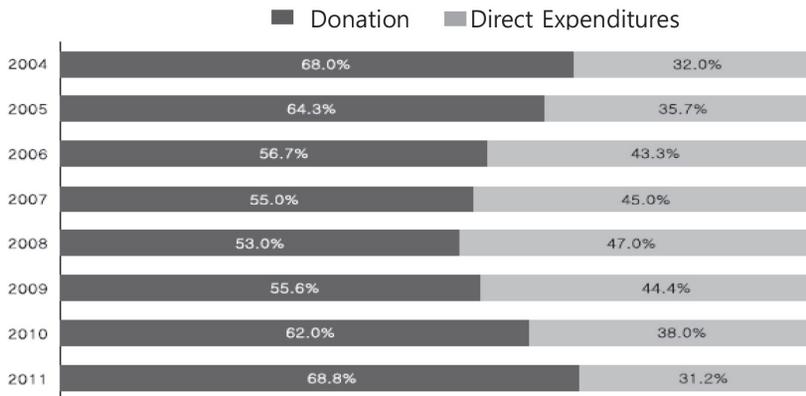
According to the domestic surveys carried out in 2012, 68.8% of all firms' CSR activities in 2011 was financial donations to charity foundations or independent NGOs(Non-Governmental Organizations), and 31.2% to directly operated social contribution programs, such as volunteer activities of employees (Jung, 2012). In addition, from 2004 to 2011, more than half of all contributions to the CSR activities took the form of donations. In other words, donations account for most of the total expenditures on CSR activities, and so justify using donations as the measure for the CSR activities.

Previous literature used the ratio of donations to sales instead of the total amount of donations. However, since the model used in this research already includes the sales amount of the firm as a control variable, the donation value of the enterprise will be included in the model as it is. In addition, it is more reason-

able to consider that CSR activity takes time to affect firms; so we used a previous year's donations as a measure for the CSR activities.

#### 4.1.2 Dependent Variable: Firm's Performance

Traditionally, a firm's financial performance is measured by accounting indicator or by market-based indicators. Those measures represent different perspectives on the firm's financial performance. Accounting based indicators, such as return on assets, return on equity or return on sales, capture the historical aspects of financial performance and are therefore backward-looking. The other types is the market based measure. One of the popular measures for this type is the Tobin's Q. Tobin's Q is a measure of return based on the stock market (market value of a company's stock compared to the value of a company's equity book value). The Tobin's Q represents the investors' evaluation of the ability of a



Source: White paper for the CSR activities of Major companies (2012), the Federation of Korean Industry

〈Figure 3〉 Donations and Direct Business Expenditures

firm to generate future economic earnings. Thus, it is forward-looking measure and can be considered as a proxy for growth opportunities (Cavaco and Crifo, 2014).

In this research a firm's performance is operationally defined using the firm's return on Assets (ROA). The ROA, the percentage of the firm's net income divided by the company's assets, shows how firms used all their assets efficiently to make a profit. Also, the ROA is one of the most popular indicator of the profitability of firms (e.g., Park, Park, Ko, and Chung, 2009; Tang, Hull, and Rothenberg, 2012).

A disadvantage of this index is its backward-looking nature which does not reflect the market value of the firm. Therefore, some studies use Tobin's  $q$  as a measure to reflect the market value of the firm (e.g., Chung and Pruitt, 1994). However, if the research sample contains both unlisted and traded companies, the market value of the stock cannot be obtained and Tobin's  $q$  cannot be calculated for the unlisted companies. Also, since financial firms have a higher debt ratio than other industries and most of the tangible assets are financial assets, Tobin's  $q$  is almost equivalent to the value of the firm's assets (Park *et al.*, 2009). Therefore, ROA is the best alternative for measuring a firm's performance, not only in the financial industry, but also for the unlisted companies included in the sample of this study.

#### 4.1.3 Control Variables

This study will control the firm size and sales amount in the previous year that affect the firm's performance. To incorporate the effects of unobserved variables into the model, we will include the previous year's performance as a control variable in the model. These variables are measured in following ways.

