Journal of Business, Economics & Finance

ISSN: 2146-7943 YEAR: 2013 VOLUME: 2 ISSUE: 4

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Journal of Business, Economics & Finance
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LEAD DIRECTORSHIP AND FIRM PERFORMANCE

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KEYWORDS

Corporate governance, lead directors, firm performance, Sarbanes oxleyact.

ABSTRACT

This paper empirically explores the role of the lead directors in the corporate governance system and strives to empirically examine the association between the lead directorship and firm performance. I measure firm performance by three empirical proxies: Tobin's Q, returns on assets (ROA) and stock returns. I explore the research question on the relationship between lead directorship and firm performance in both cross-sectional and inter-temporal contexts. The sample consists of S & P 500 firms from 2001 to 2004 that have all the required financial, stock returns, and other relevant information. Overall, the empirical results of both cross-sectional and inter-temporal analyses indicate a positive association between lead directorship and firm performance.

1. INTRODUCTION

Classical agency theory suggests that in the modern firm, shareholders provide investment capital and in return they obtain the ownership of the firm. Professional managers, however, make investment decisions on the capital provided by shareholders and virtually control the operations of the firm. Human nature determines that managers maximize their personal interests rather than those of investors (Jensen and Meckling, 1976).

Board of directors is one of the most important internal corporate governance mechanisms that monitor the management and ensure that the managers are acting in the best interests of shareholders to minimize agency cost. To minimize agency costs, board of directors represents shareholders and is charged with monitoring and advising the management, as well as executive compensation and CEO turnover decisions. Board independence is one of the most crucial factors that underlie the board effectiveness since the CEO tries to capture the board of directors so as to maximize the CEO's own interests (Hermalin and Weisbach, 2003). It is generally believed that the board is not truly independent of management since CEOs generally are able to influence the nominations and tenures of independent directors. One of the features in the American corporate governance system, which is constantly criticized by corporate governance researchers, is the CEO duality problem, the problem of CEO and chairman of the board chairman (the monitor of the CEO) being the same person. Another issue inherent in the American corporate governance is the free-rider problem of independent directors. Independent directors have different backgrounds, experiences and opinions on board issues. They enjoy a faction of benefits but bear 100% costs of their efforts to monitor the management. Hence there exists a free-rider problem for independent directors, similar to the one for common shareholders (Hermalin and Weisbach, 2003).

In the era post Sarbanes-Oxley, corporate governance has received more press ever since and lead directorship is proposed by both investors and regulators as one way to solve some corporate governance problems, especially the problem of CEO duality and the free-rider problem of independent directors, and to improve board independence and corporate governance.

The revised listing requirement for firms listed in NYSE specifically mandates a presiding director for every board: "To empower non-management directors to serve as a more effective check on management, the non-management directors of each listed company must meet at regularly scheduled executive sessions without management. A non-management director must preside over each executive session of the non- management directors…(p.39)" The new corporate governance listing requirement went into effect on June 30, 2003 and all companies listed in NYSE will have to comply with the new standards of corporate governance before January 15, 2004 (Section 303A, Corporate Governance Rules, New York Stock Exchange, 2003). NASDAQ passed a similar proposal in October 2002 that requires "regularly convened executive session of the independent directors" without presence of management and there must be an independent director to preside at the meeting, or a presiding (lead) director in those executive sessions and that the firm must disclose properly the information on the presiding director in the proxy statement.3 The new NASDAQ corporate governance proposal became effective with a company's first annual meeting occurring after January1, 2004.

Designation of a lead director in the past decade, especially in recent years, has been gaining substantial popularity. In 1996, 27 percent of respondents to the Korn/Ferry International board study of Fortune 500 firms indicated that they had a lead director in their board. Spencer Stuart4, an executive recruiting firm, reports in its 20th Annual Spencer Stuart Director Survey that in 2005 a total of 94 percent of all S&P 500boards that responded to their survey had a lead or presiding director, compared with 85 percent in 2004 and just 36 percent in 2003. Moody's 2006 report indicates that more than sixty percent of S&P 500 firms in 2005 had a lead director in their board5. Other studies also document a similar trend in recent years.

The role of a lead director in the board dynamics has gained substantial attention for its potential role of improving board effectiveness since several prominent accounting scandals around the turn of the century. Despite the demand for a lead director in the board of directors from the researchers, investors and regulators, whether the designation of a lead director can enhance the board independence and board effectiveness, thus improve firm performance, is an unanswered empirical question.

In this study, I empirically explore the relationship between lead directorship and firm performance. The sample in this study consists of S & P 500 firms from 2001 to 2004 that have all the required financial, stock returns, and other relevant information. In the univariate cross-sectional analysis, I compare mean values of firm performance (Tobin's Q, ROA and stock returns) of two mutually-exclusive groups from year 2001 to year 2004 on a year- to-year basis: the set of firms that had a lead director in the board (with-LD group) and the set of firms without a lead director in the board (no-LD group), i.e., one group-mean comparison for each year from 2001 to 2004. I also compare mean values of firm performance of those two groups for the four years on a pooling basis to see the general effect of the lead directorship on firm performance. In the above cross-sectional univariate analysis, I conduct both parametric t-tests and non-parametric Wilcoxon tests to examine the group difference. In the cross-sectional multivariate analysis, I run both OLS and fixed-effect regressions to assess the relationship between lead directorship and firm performance, controlling other factors that may influence that relationship. I regress proxies of firm performance on lead directorship in the following regression model:

F (Firm performance) = L (lead directorship) + C (control variables).

The empirical results indicate that there is a positive association between the designation of lead directorship and firm performance measured by Tobin's Q, controlling other factor that may influence the relationship. The performance improvement of Tobin's Q after the addition of a lead director in the board of directors is statistically significant.

2. INSTITUTIONAL BACKGROUND OF LEAD DIRECTORSHIP

The trend of setting a lead directorship in the board of directors began in the1980s and it became prominent in the corporate board when General Motors dismissed its CEO during a financial crisis in 1992. Throughout the 1980s, a small percentage of boards created this position primarily to empower one of their independent directors to serve as an ad hoc trouble-shooter in some critical times in response to a temporary crisis, or as a task force leader in executing a specific board initiative. The duties of the lead directors in the 1980s were not clearly defined and generally varied from leading theCEO selection and transition process and some other specific assignments of crisis- response nature. In early phases of this trend, for example, lead directors were sometimes selected for the limited purpose of leading a search for a new CEO, or for unexpected board vacancies. Other times lead directors were appointed to fulfill special board assignments, such as working closely with some outside consultants and facilitating the board with the decision-making process on a major prospective corporate events, such as merger or acquisitions, or hostile takeover bids, which could have significant impact on the company's future directions. In the 1990s when corporate governance became a prominent issue and shareholder activism picked up its momentum, lead directorship was not synonymous with crisis and stop-gap measure any more, but was rather proposed as a solution to the problem of CEO duality: the chairperson of the board of directors and CEO are the same person.

As a result of strong shareholders activism in the 1990s, investors and corporate governance researchers have increasingly called for U.S. firms to separate the chairman and CEO jobs, a model of corporate governance that is prevalent in the United Kingdom as well as in most European countries. Fama and Jensen (1983) called the CEO duality "the proverbial fox guarding the chicken coop (p.28)".

A key strength of separation of CEO and chairman in the board is that a separate chairman empowers the board versus the CEO. The board has a clear leader that is supposed to monitor and help CEO to fun the firm. In general, directors in a board should focus on the functioning of the board-its agenda, the adequacy of the information provided, the quality of debate, and quality of the board decisions, such as CEO compensation and CEO turnover decisions. Monitoring of the management is the primary duty of the board and the separation of the board chairman and CEO enhances the board's oversight capabilities. CEO duality compromises the board's functioning when the CEO is charged with leading both the board and the management.

Another strength of the separation of CEO and chairman of the board is that the CEO can focus on running the company without having to pay attention to leading the board. A CEO is not distracted by the board affairs and is able to focus on maximizing shareholders' interests. The chairman of the board can focus on the board agenda and lighten the CEO's load substantially. A non-executive chairman of the board can also have "tremendous value in placating unhappy shareholders and representing the firm to governmental bodies, trading associations, employees and suppliers as well as assuming other responsibilities (page 29)" (Larker et al, 2005).

Unlike firms in U.K where more than 80% of the major listed companies have separated CEO and the chairman of the board, less than 20% of the U.S firms have their CEO and chairman of the board separated and the vast majority of U.S CEOs are opposed to separating the row roles by arguing that (1) the separation of the two posts would dilute their capability to provide effective leadership of the company; (2) the separation would create potential power struggle and power divisiveness between the two posts; (3) the non-executive chairman may be too close to the CEO to monitor the CEO and; (4) less clear-cut division of power and duties between the two posts and both CEO and the chairman may represent the firm externally for public affairs (Lorsch and Lipton, 1993).

Shareholders have increasingly viewed the lead directorship as a fast track to improved board independence in the case of CEO duality. For example, in the wake ofpoor financial performance in 2000, Boeing shareholders requested in the shareholder proposal that "the Board of Directors take all necessary steps to adopt a policy of requiring an independent outside Lead Director when the office of Chair and CEO are held by the same person" and claimed that a lead director "will enable independent oversight of management to improve Boeing performance"9. When First BanCorp announced in 2005 the establishment of a lead directorship in its board, it specifically indicated that the move was to "bring additional independence to the board of directors from bank management (when board chair and CEO are the same person)".

Some prominent institutional investors and business associations also consistently press for the designation of lead directorship as an improvement of board independence if CEO and board Chair is the same person. For example, TIAA-CREF, one of the nation's largest pension funds, in its 2004 Policy Statement on Corporate Governance11 states: "when the board chooses not to separate the positions, it should designate a lead or presiding director who would preside over executive sessions of independent directors and, if the board determines it to be appropriate, would participate actively in the preparation of board agendas." CalPERS, another leading institutional investor in the nation, specifically includes the designation of a lead director as one of the corporate governance rating criteria in its Corporate Governance Focus List if the CEO and board chair is not separated. Conference Board, the nation's most respected business association, also recommends in its 2003 Commission on Public Trust and Private Enterprise that when the chairman is not an independent director or when the chairman is the CEO of the firm, then a lead independent director or a presiding director should be specifically established to improve the board's independence.

In response to a number of major accounting scandals at the turn of the new century that resulted in a decline of public trust in accounting and financial reporting quality, the U.S Congress passed the Sarbanes-Oxley law, or SOX, in 2002. Sarbanes- Oxley law deals with many corporate governance issues, including executive compensation and the use of independent directors. Without a doubt, the Sarbanes-Oxley Act is the single most important piece of legislation affecting corporate governance, financial disclosure and the practice of public accounting since the US securities laws of the early 1930s. The purpose of the Sarbanes-Oxley law is to "improve quality and transparency in financial reporting and independent audits and accounting services for public companies, to create a Public Company Accounting Oversight Board, to enhance the standard-setting process for accounting practices, to strengthen the independence of firms that audit public companies, to increase corporate responsibility and the usefulness of corporate financial disclosure, to protect the objectivity and independence of securities analysts, to improve Securities and Exchange Commission resources and oversight and for other purposes." One of the focus point of Sarbanes-Oxley laws is the corporate governance.