*Firm size* is defined by the number of employees in the previous year and was collected through the financial statistical portal of the Financial Supervisory Service.

*Firm revenue* are defined using the firm's operating revenue, and were collected through the KIS-VALUE service provided by KISA, collecting the amount of operating revenue in the firm's income statement.

*A firm's previous year performance* was defined as the ROA of the previous year.

Table 1 summarized the operational definition of the variable used in the study.

#### 4.2 Data collection

We collected data from the Financial Supervisory Service (FSS) and the Korean Credit Rating Information Center. In the initial data collection phase, there were 274 data points from 75 companies, but 25 data points from six firms that had abnormally low ROA or had merged during the year were excluded from the analysis. Since the Arellano-Bond estimation requires at least three data points the company with less than three observation were

〈Table 1〉 Operational definition of variables

	Variable Name	Operational definition of variables
Dependent variable	Firm's performance	Total Return on Assets (ROA) ROA = Net Income / {(Basic Asset + Ending Asset) / 2}
Independent variable	Customer complaint behavior	The number of applications filed by the Financial Supervisory Service
	Corporate CSR Activity	Amount of donation account in individual income statement of previous year
Control variable	Firm's revenue	The operating income of firm's individual income statement
	Previous year's firm size	Number of employees in the previous year
	Previous year performance	Return on assets (ROA) in the previous year

〈Table 2〉 The number of data by year and type in the financial industry

	Life	Loss	Bank	Stock	Total
2008	13	9	13	8	44
2009	13	11	13	8	45
2010	13	12	11	8	44
2011	14	11	13	6	45
2012	15	11	12	3	41
Total	68	54	62	33	217
Number of Firm	15	12	13	9	49

deleted. As a result, panel data of 217 data points for the 49 companies are used. Since not all the companies had the same length of donation period, year data included in the dataset would differ by companies. Thus our panel data are unbalanced and are treated accordingly in the estimation process.

### 4.3 Model

Panel data include both cross-sectional data and time-series data. In addition, an advantage of the panel data is that, when a regression

model is used to analyze panel data, it can include unobserved heterogeneity from the objects (e.g., customer or company) in the model. If the unobserved heterogeneity of the analysts is not incorporated in the model, the model might suffer from a misspecification error.

If the lagged variables of the dependent variable are used as explanatory variables in the model, this is called a dynamic panel model and expressed as Equation (1).

$$y_{it} = a + \beta y_{it-1} + \beta x_{it} + u_{it} + e_{it}$$

$$i = 1, 2, 3 \dots N \quad t = 1, 2, 3 \dots N \quad (1)$$

- $y_{it}$  = dependent variable
- $a$  = constant
- $\beta$  = regression coefficient
- $y_{it-1}$  = lagged dependent variable
- $x_{it}$  = independent variable
- $u_i$  = unique characteristics of each analytical entity (company) that are invariant over time
- $e_{it}$  = pure error term
- $i$  = object (company) index
- $t$  = time index (year)

In Equation (1),  $y_{it}$  and  $x_{it}$  refer to the dependent variable and independent variable, respectively, of company  $i$  in the period  $t$ . In the panel data analysis, we can split the random error into object-specific (in our data, company-specific), time invariant,  $u_i$ , and pure error  $e_{it}$ .  $u_i$  captures the company-specific heterogeneity in the panel data, which is composed of repeatedly measured data. If  $u_i$  is the same across different objects (companies), we can estimate the model using a pooled ordinary least-square method. However, if it is different, then there is a non-zero correlation between  $u_i$  and  $x_{it}$  ( $\text{cov}(u_i, x_{it}) \neq 0$ ), and OLS estimation results in inconsistent estimates.