Following the Sarbanes-Oxley law passed by the U.S Congress that aims at improving corporate governance and financial reporting quality, New York Stock Exchange (NYSE)revised the listing requirement of corporate governance of firms listed in NYSE specifically mandates a presiding director for every board: "To empower non- management directors to serve as a more effective check on management, the non- management directors of each listed company must meet at regularly scheduled executive sessions without management…A non-management director must preside over each executive session of the non-management directors…(p.39)" The new corporate governance listing requirement went into effect on June 30, 2003 and all companies listed in NYSE will have until the earlier of their first annual meeting after January 15, 2004 or October 31, 2004, to comply with the new standards of corporate governance (Section303A, Corporate Governance Rules, New York Stock Exchange, 2003).

NASDAQ passed a similar proposal in October 2002 that requires "regularly convened executive session of the independent directors" without presence of management and there must be an independent director to preside at the meeting, or a presiding (lead) director in those executive sessions and that the firm must disclose properly the information on the presiding director in the proxy statement. The new NASDAQ corporate governance proposal became effective with a company's first annual meeting occurring after January 1, 2004.

3. METHODOLOGY AND DATA

3.1 Measures of Firm Performance

I measure firm performance by three empirical proxies: Tobin's Q, returns on assets (ROA) and stock returns, which are the most widely used firm performance proxies. All of the above three empirical measures have their own shortcomings as far as empirical validity is concerned, but they are highly correlated with each other such that "the qualitative nature of the results (of the empirical studies) should not be affected by the choice of the proxy" (Mehran, 1995).

Tobin's Q is named after the Nobel prize winner James Tobin from Yale University and is calculated as the ratio of market value to asset replacement value (Yermack, 1996).

Tobin's Q is calculated as:

Tobin's Q= (Market value of assets) / (Replacement cost of assets)

Return on assets (ROA) indicates how efficient management is at using its assets to generate earnings. Calculated by dividing a company's annual earnings by its total assets, ROA is generally displayed as a percentage. Sometimes this is referred to as "return on investment", an indicator of how profitable a company is:

Return on assets (ROA) = (Net income)/ (Total assets)

Stock returns are measured as buy-and-hold returns compounded during the whole fiscal year. Financial data is from S&P Compustat database and insider equity ownership data is from S&P ExecuComp database, while data of stock returns is from Center for Research in Security Prices (CRSP).

3.2 Univariate Analysis

My sample consists of S & P 500 firms from 2001 to 2004 that have all the required financialand stock returns information. In the univariate cross-section analysis, I compare mean values of firm performance (Tobin's Q, ROA and stock returns) of two mutually-exclusive groups from

year 2001 to year 2004 on a year-to-year basis: the set of firms that had a lead director in the board (with-LD group) and the set of firms without a lead director in the board (no-LD group), i.e., one group-mean comparison for each year from 2001 to 2004. I also compare mean values of firm performance of those two groups for the four years on a pooling basis to see the general effect of the lead directorship on firm performance. In the above cross-sectional univariate analyses, I conduct both parametric t-test and non-parametric Wilcoxon test to test the group difference. If the designation of a lead director in the board of directors improves the board independence and the board monitoring effectiveness, I predict that overall, the firm performance is significantly better for the groups of with-LD than the group of no-LD for both the year-by-year and the pooling univariate analyses.

3.3 Multivariate Analysis

I use both OLS and fixed effect regressions to estimate directly the relationship between lead directorship and firm performance, following Yermack (1996). I regress proxies of firm performance on lead directorship, controlling other factors influencing firm performance.

F (Firm performance) = L (lead directorship) + C (control variables).

Where: F is proxies of firm performance: either Tobin's Q, return on assets(ROA), or stock returns; L is an indicator variable that is equal to one if there is a lead director in the board, zero otherwise; C comprises of a set of control variables based on prior research.

In multivariate analysis, the regression model is:

Firm performance (Tobin's Q, ROA, stock returns) $=a_1$LEAD + a_2BSIZE + a_3DUALITY + a_4FOUNDING +a_5OUTSIDE + a_6DIROWNL1 + a_7DIROWN1T5 + a_8DIROWN5T20 + a_9SIZE+ a_{10}BM + a_{11}LEVERAGE + a_{12}SEGMENT + a_{13}DELAWARE + a_{14}ROA+ a_{15}LAGROA+ a_{16}AGE + INDUSTRY + YEAR

LEAD is an indicator variable that has the value of one if the firm had a lead director in the board, zero otherwise. I include some corporate governance variables related to board structure and independence as control variables, based on previous research on the relationship between firm performance and those corporate governance variables. BSIZE refers to the log of board size. Yermack (1996) suggests that board size is inversely associated with firm performance measured by Tobin's Q and return on assets (ROA) and thus I expect the coefficient of BSIZE to be negative. DUALITY is a dummy variable that is equal to one if the position of CEO and chairperson of the board of directors is the same person, and zero otherwise. The relationship between CEO duality and firm performance is not conclusive. Some studies (Yermack, 1995) indicate that firms with CEO duality have experienced inferior firm performance, while others (Berg and Smith, 1978; Larker et al, 2005) fail to identify any relationship. Thus I do not have any prediction on the sign of DUALITY.

FOUNDING is an indicator variable that is equal to one if the CEO is the founding CEO, zero otherwise. Empirical studies, such as DeAngeloet al. (2000), document that the founding CEOs in public firms extract private rents through special dividends, excessive compensations, and with related-party transactions, and thus firm performance is inversely related to the founding CEO status. I therefore predict a negative effect of FOUNDING on firm performance proxied by Tobin's Q. Another board characteristic is the equity ownership by all the insider directors in the board. Classical agency theory (Jensen and Meckling, 1976) suggests that equity ownership can properly align the interests of the management with those of shareholders and empirical studies also provide evidence of it. Morck et al (1988) and McConnell and Servaes (1990) find evidence

of a curvilinear relationship between firm performance proxied by Tobin's Q and the insider equity ownership: Tobin's Q initially increases as insider equity ownership increases up to 5 percent and then falls as insider ownership increases to 25 percent, after which the Tobin'Q increases again. Consistent with Panasian et al. (2005), I divide insider equity ownership into four categories since the relationship between insider equity ownership and firm performance is curvilinear: if the insider as a group owns less than 1 percent of the total outstanding shares (DIROWNL1),between 1 and 5 percent (DIROWN1T5), between 5 and 20 percent (DIROWN5T20) and over 20 percent (DIROWN20). Note that in the regression model, DIROWN20 is subsumed in the intercept term and is thus not included in the regression model. Based on previous research, I predict DIROWN1T5 to be positive, DIROWN5T20 to be negative. I do not have any prediction on DIROWNL1.

OUTSIDE is the percentage of outside directors in the board of directors. As discussed in section 2.6.2, the empirical studies have not reached a conclusive agreement on the relationship between the percentage of outside directors and firm performance. Therefore, I do not have expectation of the sign of the coefficient of OUTSIDE. Following previous research (Morck et al, 1988; Yermack, 1996), I include other control variables in multiple regressions: firm size, growth opportunities, investment opportunities, leverage ratio and firm age. SIZE is the firm size, as measured by the log of total assets. The proxy for growth opportunities is BM (book to market ratio). Following Gompers et al (2003), BM is defined as the ratio of book value of common equity to market value of common equity. I also use capital expenditure scaled by total assets as an alternative proxy for growth opportunities in the robustness test. LEVERAGE is defined as long-term debt to total assets. SEGMENT is the number of business segments reported in COMPUSTAT. Lang and Stultz (1994) document that diversified firms have lower Tobin's Q values and therefore I predict a negative sign for the coefficient of SEGMENT.

Following Daines (2001), I control a firm's profitability and include return on assets (ROA) and the ROA of prior year (LAGROA). Return on assets (ROA) is defined as operating income divided by lagged total assets. Daines (2001) argues that a firm's profitability positively impacts a firm's Tobin's Q and therefore I expect a positive sign for both ROA and LAGROA. DELAWARE is an indicator variable that is equal to one if the firm was incorporated in the state of DELAWARE, zero otherwise. Daines (2001) presents evidence that Delaware corporate law improves firm value and thus I expect a positive sign for the variable of DELAWARE. AGE is the log of total fiscal quarters a firm has existed in Compustat, consistent with Brown and Caylor (2006). The longer the firm age, the less business risk and the more mature the firm is and the higher Tobin's Q. I expect therefore a positive sign for the variable of AGE. Finally, I use dummy variables (INDUSTRY and YEAR) to control industry (two-digit SIC) and time period effect in the multiple regression.

4. RESULTS

4.1 Descriptive Statistics

Table 1 reports the sample derivation process. Starting from financial data from Compustat, I lose one hundred and twenty eight firms due to incomplete financial data or no-coverage of Compustat database. I require at least two hundred fifty trading days for each firm to calculate the fiscal year stock returns and I lose another fifty six firms due to incomplete returns data or no-coverage of CRSP database. Information of board characteristics is collected from firm proxy statements. I lose ten firms due to incomplete board or equity ownership information. The total sample size is 306 firms and 1,224 firm years for four years.

Table1:SampleDerivation

Initial sample: S&P500 (year2001-2004)	500 firms
Compustat (incomplete financial data or no-coverage)	(128 firms)
CRSP(incomplete returns data or no-coverage)	(56 firms)
Proxy statements (incomplete board or ownership information)	(10 firms)
Final sample	306 firms

Out of the 306 firms in the S&P 500 from 2001 to 2004 that have complete financial and stock returns information, only thirteen firms, or 4.3% of my sample, disclosed detailed definitions and duties of the lead directorship in their board of directors.

4.2 Univariate Results

Appendix 1presents the empirical results of the cross-sectional analyses. Panel A is the yearly distribution of lead directors for the 1,224 firm years. For the year of 2001, 82 firms, or 26% of the 306 firms in the sample had a lead director in the board. In 2002, 34 firms added a lead director into the board of directors, boosting the total number of firms with a lead director to 116, or 38% of the total 306 firms. The year of 2003 when the regulatory change took effect witnessed a drastic increase of number of firms that added a lead director into the board: 109 firms introduced a lead director and the number of firms that had a lead director in the board in 2003 increased to 225, or 74% of the 306 firms in the sample. Fifty more firms designated a lead director in the board in 2004 and the total number of firms with a lead director in the board reached 275 or 90% out of 306 firms. Altogether, eighty two firms have always had a lead director in the board for each of the four years from 2001 to 2004, while thirty one firms did not have a lead director for any of the four years. Those eighty two firms constitute the always-designation group and the thirty firms comprise the never-designation group in the inter-temporal analyses.

Panel B of Appendix 1 examines the Tobin's Q difference between the firms with a lead director in the board and those without for each of the four years from 2001 to 2004. For each of the four years, firms with a lead director in the board had consistently higher mean Tobin's Q and t-tests suggest that the differences are all statistically significant at the conventional five percent significance level. I also pool Tobin's Qs of all four years and conduct an overall mean difference t-test. The overall mean and median differences for the all four years also indicate that firms with a lead director in the board have statistically significant higher Tobin's Q. The less powerful non-parametric Wilcoxon median tests are able to find significant differences of Tobin's Q for three of the four years from 2001 to 2004.