In addition, we cannot use both the fixed-effect model and the random-effect model to incorporate the company-specific heterogeneity (Arellano and Bond, 1991), because when the dynamic panel model is analyzed by the fixed-effect model, the estimator can be biased. For estimating the fixed-effect model, even if

with the within transformation which subtracts the average of variable,  $e_{it-1}$  is included in error term, so  $e_{it-1}$  and the explanatory variable  $y_{it-1}$  are still correlated. Therefore, if the dynamic panel model is estimated as the fixed-effect model, the endogenous problem of the model cannot be solved. Moreover, the analysis of the random-effect model does not solve the endogeneity problem either. The assumption of the random-effect model is that there is no correlation between the explanatory variable,  $x_{it}$ , and the unique characteristic  $u_i$  of the individual analysis. However, in the dynamic panel model, the lagged dependent variable,  $y_{it-1}$ , is used as a explanatory variable and is correlated with  $u_i$ . Another way to analyze the dynamic panel model is to use the instrumental variables. However, also in this method, when the past value, such as  $y_{it-2}, y_{it-3}, \dots, y_{it-n}$ , are used as the instrumental variables of  $y_{it-1}$ , the explanatory variable  $y_{it-1}$  and the error term  $e_{it}$  have a non-zero correlation.

In order to solve this problem, Arellano and Bond (1991) suggested estimating the first-difference model by using the generalized method of moments by Hansen (1982). This estimation method can derive an asymptotically efficient estimator by applying the generalized method of moments (Hereafter GMM) estimation method to the first-difference dynamic panel model. Also, GMM-based estimators are more effective for an over-identification model with more instrumental varia-

bles than endogenous variables. Moreover, it also has the advantage that the unobserved heterogeneity of the object can be included in the model (Arellano and Bond, 1991).

There are two types of GMM estimation methods: one-step GMM estimation and two-step estimation. The one-step GMM estimation uses an initial weight matrix to find a coefficient that minimizes the weighted objective function. In contrast, two-step GMM estimation takes the estimation result of the one-step GMM and the estimation coefficient that minimizes the weighted objective function again. Between the two estimation methods, the two-step GMM estimation is known to be asymptotically more efficient than the one-step method. Therefore, we attempt to analyze the first-differentiated dynamic panel model using two-step GMM estimation.

To analyze the Arellano-Bond model, various conditions must be satisfied. First, the panel data used for analysis should have a data structure with a short period of time and a large number of objects. Arellano-Bond estimation uses all the past values of the explanatory variables that have the problem of endogeneity as the instrumental variables. Thus, if the analysis period is too long, it creates too many instrumental variables, which make it difficult to obtain consistent estimates. Second, if the panel data is unbalanced, it is appropriate to include an analysis period as a dummy variable (Roodman, 2006). Third, if we want to have a proper instrumental variable as the endogenous explanatory variable,

the lagged variables of the explanatory variables must have first-order autocorrelation but not second-order autocorrelation. To verify this, the autocorrelation test of Arellano-Bond should be performed while analyzing the model. Fourth, in the dynamic panel analysis which uses the instrumental variable method, the instrumental variables in the model analysis should be identifiable. For this, the Sargan test is normally used, but it is not suitable if the data have high heteroscedasticity (Arellano and Bond, 1991). With a high level of heteroscedasticity, it is better to identify the instrumental variables by means of the Hansen test, which takes into account the heteroscedasticity of the panel data (Hansen, 1982). Also, if the panel is unbalanced (the number of periods differs across the objects), the time dummy variables should be included in the model.

Because this study's analysis period of the sample is 5 years, from 2008 to 2012, and the number of analyzed companies is 49, the analysis period is short and the number of object is large; so it satisfies the structure of panel data needed for the Arellano-Bond model. In addition, because the panel data of this study are unbalanced, the time dummy will be added in the model.

Also, the Hansen test and Arellano-Bond test will be conducted to check the autocorrelation of the instrumental variables (7.14).

The specific dynamic panel model used in this study is presented as Equation (2).

$$\begin{aligned}
 roa_{it} = & \beta_1 roa_{it-1} + \beta_2 \ln Comp_{it-1} + \beta_3 \ln CSR_{it-1} \\
 & + \beta_4 (\ln Comp * \ln CSR)_{it-1} + \beta_5 rev_{it} \\
 & + \beta_6 size_{it-1} + yrD_{it} + u_i + e_{it} \quad (2)
 \end{aligned}$$