Panel C of Appendix 1 examines the returns on assets (ROA) difference between the firms with a lead director in the board and those without for each of the four years from 2001 to 2004. Neither the t-tests nor the non-parametric Wilcoxon tests find any statistically significant difference between those two groups except a t-test of group mean difference for the year of 2002, which is significant at 0.1 level. Thus, in terms of returns on assets (ROA), there is no univariate cross-sectional evidence that firms with a lead director in the board outperform the group of firms without.

Panel D of Appendix 1 examines the stock market performance difference between the firms with a lead director in the board and those without for each of the four years from 2001 to 2004. For three of the four years, firms with a lead director in the board had consistently higher mean stock returns and t-tests suggest that the differences are all statistically significant at the conventional five percent significance level. The non- parametric median tests also confirm the similar pattern.

In the tests of pooled four-year stock returns, both the t-test of the group means and the non-parametric Wilcoxon median test are able to find significant differences of stock returns.

Therefore, the univariate results indicate that firms with a lead director in the board generally outperformed those without in terms of Tobin's Q and stock returns, but not ROA.

4.3 Multivariate Results

Appendix 2 provides empirical results of the multiple regressions in which firms performance measures are regressed on the lead directorship and other factors that may impact the relationship between firm performance and lead directorship. Panel A is the empirical result of the regression with Tobin's Q as the dependent variable. The coefficient of LEAD, an indicator variable equal to one if a firm had a lead director and zero otherwise, is positive and statistically significant in both of the basic OLS model(a_1=0.01, p<0.1) and the fixed effect model (FE model hereafter) that controls the time- invariant factors (a_1=0.01, p<0.1), indicating that there is a positive relationship between lead directorship and firm performance measured by Tobin's Q, after controlling other factors that may influence the relationship of interest.

Consistent with previous research, the result suggests that firms with a larger board size tend to have a lower Tobin's Q (a_2= -0.6 in OLS and -0.5 in the FE model respectively, p<0.01), firms with a founding member as CEO have a lower Tobin's Q (a_4=-0.01 in OLS and -0.02 in the FE model respectively, p<0.01), firms with a higher percentage of outside directors have a higher Tobin's Q (a_5=0.19 in OLS and 0.14 in the FE model respectively, p<0.01), firms with higher growth opportunities have higher Tobin's Q (a_{10}= -0.15 in OLS and -0.24 in the FE model respectively, p<0.01), firms with more business segments have lower Tobin's Q (a_{12}= -0.09 in OLS and -0.08 in the FE model respectively, p<0.01), firms incorporated in the state of Delaware have higher Tobin's Q (a_{13}=0.29 in OLS and 0.46 in the FE model respectively, p<0.01), and firms with bigger firm age and thus with less business risk have higher Tobin's Q (a_{16}=0.06 in OLS and 0.07 in the FE model respectively, p<0.01). Consistent with Morck et al (1988) and McConnell and Servaes (1990), I find a curvilinear relationship between insider equity ownership and Tobin's Q: firms having an insider ownership of less than one percent and less than five percent enjoy a higher Tobin's Q (a_6=0.09 and a_7=0.02 in OLS, and a_6=0.08 and a_7=0.06 in the FE model respectively, p<0.01). However, when the insider equity ownership is between five percent and twenty percent, there is a negative association between insider equity ownership and Tobin's Q (a_8= -0.05 in OLS and -0.07 in the FE model respectively, p<0.01), due to the more entrenched position the CEO has (Morck et al, 1988; McConnell and Servaes, 1990). The adjusted R squares are0.34 for the basic OLS model and 0.37 for the fixed effect model respectively.

Panel B presents the empirical result of the regression with ROA as the dependent variable. The coefficient of LEAD, an indicator variable equal to one if a firm had a lead director and zero otherwise, is positive but not statistically significant in either of the basic OLS model (b_1=0.01) or the fixed effect model(b_1=0.08). Consistent with previous research, the result suggests that firms with a larger board size tend to have a lower ROA (b_3= -0.1 in OLS and -0.02 in the FE model respectively, p<0.01), firms with a founding member as CEO have a lower ROA (b_4= -0.09 in OLS and -0.08 in the FE model respectively, p<0.01), firms with a higher percentage of outside directors have a higher ROA (b_5=0.03 in OLS and 0.05 in the FE model respectively, p<0.01), firms with higher growth opportunities have higher ROA (b_{10}= -0.03 in OLS and -0.02 in the FE model respectively, p<0.01), and firms with bigger firm age and thus with less business risk have higher ROA (b_{13}=0.01 in OLS and 0.03 in the FE model respectively, p<0.01). Consistent the regression model with Tobin's Q as the dependent variable, I find a curvilinear relationship

between insider equity ownership and accounting performance: firms having an insider ownership of less than one percent and less five percent but greater than one percent enjoy a higher ROA (b_6=0.02 and a_7 =0.09 in OLS, and b_6=0.08 and b_7 =0.1 in the FE model respectively, p<0.01). However, when the insider equity ownership is between five percent and twenty percent, there is a negative association between insider equity ownership and ROA (b_8= -0.01 in OLS and -0.09 in the FE model respectively, p<0.01). The adjusted R squares are 0.28 for the basic OLS model and 0.31 for the fixed effect model respectively.

Panel C presents the empirical result of the regression with stock returns as the dependent variable. The coefficient of LEAD, an indicator variable equal to one if a firm had a lead director and zero otherwise, is positive and statistically significant in both of the basic OLS model (c_1=0.01, p<0.1) and the fixed effect model that controls the time-invariant factors (c_1=0.01, p<0.1), indicating that there is a positive relationship between lead directorship and firm performance measured by fiscal annual stock returns, controlling other factors that may influence the relationship of interest. Consistent with previous research, the result suggests that firms with a larger board size tend to have a lower stock returns (c_3= -0.9 in OLS and -0.04 in the FE model respectively, p<0.01), firms with a founding member as CEO have a lower stock returns (c_4= -0.09 in OLS and -0.07 in the FE model respectively, p<0.01), firms with a higher percentage of outside directors have a higher stock returns (c_5=0.06 in OLS and 0.07 in the FE model respectively, p<0.01), and firms with bigger firm age and thus with less business risk have higher stock returns (c_{12}=0.09 in OLS and 0.08 in the FE model respectively, p<0.01). Consistent the regression model with Tobin's Q and ROA as the dependent variables, I find a curvilinear relationship between insider equity ownership and accounting performance: firms having an insider ownership of less than one percent and less five percent but greater than one percent enjoy a higher stock returns (c_6=0.1 and a7=0.13 in OLS, and c_6=0.12 and c_7 =0.09 in the FE model respectively, p<0.01). However, when the insider equity ownership is between five percent and twenty percent, there is a negative association between insider equity ownership and stock returns (c_8= - 0.06 in OLS and -0.02 in the FE model respectively, p<0.01). The adjusted R squares are 0.21 for the basic OLS model and 0.19 for the fixed effect model respectively.

In summary, the evidence from cross-sectional analyses indicates that there exists a positive relationship between lead directorship and firm performance measured by Tobin's Q and stock returns.

5. CONCLUSION

In summary, the empirical results indicate that there is a positive association between the designation of lead directorship and firm performance measured by Tobin's Q and stock returns, but not accounting performance measured by return on assets, controlling other factor that may influence the relationship. The performance improvement of Tobin's Q and stock returns after the addition of a lead director in the board of directors is statistically significant.

The results are not surprising, given the inherent difference between the three empirical proxies of firm performance and the sample in the study. Tobin's Q is calculated as the ratio of market value to asset replacement value (Yermack, 1996). If Tobin's q is greater than 1.0, then the market value is greater than the value of the company's recorded assets, which suggests that the market value reflects some unmeasured or unrecorded assets of the company. Therefore, Tobin's Q measures better the market expectation (Yermack, 1996) and so do stock returns that hinge on the expectation of future cash flow. The positive association between the designation of lead directorship and Tobin's Q and stock returns indicates that the introduction of a lead director in the

board has impact on the future cash flow and thus leads to very high expectation of future performance. In other words, Tobin's Q and stock returns are able to promptly pick up market expectation of future performance. Return on assets, however, indicates how efficient management is using their assets to generate earnings for the current period. Lead directorship may not instantly improve accounting performance and it may take several years for the impact of the lead directorship to be reflected on the accounting performance. The sample consists of only four-year data, in which there is only one year data after the regulatory requirement came into effect. It is therefore not surprising to observe the insignificant influence of the lead directorship on accounting performance given the data structure in this dissertation. A longitudinal study with multiple years of data may be better suited to examine the effect on accounting performance.

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Appendix 1: Descriptive Statistics (Yearly Distribution)

Panel A: Lead Directors

Year	With Lead Director (A)	Without Lead Director (B)	Total Firm (C)	Percent (A/C)	Changes
2001	82	224	306	0.26	16
2002	116	190	306	0.38	34
2003	225	81	306	0.74	109
2004	275	31	306	0.9	50
All four years	82	31	306	0.26	209

Panel B: Tobin's Q

	Mean			Median		
Year	With LD	W/o LD	Difference	With LD	W/o LD	Difference
2001	2.18	2.12	0.06**	2.03	1.97	0.06**
2002	2.01	1.89	0.12***	1.93	1.92	0.01
2003	2.33	2.22	0.11***	2.21	2.18	0.03**
2004	2.38	2.30	0.08**	2.24	2.20	0.04**
All years	2.35	2.26	0.09***	2.19	2.16	0.03**

Panel C: ROA

	Mean			Median		
Year	With LD	W/o LD	Difference	With LD	W/o LD	Difference
2001	0.09	0.08	0.01	0.08	0.06	0.02
2002	0.03	0.02	0.01	0.02	0.01	0.01
2003	0.11	0.1	0.01	0.1	0.1	0
2004	0.14	0.11	0.03**	0.11	0.1	0.01
All Years	0.11	0.09	0.01	0.09	0.07	0.01

Panel D: Stock returns

	Mean			Median		
Year	With LD	W/o LD	Difference	With LD	W/o LD	Difference
2001	0.07	0.06	0.01	0.06	0.05	0.01
2002	-0.01	-0.03	0.02***	-0.01	-0.03	0.02**
2003	0.11	0.08	0.03**	0.09	0.04	0.05***
2004	0.15	0.07	0.08***	0.12	0.05	0.07***
All Years	0.13	0.07	0.06***	0.11	0.05	0.06***

***: significant at .01 level; **: significant at .05 level; *: significant at .1 level, all two-tail;

Appendix 2: Multiple Regression

Panel A

Tobin'sQ = a_0+ a_1LEAD+ a_2BSIZE+ a_3DUALITY+ a_4FOUNDING+ a_5OUTSIDE+ a_6DIROWNL1+ a_7DIROWN1T5+a_8DIROWN5T20+ a_9SIZE+ a_{10}BM+ a_{11}LEVERAGE+ a_{12}SEGMENT+ a_{13}DELAWARE+ a_{14}ROA+ a_{15}LAGROA+a_{16}AGE

Model	N		a_0	a_1	a_2	a_3	a_4	a_5	a_6	a_7	a_8	a_9	a_{10}	a_{11}	a_{12}	a_{13}	a_{14}	a_{15}	a_{16}	AdjR^2
		Coefficient	0.02	0.01	-0.6	-0.03	-0.01	0.19	0.09	0.02	-0.05	-0.12	-0.15	0.38	-0.09	0.29	0.78	0.03	0.06	0.34
OLS	1,124	t-value	2.69	1.67	-3.4	-0.2	-3.7	2.58	2.76	2.17	-3.7	-0.75	-1.98	0.48	-2.98	3.17	2.94	2.76	2.85	
		Significance	***	*	***		***	***	***	**	***		**		***	***	***	***	***	
		Coefficient	0.03	0.01	-0.5	-0.02	-0.02	0.14	0.08	0.06	-0.07	-0.32	-0.24	0.28	-0.08	0.46	0.07	0.01	0.07	0.37
FE	1,124	t-value	3.22	1.63	-2.9	-0.1	-2.5	2.32	2.47	2.32	-3.2	-0.35	-2.18	0.09	-3.29	3.98	3.18	2.48	2.36	
		Significance	***	*	***		***	**	**	**	***		**		***	***	***	**	**	

Panel B

ROA= b_0+b_1LEAD+ b_2BSIZE+ b_3DUALITY+ b_4FOUNDING+ b_5OUTSIDE+ b_6DIROWNL1+ b_7DIROWN1T5+ b_8DIROWN5T20+b_9SIZE+ b_{10}BM+ b_{11}LEVERAGE+ b_{12}SEGMENT+ b_{13}AGE

Model	N		b_0	b_1	b_2	b_3	b_4	b_5	b_6	b_7	b_8	b_9	b_{10}	b_{11}	b_{12}	b_{13}	AdjR^2
		Coefficient	0.18	0.01	-0.1	-0.6	-0.09	0.03	0.02	0.09	-0.01	0.08	-0.03	0.29	-0.19	0.01	0.28
OLS	1,124	t-value	0.7	-2.6	-0.4	-2.8	2.35	2.82	3.23	-3.1	2.1	-2.01	0.14	-0.18	3.1		
		Significance	***	***		***	**	***	***	***	**	**			***		
		Coefficient	0.13	0.08	-0.02	-0.8	-0.08	0.05	0.08	0.1	-0.09	0.06	-0.02	0.13	-0.21	0.03	
FE	1,124	t-value	3.2	1.03	-3	-0.3	-3.1	2.58	2.19	2.81	-3.3	3.03	-2.38	0.09	-0.82	3.2	
		Significance	***		***		***	***	**	***	***	***	**			***	

Panel C

RET=c_0+c_1LEAD+ c_2BSIZE+ c_3DUALITY+ c_4FOUNDING+ c_5OUTSIDE+ c_6DIROWNL1+ c_7DIROWN1T5+ c_8DIROWN5T20+ c_9SIZE+ c_{10}BM+ c_{11}AGE

Model	N		C^0	C^1	C^2	C^3	C^4	C^5	C^6	C^7	C^8	C^9	C^{10}	C^{11}	Adj R^2
		Coefficient	0.34	0.01	-0.09	-0.4	-0.09	0.06	0.1	0.13	-0.06	0.45	-0.11	0.09	0.21
OLS	1,124	t-value	3.24	2.07	-2.2	-0.9	-2.4	3.19	2.8	3.3	-3.2	0.48	-2.75		
		Significance	***	**	**	**	***	***	***	***	***		***	***	
		Coefficient	0.83	0.01	-0.04	-0.8	-0.07	0.07	0.12	0.09	-0.02	0.31	-0.13	0.08	0.19
FE		t-value	3.03	3.14	-2.5	-0.1	-2.5	2.45	2.89	2.45	-3.6	0.22	-1.91	3.2	
		Significance	***	***	**		**	**	***	**	***		**	***	

***: significant at .01 level; **: significant at .05 level; *: significant at .1 level, all two-tail;

LEAD is an indicator variable that has the value of one if the firm had a lead director in the board, zero otherwise. BOARDSIZE is the size of the board of directors; DUALITY is a dummy variable that is equal to one if the position of CEO and chairperson of the board of directors is the same person, and zero otherwise; FOUNDER is an indicator variable that is equal to one if the CEO is the founding CEO, zero otherwise; OUTSIDE is the percentage of outside directors in the board of directors; DIROWNL1 is an indicator variable that is equal to one if the insider as a group owns less than 1 percent of the total outstanding shares, between 1 and 5 percent (DIROWN1T5), and between 5 and 20 percent (DIROWN5T20); SIZE is total assets in millions(Compustat item 6); BM is the book to market ratio (Compustat item 60/ item 199*item 25); LEVERAGE is long-term debt divided by total assets (item 9/item 6); SEGMENT is the number of business segments reported in Compustat; PEXEOWN is the percentage of the shares owned by the insiders; DELAWARE is a dummy variable equal to one if the firm is incorporated in Delaware, zero otherwise; AGE is the number of quarters that a firm has existed in Compustat; ROA is the returns on assets (item 178/average item 6); Tobin's Q is calculated as (Market value ofassets) / (Replacement cost of assets), or (Compustat item 6+ item 199* item 25- item 60- item 74/ (item 6)); RETURNS is the fiscal year stock returns.

Journal of Business, Economics & Finance ISSN: 2146-7943

Journal of Business, Economics & Finance
Year: 2013 Volume: 2 Issue: 4

BASEL ACCORDS: LESSONS FOR TURKEY

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KEYWORDS

Basel accord, banking system, financial crisis, non-performing loans, Turkey.

ABSTRACT

In the last two decades, the world economies have experienced severe financial crises. After every crisis "new" financial regulations were offered to prevent an upcoming one. Basel Criteria have become the milestone of these regulations regarding the banking sectors where the problems and the solutions of the financial crises have emanated. However, it is observed that the Basel Accords have not met the required measures in preventing the world economy from entering a global financial crisis in 2008. Turkish banking sector has been implementing its ownmeasures which are tighter than the Basel criteria since the financial crisis it went through in 2001 and has been growing in spite of the last financial turmoil unlike its developed country counterparts. Thus our aim is to compare the banking sectors of Turkey and 10 other OECD countries for the period 2000-2008, and try to answer whether Turkey performs better regarding risk management and whether she should adopt the Basel criteria or not. To this end, we perform a panel data estimation making use of measures such as capital adequacy ratio, liquid reserves, and non-performing loans. The results indicate that in time Turkish banking sectorgot better in handlingrisk management, but that it is more prone to risk compared to OECD countries.

1. INTRODUCTION

The recent global crisis that started in 2008 has shed light on the vulnerability of the financial system vis-à-vis severe economic and financial crises, and showed the importance of risk control and serious monitoring and regulation of the financial system. Although risk control cannot provide full protection for the agents of the system, updating perception of new risks lowers the vulnerability against risks. Authorities modify and update the criteria of risk control after every market failure or a crisis in financial markets. However, precautions and risk control measures did not work out well as revealed by the recent crisis. Moreover, the recent crisis has brought about controversies about the inadequacy of the very detailed and complex financial regulations. It should be underlined that recent financial crisis has specifically affected banking systems in many countries which already apply the rules of such a regulation - Basel II Accord. This is the basis for the motivation of this study.

Basel II, published in 2004 and accepted in 2006, put under jurisdiction the calculation of capital provisions, issues about supervision and auditing, and obligations about public declarations. However, the 2008 crisis, especially events like the bankruptcy of Lehman Brothers, the

nationalization of institutions like Fannie Mae and Freddie Mac, the collapse of the banking sector in Iceland, and the fact that many countries had to give immense support to their banks revealed that precautions have not been duly taken against crises and that the existing system had serious flaws. To make the banking hence the financial system stronger against future crises, the need for reforms has gained importance. In 2010 the Basel committee announced a new set of reforms, namely Basel III Accord, with a press conference. It is basically aimed at expanding the scope of the obligations of banks and plans on bringing additional obligations in order to counterbalance the systemic risks. Although this new accord does not deviate from Basel II criteria significantly, it brings tighter obligations to banking sector. It is planned and expected that countries will adopt Basel III between 2013 and 2019.

The aim of this study is to see whether there are differences in managing risks between the Turkish banking sector which has been implementing her own regulations and the countries that already implement Basel II.[1] The reason and motivation for such a comparison is that during the recent crisis many banks which are regulated under Basel II have been affected substantially, whereas the banking sector in Turkey has not been affected and came out even stronger than before the crisis.[2] In order to measure the effect of Basel criteria, we examine and compare common banking ratios of Turkey with her own country specific measures and various countries which adopt Basel criteria hoping to contribute to the literature.

In the second section we provide a brief literature review to understand the criticisms about Basel II and hence the need for Basel III. Section three outlines the reasons of why Turkey's banking sector was not affected by the recent global crisis by providing a brief retrospective historical background. In the fourth section, we apply an empirical exercise through panel data estimation, andthe last section concludes.

2. WHY THE NEED FOR BASEL III?

Bank for International Settlements (BIS) defines Basel III as a comprehensive set of reform measures, developed by the Basel Committee on Banking Supervision, to strengthen the regulation, supervision and risk management of the banking sector. Basic aims of Basel III are to improve the banking sector's ability to absorb financial and economic shocks, improve risk management and corporate governance, strengthen banks' transparency and disclosures, and improve individual banks' endurance with micro regulations while improving system's endurance with macro regulations.

The previous accord, shortly called, Basel II was accepted by the European Union (EU) in 2006. After the recent global financial crisis of 2008, it became apparent that the regulations of Basel II were not sufficient to hinder the breakdown of the banking systems and that these measures needed to be revised and developed further. Hence, in the G-20 assembly in October 2009 it was

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[1]AlthoughTurkey started to implement Basel II on 01.07.2012, it is not for certain that all of the banks started complying with it. Turkish banks still use some of the existing measures and criteria of obligations which are different than in Basel II. Moreover, this study covers the period of 2000 to 2009.

[2]Although this was the case for the banking sector, Turkish economy was hit hard by the crisis, even more than the countries in which the crisis began and spread. Turkey's GDP decreased by 4.8% in 2009, whereas the U.S.A.'s (origin of the crisis) GDP decreased by 3%.

decided to set a new accord that would increase the endurance of financial system to economic and financial shocks. As a result, on 12.09.2010, Basel Committee announced a new set of reforms which is shortly called Basel III.

To understand the weaknesses of Basel II and hence the need for Basel III in a more analytical framework, in this section, we provide a brief review of the literature regarding Basel II and III accords and the issues which are underlined within the scope of Basel. As Basel III is a new accord there are a limited number of studies about it. On the other hand, there is a vast literature on Basel II. Some are analysis of the three pillars of the accord, some study the effect of Basel accords on developing countries, some try to answer how macroeconomic variables determine default rates in an economy, and yet another branch studies the behavior of banks under Basel accords. Even though there are different approaches to studying Basel accords, a vast majority of the literature unanimously claims that Basel II was far from stabilizing financial markets. This is put forth and very well explained in an influential article by Danielsson et al. (2001). It is claimed that the proposed regulations fail to consider the fact that risk is endogenous and that value-at-risk can destabilize an economy and induce crashes when they would not otherwise occur. Moreover, statistical models used for forecasting risk have been proven to give inconsistent and biased forecasts, notably underestimating the joint downside risk of different assets. It is also claimed that the Basel Committee has chosen poor quality measures of risk when better risk measures are available. Furthermore, heavy reliance on credit rating agencies for the standard approach to credit risk is misguided as they have been shown to provide conflicting and inconsistent forecasts of individual clients' creditworthiness. They are unregulated and the quality of their risk estimates is largely unobservable.