$i = 1, 2, \dots, N$

$t = 2, 3, \dots, T$

- $roa_{it}$  : firm performance in the given year
- $roa_{it-1}$  : firm performance in previous year
- $\ln Comp_{it-1}$  : log value of customer Complaining behavior in the previous year
- $\ln CSR_{it-1}$  : log value of the CSR activity in the previous year
- $(\ln Comp * \ln CSR)_{it-1}$  : interaction term for the Customer complaining in the previous year and the CSR activity in the previous year
- $rev_{it}$  : revenue of the firm
- $size_{it-1}$  : firm size in the previous year
- $yrD_{it}$  : year dummy from 2010 to 2012
- $u_i$  : the unique characteristics of individual companies
- $e_{it}$  : pure error term
- $i$  : firm index
- $t$  : time index (year)

## V. Empirical result

### 5.1 Descriptive statistics and Correlation analysis

#### 5.1.1 Descriptive statistics

Before describing the results of the hypothesis of this study, the descriptive statistics, such as average, standard deviation, minimum value, and maximum value of the variables used in the model, are shown in Table 3.

#### 5.1.2 Correlation analysis

Table 4 shows the correlation among variables. In the correlation analysis, a firm's performance, customer complaining behavior, CSR activities, corporate sales, scale, and previous year performance were reported. Since the logarithm of the customer complaining behavior and the firm's CSR variables are included in

〈Table 3〉 Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Firm's Performance (%)	217	-4.85	4.14	0.72	1.33
Customer Complaining Behavior (Number)	217	3.00	2,641.00	502.57	542.61
Firm's CSR Activity (Hundred Million KRW)	217	0.00	898.00	109.91	192.51
Revenue (Hundred Million KRW)	217	3,039.99	749,013.18	80,615.93	107,038.62
Previous Year's Firm Size (Number of Employees)	217	609.00	53,884.0	11,060.99	12,028.37
Previous Year's Firm Performance (%)	217	-35.52	5.76	0.53	3.00

〈Table 4〉 Correlations among variables (across firms and years)

	Firm's Performance	Customer Complaining Behavior	Corporate CSR Activity	Revenue	Previous Year's Firm Size (Number of Employees)	Previous Year's Performance
Firm's Performance	1					
Customer Complaining Behavior	-0.029	1				
Corporate CSR Activity	0.377***	0.032	1			
Revenue	0.057	0.286***	0.457***	1		
Previous Year's Firm Size (Number of Employees)	0.241***	0.668***	0.377***	0.467***	1	
Previous Year's Performance	0.374***	-0.017	0.494***	0.094	0.153**	1

(\*: p-value < 10%, \*\*: p-value < 5%, \*\*\*: p-value < 1%)

the analysis model, such values were also used for correlation analysis.

### 5.1.3 Results of the panel data analysis

As discussed in the previous section, a dynamic panel analysis with a lagged dependent variable as an independent variable was used to test the hypotheses proposed in this research. Through this dynamic panel model, we first proved the negative impact of customer complaining behavior in the previous year on a firm's performance in the current period (Hypothesis 1). Second, we proved that CSR activities mitigate the adverse effects of customer complaints in the previous year on

a firm's performance (Hypothesis 2). These hypotheses were tested by using panel data from 2008 to 2012 on 49 companies in the financial industry, including a firm's performance, customer complaining behavior, CSR activities, and sales. The two-step differences GMM estimation method proposed by Arellano and Bond (1991) was adapted in the model.

The results show that the firm's performance in the previous year ( $t-1$ ) negatively affects the current period performance, and the effect was statistically significant at the significant level of 1%. This also means that performance in the year  $t-2$  has positive impact on the performance in the year  $t$ , which can be explained as the mean-reverting view

of the firm's performance (Canarella, Miller and Nourayi, 2013). The customer complaining behavior variables have negative impact on the firm's performance in the current period at the significance level of 10% and supports Hypothesis 1 presented in this study. In addition, the interaction of customer complaining behavior and a firm's CSR activities in the previous year has a positive effect on the performance of the firm in the current period and are statistically significant at the level of 10%. This also supports Hypothesis 2 of this study, which means that the more CSR activities the firm has, the more the negative effect of customer complaints on the firm's performance can be offset.

Although it is not formally presented as a hypothesis in this study, the CSR activities of firms in the previous year have a negative

effect on a firm's performance in the period, as was significant at the level of 10%. In fact, mixed results about a firm's CSR activities and performance can be found in the previous literature. Research about negative effects of CSR activities argues that because of excessive spend on CSR activities, their financial performance can be reduced and can cause organizational conflicts when contradict with the activity of firm to pursue 'profit maximization' (Friedman 1970). Because CSR activities require investment, they might have a negative impact on the firm's ROA. In addition, the two control variables included in the model to control a firms' size and sales were not statistically significant at the level of 10%. The year dummies (except for 2012) were not statistically significant at the level of 10% either.

<Table 5> Analysis Results

Dependent Value: Firm Performance	Coefficient	Standard error	z-statistic	P-Value
Previous Year's performance	<b>-0.3974</b>	0.1453	-2.74	0.006
Previous Year's Customer complaints	<b>-5.8036</b>	3.3595	-1.73	0.084
Previous CSR Activities	<b>-1.5616</b>	0.8558	-1.82	0.068
Previous Customer Complaints* CSR Activities	<b>0.2572</b>	0.1390	1.85	0.064
Firm's Size (Number of employees)	-0.0001494	0.0002286	-0.66	0.512
Previous years Number of Employees	-0.0002	0.0002	-1.21	0.227
Year 2010	0.1828	0.2046	0.89	0.372
Year 2011	0.0267	0.1730	0.15	0.877
Year 2012	<b>0.5818</b>	0.2842	2.05	0.041

Coefficient in the bold Characters are statistically significant at 0.1

In addition, when reporting the results of the dynamic panel model, it is necessary to test whether the number of instrumental variables for the endogenous explanatory variables used in the model is appropriate for the model. In other words, we need to test for the “over-identifying restriction”. The null hypothesis of the test for over-identification is that ‘the instrument variables included in the model are not correlated with the error term’. We used the two-step difference GMM estimation to analyze the model. The two-step GMM results are more asymptotically efficient estimates than one step. However, the two-step standard errors were biased downwards. Windmeijer (2005) suggested a way to correct this bias, and the procedure can be easily applied in the STATA program with the robust option in the XTBOUND2 command. When we use the robust option, it might assume the existence of heteroscedasticity in the variable. In this case, we use the Hansen test for the over-identifying restriction. The result of the Hansen test shows that the  $p$  value is 0.254, which cannot reject the null hypothesis; so there is no correlation between the instrumental variables and the error term of the model. In other words, instrumental variables are properly used in the model.

In order to use the first-difference GMM estimation method proposed by Arellano and Bond (1991) for the dynamic panel model, we assumed that there is a first-order autocorrelation of the error term, but not a second-order autocorrelation. The Arellano-bond test

for the model used in the study shows that the  $p$  value for the AR(1) and AR(2) are 0.159 and 0.276, respectively, which means that we have autocorrelation for neither AR(1) nor AR(2). For the results, Arellano and Bond (1991) stated that it does not necessarily need an autocorrelation for AR(1), but it must not have autocorrelation for AR(2). Thus the fact that there is no auto correlation for AR(2) is the more important condition, which our data satisfied. Thus we can conclude that our model is proper for estimating the coefficient.

## VI. Conclusion

### 6.1 Summary of research results and managerial implications

The purpose of this study was to investigate the effect of customer complaining behavior on a firm’s performance. We also examined how CSR activity moderates the effect of customer complaints on a firm’s performance. A dynamic panel model proposed by Arellano and Bond (1991) was estimated with data of firms in the financial industry. The results of the empirical analysis show that customer complaints act negatively on a firm’s performance, even though the unique heterogeneity of the individual firm is included in the model. The dynamic panel model also shows that a firm’s CSR activities can reduce the negative effects of customer complaints on its per-

formance, and the negative effects of customer complaints on the firm's performance can be offset by how much it invests in social responsibility activities.

Customers do not always feel satisfied with the service or product they purchase, and even if they are satisfied, it is difficult to keep it up. Therefore, any business at any time can be negatively impacted by customer complaining behavior. Moreover, these customer complaining behavior have an adverse effect on the firm's financial performance. So firms should be more concerned about the complaints and manage them in advance to avoid customer complaining behavior.