Basel II was constructed on three pillars which were a new capital adequacy requirement, supervisory review and market discipline. However, these three pillars and Basel II have been analyzed and criticized by many, tackling the issue from different aspects. Decamps, Rochet and Roger (2004) interprets the first one as a closure threshold rather than a mean of influencing banks' asset allocation. They claim that market discipline can be used to reduce capital adequacy and that for an effective market discipline, banking supervisors must be protected from political interference. Similarly, Herring (2004) states that Basel II attempts to eliminate incentives for regulatory capital arbitrage and align capital regulation with best practices in credit risk management, and it describes an alternative approach, based on mandatory issues of subordinated debt, which makes use of market discipline to achieve these goals at much lower cost. Correspondingly, Rochet (2004) argues that banking authorities should keep close relationship with bankers, and supervisory resources must be used primarily to control the behavior of banks in distress instead of implementing complex regulations inasmuch as these complex regulations will at the end be bypassed by the most sophisticated banks. In line with Rochet (2004), Zicchino (2006) claims that under Basel II banks might not have the necessity to maintain the same level of capital during periods of high economic activity as under Basel I and banks would be more vulnerable to unexpected negative shocks and if the economy falls into a recession or experiences a weakening in its growth, it would be more likely for banks' capital constraints to be binding and thus for credit to be rationed. On the other hand,Scellato and Ughetto (2010) criticize Basel II on the ground that it has negative impact on lending conditions for the small and medium sized enterprises that are relatively younger after analyzing data of 168 Italian companies.

Some studies analyze the behavior of banks under Basel accords and criticize Basel II within this framework. Benink, Danielsson and Jonsson (2008) argue that Basel II regulations lead to a harmonization of bank behavior to maintain a special level of regulatory capital. Moreover Hermsen (2010) investigates the consequences of this bank behavior and claims that although

Basel II accord aims to ensure banks having enough regulatory capital to withstand periods in which they have extraordinary losses, the accord itself provokes such extraordinary events. In another study, Moreira (2010) claims that the model used by Basel II to estimate the capital required to cover credit losses has some drawbacks and misestimates the capital needed to cover unexpected losses.

Yet some study how macroeconomic variables and bank lending and default rates interact in an economy. Ali and Daly (2010) try to improve the understanding of the credit risk modeling at the country level under the framework of Basel II capital adequacy standards and they aim to investigate the interaction between the cyclical implications of aggregate defaults in an economy and the capital stock of a bank. They construct a macroeconomic credit model and perform a scenario analysis comparing two countries, Australia and the U.S.A. They conclude that the same set of macroeconomic variables present different default rates for the two countries and finds that compared to Australia, the U.S. economy is much more susceptible to adverse macroeconomic shocks.

As aforementioned, there are a limited number of studies about Basel III. One of them, by Blundell and Atkinson (2010) suggest that although Basel III have some very useful elements, like support for a leverage ratio, a capital buffer and the proposal to deal with procyclicality through dynamic provisioning based on expected losses, it also has some major concerns. The most important one is not dealing with the most fundamental regulatory problem. Promises that make up any financial system are not implemented equally in different countries and banks can shift them around by transforming risk buckets with derivatives to minimize their capital costs. Heid (2007) examines the problem of capital-induced lending cycles and theirprocyclical effect on the macro economy in greater detail. He finds that the capital buffer that bankshold on top of the required minimum capital plays a crucial role in mitigating the impact of the volatility of capital requirements. By using a different methodology Chamia and Cosimanob (2010) utilizea dynamic banking model to endogenize the capital decision andshow that banks are likely to hold capital above the regulatory minimumto avoid being constrained. They derive the option value ofholding capital, and show how this value is affected by monetarypolicy, level of economic activity, structure of the banking industry,and by changes in the level of regulatory capital.Gordy and Howells (2006) reexaminethe problem from the perspective of market discipline. They show that the marginal impact ofintroducing Basel II depends strongly on the extent to which market discipline leads banks to vary lendingstandards procyclically in the absence of binding regulation.

Last but not the least, some study the effects of Basel II on developing countries. Tonveronachi (2009) studies implications of Basel on developing countries and finds that effective implementation of Basel II in developing countries encounters many obstacles, perhaps the biggest being the problem of setting up supervisory authorities with necessary independence, resources and skills. It is concluded that implementation of Basel II will not achieve financial stability in countries that lack the necessary structural and macroeconomic preconditions. Griffith-Jones, Segoviano and Spratt (2002), examining the effects of Basel II on developing countries regarding diversification and portfolio effects, argue that the current proposals run the risk of causing an increase in cost and/or reduction in quantity of bank lending to developing countries as a consequence of the sharp increase in capital requirements for lending. Similarly, Reisen(2001) suggests that speculative grade borrowers, bulk of emerging and developing countries, would suffer from a dramatic rise in debt costs and heightened cyclicality of global bank credit as a result of Basel II. More specifically, Basel II would raise the volatility of private capital flows to speculative grade developing countries, and hence their vulnerability to currency crises. Mrak (2003) likewise concludes that implementation of the new capital adequacy standards is likely to

have negative results for emerging markets, such as increased costs and/or diminished levels of lending to the emerging countries, bias in favour of short-term lending, enhancement of competitive advantages of large international banks and increased procyclicality.

Barth, Caprio and Levine (2008) present a survey based on information on bank regulations in 142 countries including both developed and developing countries. The data do not suggest that countries have primarily reformed their bank regulations for the better over the last decade. Following Basel guidelines many countries strengthened capital regulations and official supervisory agencies, but existing evidence suggests that these reforms will not improve bank stability or efficiency.

All of these studies show that Basel II has its own weaknesses and drawbacks analyzed from different perspectives and that it is far from creating a well-functioning banking system both in developed and emerging economies. With an improved set of criteria such as Basel III the banking systems can be strengthened against future shocks and regulated in a better manner.

3. TURKISH BANKING SECTOR

Although the banking systems in the developed countries apply Basel II criteria, they went through a devastating experience quite similar to the episode Turkey went through in 2001. Even though Turkey does not yet fully implement Basel criteria in her banking system and applies her own regulations, the banking sector came out quite strong during the recent global financial crisis. Hence, it is important to look at the experience of the Turkish banking system in retrospect to understand why and how the banking sector was not affected by the recent crisis like her developed country counterparts and to see the differences in the risk management of the banking sectors.

3.1 1980s

Turkey was a closed economy before 1980 adopting import substitution industrialization (ISI) strategy. The Turkish economy, until 1980, can be characterized by restrictive monetary policy, contraction of monetary aggregates, foreign exchange shortage, declining production, and high inflation rates. Especially, excessive borrowing and imports created a substantial imbalance between exports and imports causing a huge external debt. At the end of 1970s Turkey went through a balance of payments crisis resulting from the collapse of the inward oriented ISI model development exacerbated by the externally generated oil price shocks of the period. All together, these forced the need to stabilize the economy and reduce inflation. This crisis led to a military coup in 1980, and the minority government of the time launched a structural adjustment program. With this program, Turkey changed her overall development strategy by adopting outward oriented policies aiming to achieve export led growth. Hence, Turkey began liberalizing her financial and trade sectors to transform into a free market economy.

A more in-depth look into the evolution of financial liberalization is essential to understand the banking system in Turkish economy. Until 1980s the financial sector had been repressed with imposed ceilings on deposits and lending rates resulting in negative real interest rates, credit rationing and subsidized credits, high banking sector concentration ratios and the absence of alternative capital markets leading to inefficient savings and investment decisions. The effort of the government to maximize private sector participation in economic activity and to minimize state intervention called for measures to enhance domestic savings and channel them into physical investment. These measures included decontrolling prices, restructuring the financial system through the establishment of money and capital markets, adopting a flexible exchange rate regime

and liberalizing interest rates. By liberalization of the foreign exchange deposits and loan interest rates in July 1980, the deepening of the financial sector started its progress. On the other hand, the increasing competition between banks and brokerage houses for offering high interest rates created higher costs. Hence, the breakdown of some of these banks and brokerage houses led to a financial crisisin 1982, necessitating the implementation of some regulation on interest rate on deposits by maintaining it positive in real terms until 1988 when they were once more freed. Some other developments including the establishment of Saving Deposit Insurance Fund (SDIF) in 1983 to protect savings deposits, launching of auctioning the Turkish government securities in 1985, the establishment of inter-bank money market, the Banks Act of 1985 announcing provisions for a minimum capital base for banks and capital adequacy ratio in line with the BIS, the reopening of Istanbul Stock Exchange in 1986, and the introduction of open market operations with government securities in 1987 catalyzed the financial deepening.

During the same period, as a part of the stabilization program towards liberalizing the financial sector, also the foreign exchange regime was liberalized. The depository banks were allowed to accept foreign exchange denominated deposit accounts from residents in 1984. Meanwhile, the internalization of foreign residents' transactions by permitting them to enter in the market of government securities and to make transfers allowed the export of capital. Moreover, in 1988 the exchange rate was allowed to be determined under free market conditions. Turkey completed her capital account liberalization by the full convertibility of Turkish Lira (TL) and elimination of controls on foreign capital flows in 1989.

As a result, liberalization process increased the number of banks in the sector from 43 in 1980 to 66 in 1990. Likewise, the number of foreign banks increased from 4 in 1980 to 23 in 1990 though their share of the market was only 3.5%. Banks became more transparent by reporting their non-performing loans and they were obliged to reserve provisions for failed loans. Moreover, control of external auditing of the banks was one of the new requirements.

3.2. 1990s and 2000s

As Turkey started following populist policies after 1987, inflation started to accelerate and was high at two digit levels all throughout the 90s due to excessive spending and expansionary monetary policies prompted by local and general elections. Although the financial liberalization boosted the development of the economy, it also increased the risk of facing international shocks. In 1990s it was easier to access international funding by Turkish banks which made them hold external open positions. Increasing financial instability and the changing balance sheets of the banking sector due to increased open short positions were realized through the end of 1980s, in addition to the increasing domestic debt, which dragged the economy into yet another crisis in 1994 elevating the inflation rate into three digit numbers around 100%. The results of 1994 crisis were severe and showed the fragility of the banking sector. After the crisis government accepted a full deposit system thereby encouraging banks to be irresponsible with their actions and, therefore, removing competition conditions in the market. Consequently, banks were offering high interest rates to cover debts and open positions. These developments resulted in taking over of 6 banks by the SDIF in 1999.

A new regulation was needed in order to strengthen and consolidate the banking sector. A new institution - Banking Regulation and Supervision Agency (BRSA) - with financial and administrative autonomy was established in order to provide the supervision and transparency in the banking sector with the act of 4491 in 1999. The mission of the agency has been to safeguard the rights and benefits of depositors and create the proper environment in which banks and financial institutions can operate with market discipline, in a healthy, efficient and globally

competitive manner, thus contributing to the achievement of the country's long-term economic growth and stability. With the establishment of the BRSA, the SDIF, previously under the authority of the Central Bank, started to operate under its administration. Later, with the enactment of Act No. 5020 in 2003, the management of the SDIF was separated from the management of the BRSA.