However, there are many ways to reduce the adverse effects of such customer complaining behavior on corporate performance. One could be a firm's CSR activities. Managers need to be careful when they need to assess the impact of CSR on the firm's profitability. As mentioned before, recent empirical research showed inconsistent results regarding the effect of CSR on the firm's performance. According the result of this research, CSR has a mixed effect on the firm's profitability. CSR has a negative main effect as the coefficient of CSR variable is -1.5616, but has a positive interaction effect with the customer complaints as the coefficient of the interaction term is 0.2572. This result means that investment in the CSR decreases next year's profitability but also increases the firm's profitability through mitigating the negative effect of customer complaints on the firm's profitability.

Thus, the net effect of CSR on the firm's profitability is decided by the amount of customer complaints. According to our estimation results the inflection point can be found as  $\frac{\partial(\text{performance})}{\partial \ln(\text{CSR})} = -1.5616 + 0.2572 \ln(\text{complaints}) > 0$ .  $\ln(\text{complaints}) > 6$  Thus, if a firm has more than  $e^6 = 403$  complaints per a year, which is about 40% of the entire cases in our data set, the investment on CSR activities has positive impact on the firm's profitability.

## 6.2 Limitations and future research direction

This study has several limitations. First, since the sample collected in this study is limited to the financial industry, it is difficult to generalize the adverse effects of customer complaining behavior on every business performance. The sample covered only the financial industry, because it used the number of disputes that consumers raise for the financial firms announced by the Financial Supervisory Service as a measure for the customer complaining behavior. Based on these limitations, future studies can collect samples from various industries and study them to generalize the negative effects of customer complaints on a firm's performance. Second, as a measure for the corporate performance, this study used the ROA based on book value, which has the disadvantage of not reflecting the market value of the firm. To reflect the market value, Tobin's  $q$  can be used for a firm's performance, but it could be limited by

calculating only firms listed on the stock market.

In addition, we examined only the adverse effects of customer complaints on a firm's performance, but future studies should include the effect of direct resolution of the customer complaints, that is, examine how the negative effects of customer complaints on a firm's performance are mitigated by a firm's efforts. Last, expenditures on R&D and marketing are popular control variables when the firm's performance is the dependent variable. However we could not use those variable in our estimation due to the measurement issues on those variables. Thus we decided to use more objective measures such as previous year's ROA and current revenue, and firm's size (number of employees) as control variables hoping that the impact of the marketing intensity and R&D is already included in the previous year's ROA and the current revenue. Also, the effectiveness of the R&D and marketing related variables as control variables might not be same as that in the manufacturing industries. In other words, the number of sales persons might be a better control variable than R&D expenditure for the financial institute like insurance companies.

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## 고객 불평 행동이 기업의 성과에 미치는 부정적인 영향과 그에 대한 CSR의 조절효과에 관한 동태적 패널 분석

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### 요 약

이 연구의 목적은 고객의 불평행동이 기업의 재무 성과에 미치는 부정적인 영향과 그 부정적인 영향을 기업의 사회적 책임활동 (CSR)이 경감시킬 수 있는가의 문제를 밝히는 것에 있다. 이를 위하여 49개의 금융 회사의 데이터를 기반으로 하였으며 고객의 불평행동은 금융감독원에 보고된 민원요청 건수로 측정하였고 사회적 책임활동은 기업의 기부금액으로 측정하였으며 기업의 재무성과는 ROI로 측정하였다. 이렇게 수집된 데이터를 기업이 가지고 있는 고유한 특성을 모형에 반영할 수 있는 동태적 패널 모형 분석을 사용하여 분석하였다. 그 결과에 의하면 고객의 불평행동은 기업의 재무성과와 부정적인 관계에 있었으며 사회적 책임활동이 그 부정적인 영향을 상당 부분 감소시켜 주는 것으로 나타났다.

주제어: 고객불평행동, 기업의 사회적 책임활동, 기업의 재무성과, 동태적패널분석

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