Nonetheless, macroeconomic instability continued until the late 1990s due to delayed stabilization of the governments. Turkey had not been able to overcome her structural problems such as fiscal imbalances and high inflation rates yet she managed to sustain a rather rapid economic growth in the latter half of the 1990s until the sharp downturn of 1998-1999. The standby agreement made with the IMF after the 1994 crisis was taken off track with the Russian crisis of 1998 and the massively destructive earthquake of 1999. Following these events, a disinflation program with a crawling peg system was adopted in 2000 together with the implementation of new laws concerning the banking sector. This program seemed to be performing well concerning the macro indicators, such as the falling inflation rate and the growing domestic production, until the end of 2000. In November 2000 and February 2001 Turkey was hit by two more financial crises, the latter having devastating effects both in the banking sector and on the overall economy.

After the crises in November 2000 and February 2001, the government launched aBanking Sector Restructuring andRehabilitation Program. The aim of the program was to enhance competition in the sector and make it more effective by strengthening the private banks, restructuring the state banks, providingresolution of the banks which were transferred to the SDIF through merger, sale and liquidation,and developing the legal and institutional framework to increase supervision in the sector. As the SDIF took overbanks,the number of banks decreased from 81 in 1999 to 54 in 2002.

In February 2003, under the leadership of BRSA, a coordination committee was formed with representatives of the Banks Association ofTurkey, to ensure implementation ofNew Capital Adequacy Agreement called *CAD*-3under the EU Legislation.This new framework was different then the past developments in the banking sector because control and regulation of the sector was assigned to an autonomous body and equity levels of the banks were increased. A close and transparent supervision and control mechanism was established. Banks which failed were consolidated and sold. State banks, also part of this reformation process, started to make profits instead of losses. All of these improvements led to increased profit in the sector calling attention of foreign direct investment. As a result foreign banks started to invest in Turkish banking system and many banks were sold or merged with foreign banks at high book or market values.

According to the data of Banking Association of Turkey, banking system has grown 3.5-fold since the end of 2002 to 2008, when its total bank assets stood at a mere 126.7 billion USD. Growth has run parallel with the robust performance of the Turkish economy, strength of the Turkish Lira, record foreign investment into the banking system, and abundance of global liquidity as the nation rebounded from the 2001 crisis. Since 1997, the SDIF took control of 23 financially tottering banks, which have since been shut down, merged with stronger banks, or privatized. A dozen other private banks have also merged with affiliate banks. Although the number of banks in total decreased after all the restructuring in the last two decades, both the number and the market share of foreign banks increased in Turkey. Today there are 45 banks in total of which 16 are foreign, and the market share of foreign banks increased from 5.4% in 2000 to 41% in 2012.

3.3. Capital Requirements and Risk Minimizing Regulations

Many lessons were learned with the 2001 crisis which led to the implementation of several reforms. Structural changes have been considered in the banking law to better align Turkey with EU practices and Basel standards. The BRSA has been gaining authority over non-bank financial

institutions and also issued its own set of accounting standards with the International Financial Reporting System since 2002.

The Financial Services Act of 5411 was enacted in 2005 to empower the banking system of Turkey. According to this act, significant improvements had already been made on the regulatory front. Revisions to the regulatory framework have focused on areas such as capital adequacy, risk management, and credit limits. Additional measures taken to strengthen commercial banks included limiting the net foreign open position, reducing bank loans to owners, applying international standards to loan-loss classification and provisioning, and requiring consolidated accounting. However, compliance with the regulations is as important as adopting the regulations themselves. The BRSA, which benefits from good credibility, needs to be proactive and continues to take strong action against banks that will not follow regulations.

According to article 45 of Banking Law (5411), capital adequacy means keeping adequate own funds against losses that could arise from the risks encountered. Banks shall be obliged to calculate, achieve, perpetuate and report capital adequacy ratio, which shall not be less than 8% within the framework of the regulation to be issued by the BRSA. The Board shall be authorized to increase the minimum capital adequacy ratio, to set different ratios for each bank and to revise the risk weights of assets that are based on participation accounts taking into consideration the banks' internal systems together with their asset and financial structures. The capital adequacy ratio which is determined to be 8% by law was increased to 12% as a target by the BRSA after 2006, whereas, this ratio is set at 6% according to Basel II accord.[3]However, the banking sector realized much higher capital adequacy ratios since the recent global crisis. It was 19% in 2010, 18% in 2011 and 16.6% in 2012. The measures concerning the capital adequacy ratio are tighter in the Turkish banking system compared to Basel criteria.

Moreover, all loans are classified into five groups, such as standard, closely monitored, limited collectability, doubtful and loss. All loans classified in the third category and below, and all receivables whose principal and interest has been delayed by more than 90 days are classified as non-performing loans (NPLs). If there are several loans to the same borrower at a bank they would be classified as NPLs if the borrower defaults on any one of these loans. Banks have to establish specific provisions of at least 20% for loans classified in the third group, 50% for the fourth group, and 100% for the fifth group.

4. ESTIMATION AND RESULTS

The aim and motivation of this paper is to compare the banking sectors of the countries which apply Basel Criteria and Turkey which has her own adopted criteria. There are 112 countries which adopted Basel II. In order to make a comparison OECD countries are taken as examples including Turkey. We apply a similar methodology as in the study of Ali and Daly (2010) which also compares credit defaults of the U.S.A. and Australia. In this paper we to measure the effect of various variables on non-performing loans. Non-performing loans are one of the best examples of risk measurement because they represent the amount of problem in the system of risk management and are used as a risk variable in many studies which measure the risk regarding Basel criteria.[4]

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[3] According to Basel criteria Tier 1 capital ratio is formulated as Tier 1 capital/risk adjusted assets and is set at 6%. Total capital (Tier 1 and Tier 2) ratio is formulated as Tier 1 capital/average total consolidated assets and is set at 10%.

[4]See Chang (2006), Demirgüç-Kunt et al. (2006), Majnoni et al. (2004)

Non-performing loans create a multiplier effect in the system causing more defaults due to the deposit-credit system. In order to make a sound comparison we take ratio of the non-performing loans to total gross loans. We decompose Turkey and other countries by using a dummy variable. By this way, significance and direction of the dummy would let us compare Turkey and other countries which apply Basel criteria. We also control for total rate of bank liquid reserves to bank assets ratio and rate of bank capital to asset ratio. Regression is formulated as:

$$NPL = c + \beta_1 LR + \beta_2 BC + \beta_3 D + \varepsilon$$

where *NPL* is the ratio of non-performing loans to total gross loans, *LR* is the rate of bank liquid reserves to bank assets ratio, *BC* is the rate of bank capital to asset ratio, *D* is the country dummy for Turkey, and ε is the error term.

Since as banks have more liquid reserves they are able to lend more loans which increases the possibility of defaults on loans, we expect LR to have a positive coefficient. BC which basically shows the capital adequacy is expected to have a negative coefficient because as capital adequacy increases the rate of non-performing loans should decrease. Similarly, we expect D to have a negative coefficient. The reason is that Turkey has more strict regulations compared to Basel II criteria, therefore, the country dummy which represents Turkey's LR and BC would affect the non-performing loans negatively.

The independent variables are chosen based on the three pillars of Basel criteria. Data on all variables are annual and are taken from the BIS for 2000-2008 period. Although at the beginning we tried to include 20 countries in the regression, due to lack of data 9 countries were omitted and country set was established among 11 countries, which are all OECD countries: Australia, Canada, Czech Republic, Estonia, Hungary, Israel, Japan, Mexico, Switzerland, Turkey and the U.S.A.

Table 1 shows the averages of the variables used in our model in addition to domestic credit provided by the banking sector. Although this variable is not used in our estimation, we provided the average of it to show that while Turkish banking sector implements higher risk managementand provides lower domestic credit compared to OECD countries in the period under study, the percentage of non-performing loans is much higher.[5] This makes it clear why we try to answer the question of whether Turkey should adopt Basel criteria or not.

Table 1: Averages of Selected Variables

	Domestic Credit (% of GDP)	LR (%)	BC (%)	NPL (%)
Turkey	47,03	8,91	11,39	9,38
OECD (Sample Countries)	144,26	4,16	6,05	2,62

Because panel data series may have unit roots and that regressing non-stationary series on each other is bound to yield spurious regression results, we first investigated the stationarity and order

[5] The graphs for the selected variables of each country can be seen in Table1a in the Appendix.

of integration of the variables by a panel unit root test. TheIm, Pesaran and Shin (IPS) unit root test is adopted for this purpose. The results of the IPS panel unit root test at level indicates that all variables are *I*(0) in the constant of the panel unit root regression, hence the variables are stationary. We then applied Hausman test to check whether there is endogeneity, and we accepted the null hypothesis of exogeneity concluding that we can use random effects model. The Honda LM test allows us to identify whether one way or two way random effects model must be used. We accepted the null hypothesis of no random time effects and hence estimated a one way random effects model with individual effects. We took care of existingheteroskedasticity and autocorrelation via using White period standard errors and covariance.[6] Since we have a dummy variable and we estimate a one way random effects model, Wallace-Hussain estimator is used. The results of the estimation are given in Table 2.

Table 2: Random Effects Model (dependent variable is NPL)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.815895	2.091362	2.780913	0.0065
LR**	0.497295	0.264618	1.879292	0.0633
BC**	-0.741090	0.336515	-2.202251	0.0301
D***	7.571675	1.247953	6.067275	0.0000

*** indicates % 0,01 probability

** indicates % 0,05 probability

Results of the panel regression indicate that rate of bank liquid reserves to bank assets ratio, rate of bank capital to asset ratio and dummy variable are significant to explain the changes in non-performing loans to total gross loans. All of the variables except the dummy variable have the expected signs. The sign and significance level of the dummy variable is the core of this paper. The positive coefficient of D reflects that Turkey's more strict regulations increase the level of risk which is indirectly calculated by NPLs when she is compared to other countries in this study.

In the light of these results we can conclude that country specific measures of the banking sector create a difference. Thus adopting her own criteria did not put Turkey in a better and safer place among the OECD countries during the period under study regarding risk management. Although Turkey made incredible restructuring in her banking system during the last decade and manages the level of risk in the banking sector better relatively to past, and her banking sector was not affected by the recent financial crisis, she does not perform better than the other countries in the regression.

[6]The results can be provided upon request.

5.CONCLUSION

In this study we try to understand whether Turkish banking system creates a difference about managing the risk in the framework of Basel criteria among the OECD countries and whether she should adopt Basel criteria or not. As it is mentioned in the third section after the financial crisis of 2001 in Turkey, the BRSA created new measures for the banking sector based on Basel Criteria. The government took over the banks which were in bankruptcy and strengthened theratio of the banks by putting capital and establishing a transparent and sound supervision and control system. The criteria of the BRSA for Turkish banking sector were higher than the Basel Criteria.For instance, rate of bank capital to asset ratio (capital adequacy) is higher than the OECD countries.As this ratio keeps high it creates an extra cost for banks, but it also creates confidence and decreases the level of the total risk in the sector. By the help of the regulations and country specific measures a new risk culture has been formed in the sector. Even though the minimum bank capital to asset ratio is declared as 12% by the BRSA, the banking sector, without any enforcement, kept this ratio around 18% for last three years after the global financial crisis hit the world in 2008. This is a simple but important risk perception and application culture in Turkish banking sector.

In order to see whether the effects of the structural changes in banking sector of Turkey would create a positive difference for managing risk for Turkey among OECD countries we performed a panel data estimation and estimated the effects of risk management on non-performing loans to total gross loans. Rate of bank liquid reserves to bank assets ratio, rate of bank capital to asset ratio and country dummy (indicating Turkey), are taken as independent variables. We find all variables to be significant. Results of the regression indicate that Turkey is not better than the countries in the regression in order to manage her risk in the banking sector.

This study displays that Turkey has taken the necessary lessons after she faced a severe financial crisis but she did not perform as good as OECD countries which adopt Basel Criteria. Although Turkey's banking sector was not affected by the recent global financial crisis, and moreover it came out quite strong from the crisis, the analysis undertaken in this study implies that Turkey should adopt and implement Basel criteria to further increase the endurance of the banking sector regarding the vulnerability to risk.

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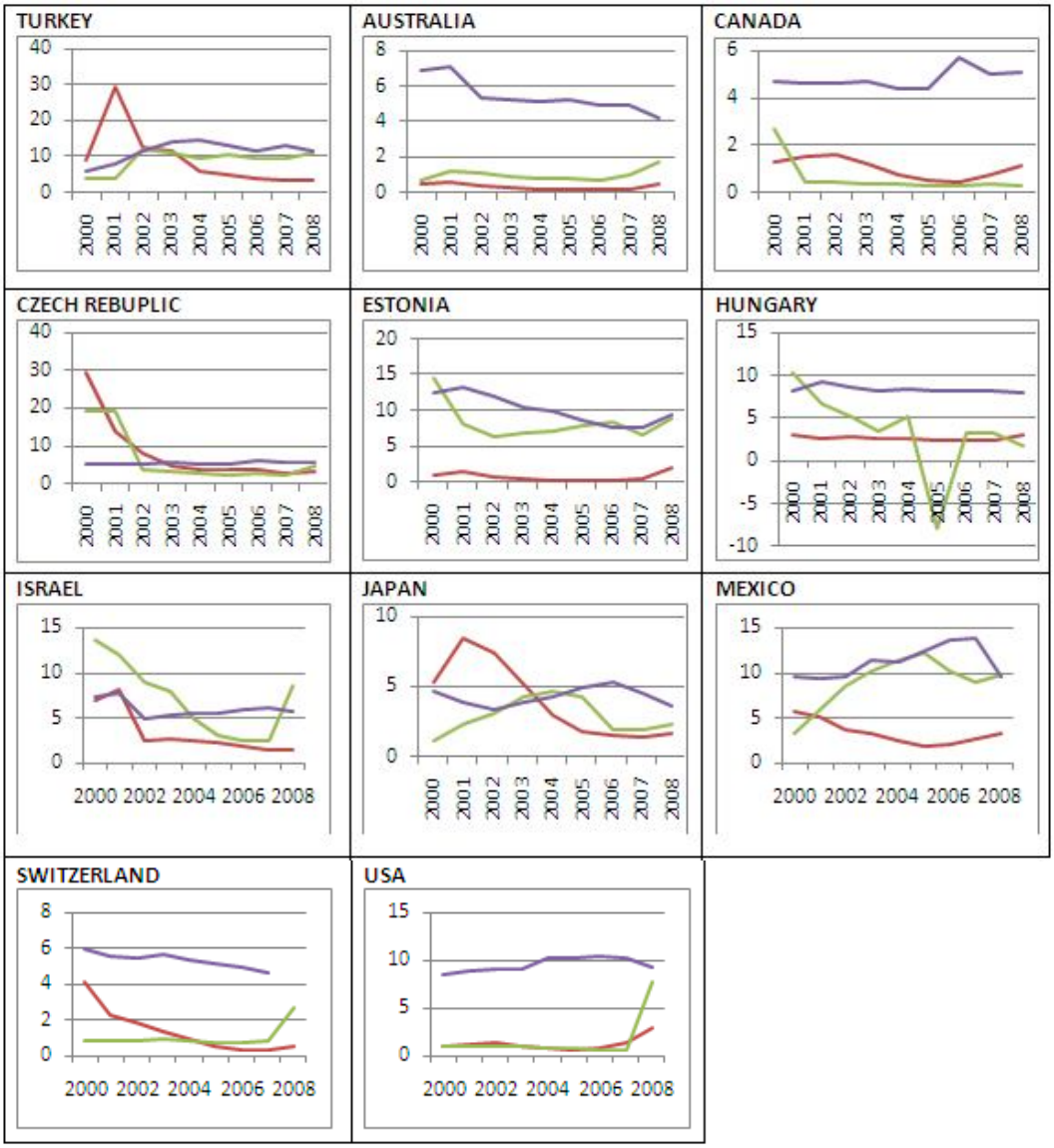
Appendix

Table 1a: Graphs of Selected Variables (Percentages) for Sample Countries, 2000-2008



Red Line: Non-Performing loans to total gross loans (NPL), Green Line: Rate of bank liquid reserves to bank assets ratio (LR), Purple Line:Rate of bank capital to asset ratio (BC)

Journal of Business, Economics & Finance ISSN: 2146-7943

Journal of Business, Economics & Finance
Year: 2013 Volume: 2 Issue: 4

INVESTING IN BANKRUPT STOCKS: IS IT A SWEET TRICK?

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KEYWORDS

Chapter 11, bankruptcy, holding period return.

ABSTRACT

We track the holding period return from investing in bankrupt stocks using a buy-and-hold strategy, buying the stocks on the bankruptcy filing date and holding them until the final resolution date (reorganization or liquidation). We find that holding a simple long position in the bankrupt stocks will generally lead to a large loss. The holding period return computed from the stock price alone cannot show the entire story. When considering final distributions plus the stock price, we seea much greater loss. In our regression analysis, we find that liquidity is always a key factor in explaining the returns. Profitability and information uncertainty plays a significant role in explaining the positive returns, while liquidity and (un)profitability are the two key issues associated with the negative returns. In addition, the involvement of hedge funds does not seem to be associated with better stock performance.

1. INTRODUCTION

Bankruptcy filing is a significant economic event in a corporation's life cycle. Prior research documents negative market reactions to bankruptcy filing announcements (Clark and Weistein (1983), Datta and Iskandar-Datta (1995), Dawkins and Rose-Green (1998), and Coelho and Taffler (working paper, 2008)). The securities of a publicly owned firm that files for Chapter 11 often continue to trade. If such a firm's securities are delisted by the NYSE, Nasdaq or AMEX, their trading may move to the Pink Sheets.

One of the most noticeable characteristics of the stocks of most bankrupt firms is the dramatic decline in their price as compared to its prior levels. These very low prices (typically a stock that may have traded in the tens of dollars now trades in the pennies) often draw attention from unsophisticated individual investors who rush in to buy. Such investors may expect,or at least hope, for a huge profit when the company reorganizes and emerges from Chapter 11. They may believe that even if they don't make a killing, any loss will be limited due to the already depressed current level of the stock price. Such investors may not contemplate the likelihood that thestockwill become worthless. A stock that falls from pennies a share to zero is still a 100% loss, a not uncommon result.

Herein weexplore both the performance and the major factors which help explain the performance of these bankrupt stocks. The holding period return performance is measured in three ways:1. The

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simple holding period return which only uses the price information: 2. The comprehensive holding period return which takes account of both price and final distributions specified in the reorganization or liquidation plan, and; 3.Alpha estimated from Carhart four-factor model (Carhart,1997).

We find that a strategy of buying such stocks on the date of their bankruptcy filing day and holding until the final resolution date has produced significant negative returns for allthree measures. The stock price alone may provide an illusion of limited loss exposure. The final distribution, however, reveals that investors will generally suffersevere losses. Over half of our sample, for which the plan of reorganization can be identified, cancel or extinguish their pre filing shares. As a result the common stock holders receive nothing and their stocks become worthless on the final resolution date.

In our multivariate regression analysis, we test three accounting variables, liquidity, profitability, and leverage, plus one dummy representing whether a firm suffers from financial distress pre bankruptcy, and one proxy for information uncertainty. The uncertainties of the Chapter 11 process add significant risk to investing in bankrupt stocks. We find liquidity to be the key factorin explaining stock returns. Profitability and information uncertainty are significant in explaining the positive returns, while liquidity and (un)profitability are the two major concerns for negative returns. Another interesting factor, the involvement of hedge funds, also draws our attention as hedge fund managers are experienced investors. We explore whether they are able to select stocks with more attractive potentials. Our results, however, do not support this hypothesis.

Our paper contributes to the relevant literature in several ways. First, we extend the existing literature which document the large loss around the bankruptcy filing period (Clark and Weinstein (1983), Datta and Iskandar-Datta (1995), etc) and poor long-term after bankruptcy performance (Hotchkiss (1995), Coelho and Taffler (working paper, 2008), etc) by investigating the period during Chapter 11. This period draws our interests as investors are lured into the market by noticing a record low stock price upon bankruptcy filing, but is the deal really as sweet as it looks?

Second, differing from Li and Zhong (2013) and Coelho and Taffler (working paper, 2008)which also focus on stock performance during Chapter 11is the comprehensive way we look at the holding period return. Investing in bankrupt stocks is not purely a financial activity, as it involves the uncertainty of the Chapter 11 legal process. The returns are also determined by the distributions listed in the reorganization plans, which are largely out of most investors' control. Therefore, the simple holding period return which only uses stock price is a biased measure of the return over the full Chapter 11 period. Combining the final distribution to the investors with the stock price information provides a more accurate understanding of the return scheme for bankrupt stock.

Third, our regression analysis uses lagged information in the year before bankruptcy filing, in order to test whether investors can rely on this available information when they invest in the bankrupt stocks. In addition to some traditional accounting variables, such as liquidity, profitability and leverage, we also explore whether a company files for bankruptcy due to financial distress or some other strategic purpose. More interestingly, we add a dummy variable for hedge fund participation, as hedge funds are managed by veteran investment managers whomay be able to identify situations which offer higher returns.

2. LITERATURE REVIEW

The effect of a Chapter 11 filing on distressed companies' stocks has been well explored. Clark and Weinstein (1983) find large losses occur during the bankruptcy filing month. Those losses are especially concentrated in the three trading day interval surrounding the filing. Datta and Iskandar-Datta (1995), who explore the impact of a bankruptcy announcement on stock and debt holders, find a significant negative stock price reaction to the announcement. Dawkins and Rose-Green (1998) investigate the relationship between any prior WSJ discussions of possible bankruptcy filings and the price reaction to an actual filing. They also find significant negative abnormal returns around the bankruptcy filing date. The price reaction to bankruptcy filings is smaller for firms having prior WSJ stories of potential bankruptcy filings. Rose-Green and Dawkins (2002) explore the tendency of the stock market to differentiate between strategic bankruptcies and financial bankruptcies. Financial bankruptcy is characterized by short- or medium-term financial distress, such as default on interest or principal payment. Strategic bankruptcy is characterized by filing for Chapter 11 against one identifiable stakeholder (such as unionized employees), aiming to benefit the firm at the expense of the interest of that specific stakeholder. They find significantly less negative abnormal returns for strategic bankruptcies around the filing dates. Dawkins, Bhattacharya, and Bamber (2007) find, on average, the more negative the filing period price reaction, the more favorable the immediate post-filing returns. Coelho and Taffler (working paper, 2008) also document negative abnormal and raw returns at the Chapter 11 filing date.

Related to our paper, many studies discuss the long-term performance of the stock of bankrupt firms after they emerge from Chapter 11, although the results are mixed. Morse and Shaw (1988) find that while trading in bankrupt stocks has become much more common, three year average returns for firms emerging from bankruptcy are positive and large but not significantly so, implying that no abnormal return is likely to be available. Hotchkiss (1995), who studies the operating performance of bankrupt firms after they emerge from Chapter 11, finds that over 40% of the firms continue to suffer operating losses in the first three years after emergence. Covering a more recent time period, Hotchkiss and Mooradian (2004) find that more than two thirds of their sample underperforms industry peers for up to five years after emergence. Coelho and Taffler (working paper, 2008), who explore the long-term reaction to Chapter 11 filings, find strong negative and statistically significant post-Chapter 11 abnormal returns of at least -28% over the 12-month period after the Chapter 11 announcement. On the other hand, Eberhart, Altman, and Aggarwal (1999), who examine the equity performance of firms going through Chapter 11, document large positive excess returns over the 200 trading days following emergence. Kalay, Singhal, and Tashjian (2007) find that their sample experiences significant improvement in operating performances during Chapter 11. While Alderson and Betker (1999) report that the five year average annualized post emergence return of reorganized firms neither under- nor out-perform the S&P 500.

The characteristics and factors that impact the distressed bond/stock returns of bankrupt firms have been extensively studied. Morse and Shaw (1988) show that filing for bankruptcy generally does not change systematic risk significantly but does significantly increase return variance. Datta and Iskamdar-Datta (1995) investigate both bond and stock returns. They find that three different classes of debt holders react differently to the information revealed by the bankruptcy filing. The secured debt holders are unaffected by the announcement. The unsecured and the convertible debt classes, in contrast, show significant adverse price reaction to the announcement. In addition, in the 21-day event period, the secured debt holders gain significantly while all other classes suffer substantial losses. Duration and complexity of the reorganization process both have a negative impact on the excess returns of bonds. Leverage is positively related to securities' excess returns.

Griffin and Lemmon (2002) examine the relationship between book-to-market equity, distress risk, and stock returns. In the most distressed group, the return difference between high and low book-to-market is more than twice as great as that of the other groups. Campbell, Hilscher, and Szilagyi (2008) explore the determinants of the pricing of financially distressed stocks. They find such stocks have delivered anomalously low returns since 1981. Those stocks have lower returns but much higher standard deviations, market betas, loadings on value and small-cap risk factors than do stocks with a low risk of failure.

3. HYPOTHESIS, DATA AND METHODOLOGY

3.1 Hypothesis

While the negative performance of bankrupt stocks is well documented, most of the returnsare calculated based on stock performance only. However, the entire Chapter 11 process is full of rich content, such as plan of reorganization, disclosure statement, etc. The information generated during the Chapter 11 process should not be neglected. If we combine the stock price and the reorganization treatment information for the common stock class, we should be able to assess the performance of bankrupt stocks more effectively. In addition, the largely negative stock performance of a sample of bankrupt stocks is a reflection of overall performance. Such average overall performance does not by itself rule out the possibility that making a profit by investing incarefully selected bankrupt stocks. Therefore, we test the following two hypotheses in this paper:

Hypothesis 1: Investing in bankrupt stocks would generate a larger loss considering both stock price and the final distributions to old common stock holders, compared to the existing literature which largely uses stock prices only to compute returns.

Hypothesis 2: Stocks of bankrupt companies with profit potential behave differently compared to the ones without such potential.

3.2 Data

Our sample collection process is outlined in Table 1. We obtain our initial list of 2776 bankruptcy filings from 1978 to 2008 from the bankruptcydata.com database. First, we checked their records on the Center of Research in Security Prices (CRSP) database. The1007 cases that werenot found in CRSP were eliminated. Second, we checked how many of the remaining firms have trading information during their Chapter 11 process thereby eliminating 1209 firms that were delisted prior to or upon their bankruptcy filing. Of the remaining 560 firms, 80 additional cases were removed because their data were unavailable or they were still in Chapter 11 in 2010. Nineteen firms were also excluded as they have missing trading information during the bankruptcy period, and 7 more firms were removed as their first available trading date is longer than 5 days after the Chapter 11 filing. Following Fama and French (2001), we exclude 55 financial (SIC code 6000-6999) and utility firms (SIC code 4900-4999), as the financial decisions of utility firms are affected by regulation and the financial ratios of financial firms are not comparable to those of other industrial firms. Accounting information from COMPUSTAT is also required, thereby eliminating another 104 firms, our final sample consisted of 295 firms.

Table 1: Sample Collection Process

	Number of Firms	Percentage
Initial Samples	2776	100.0%
- No CRSP Data	1007	36.3%
- No trading during Ch 11	1209	43.6%
- Data N/A or still in Ch 11	80	2.9%
- Missing trading info	19	0.7%
- First trading date is more than 5 days after Ch 11 filing	7	0.3%
- Financial and Utility Firms	55	2.0%
- No Compustat Data	104	3.7%
Final Sample	295	10.6%

3.3 Return to existing common stock holders

We assume that the investor buys the stocks as soon as a trouble company files Chapter 11, probably expecting that it can successfully reorganize and resume trading on major stock exchanges. Such investors are assumed simply to buy the bankrupt stocks and hold them until the resolution date of Chapter 11 case.

We consider three measures for the returns to existing common stock holder starting with the simple holding period return (S-HPR), which only uses the trading information (stock prices) available from CRSP:

$$\text{S-HPR} = \text{Price}_{\text{Last}} / \text{Price}_{\text{First}} - 1 \quad (1)$$

in which $\text{Price}_{\text{Last}}$ is the last available stock price, and $\text{Price}_{\text{First}}$ is the stock price on the bankruptcy filing date. S-HPR is the most straightforward way to look at the returns as stockholders simply buy-and-hold the bankrupt stocks.

Our second measure also takes account of the final distributions to the pre filing common stock holders.Of these 295 firms, we are able to obtain the Chapter 11 plan of reorganization for 71 firms primarily from PACER. The company's reorganization plan contains a detailed discussion of each class of claimholders' treatments. Generally the existing common stock holders will be compensated according to the terms provided that the required majority of creditors vote to accept the plan. Otherwise, the shareholders will receive no more from the company than they would have received in liquidation (usually nothing). In49 out of 71 bankruptcies in our sample the old common shares were cancelled on the effective date giving existing shareholders nothing. While cash is almost never distributed to those holding old shares, a combination of new shares and warrants may be distributed. The stock in the reorganized company almost always goes largely or exclusively to its creditors.

A comprehensive way of calculating the return to the old stockholders should include the distribution to the old shareholders listed in the plan of reorganization, which requires information on: 1) the resolution of Chapter 11 filing; 2) type and amount of securities received; and 3) price of the securities on the effective date. The comprehensive holding period return (C-HPR) to old shareholdersis calculated as:

C-HPR = [Ending Value – Beginning Value] / Beginning Value (2)

in which, Ending Value = Distribution per share made to old common stock holders

= [# of new shares received × Price of new shares on effective date +

# of warrants received × Value of warrant on effective date + Cash]

Beginning Value = Stock price in bankruptcy filing date

If the old shareholders retained their existing stock, the ending value will be the stock price on the effective date.

Our third measure follows Carhart (1997), which assumes that a stock's expected return is explained by the market portfolio and three factors designed to mimic the risk factors related to size, book-to-market, and momentum. The model takes the form:

$$r_{i,t} - r_{f,t} = \alpha_i + b_i(r_{m,t} - r_{f,t}) + s_i SMB_t + h_i HML_t + w_i UMD_t + \varepsilon_{i,t} \quad (3)$$

where $r_{i,t}$ is the return on stock i at time t, $r_{f,t}$ is the risk-free rate at time t. $r_{m,t} - r_{f,t}$, SMB_t, HML_t, and $UMD_t$are the risk premium on the market portfolio, the difference between the returns on portfolios of small stocks and large stocks, the difference between the returns on portfolios of high and low book-to-market stocks, and the difference between the returns on portfolios of high prior returns and low prior returns. We obtained the SMB, HML, and UMD from Kenneth French database. We estimate a time-series regression for each bankrupt stock using its daily returns over the entire period during Chapter 11, and use intercept α_i as risk-adjusted return for stock i.

4. RESULTS AND DISCUSSIONS

4.1 Descriptive statistics

Table 2 contains accounting performance data for our sample. Panel A reports the summary statistics of our variables one year before the official bankruptcy filing. The median asset value of our sample is $96.14 million with standard deviation of $3,542 million. Thus our sample does not appear to over represent either small or large firms. Not surprisingly, we find that our sample tends to suffer from negative net income, low book equity, and high book-to-market. We also construct four variables to represent the major areas of interest. We use Altman's Z-score to measure the overall bankruptcy risk. CA/TA is calculated using current assets divided by total assets, which is a liquidity measure. EBIT/TA is calculated using earnings before interest and taxes divided by total assets, which is a profitability measure. TL/TA is calculated using the total liability divided by total assets, which is a leverage measure. We see these four variables as most directly related to our sample firms' performances. We find that our sample suffers from poor operating conditions, shown in negative Z-scores, indicating high levels of bankruptcy risk, negative profitability, and high leverage. Panel B shows the correlations between all the variables. The overall bankruptcy risk measures Z-score is highly correlated with profitability measure EBIT/TA. Therefore, putting them into the same regression would result in a high level of multicollinearity.

Table 2: Sample Characteristics

Panel A: Summary statistics

	N	Mean	Median	Min	Max	StdDev
Total Assets (MM$)	238	986.87	96.14	6.75	25197.00	3542.00
Net Income (MM$)	238	-150.36	-14.13	-3960.35	44.36	590.22
Book Equity	238	23.24	16.30	-2824.00	1550.20	445.31
Book/Market	238	3.25	2.54	-239.20	143.57	23.55
Z-score	238	-36.69	-1.48	-6664.82	16.57	432.85
CA/TA	238	0.46	0.48	0.00	0.97	0.25
EBIT/TA	238	-0.91	-0.06	-170.72	0.22	11.07
TL/TA	238	0.88	0.79	0.08	5.05	0.56

Panel B: Correlation matrix

	Total Assets	Net Income	Book Equity	B/M	Z-score	CA/TA	EBIT/TA	TL/TA
Total Assets	1.00	-0.46	0.00	0.06	0.02	-0.24	0.02	0.02
		(0.00)	(0.97)	(0.35)	(0.73)	(0.00)	(0.73)	(0.74)
Net Income	-0.46	1.00	0.50	0.11	0.42	0.20	0.43	-0.02
	(0.00)		(0.00)	(0.10)	(0.00)	(0.00)	(0.00)	(0.73)
Book Equity	0.00	0.50	1.00	0.29	0.42	0.00	0.42	-0.11
	(0.97)	(0.00)		(0.00)	(0.00)	(0.96)	(0.00)	(0.09)
B/M	0.06	0.11	0.29	1.00	0.04	0.01	0.04	-0.39
	(0.35)	(0.10)	(0.00)		(0.49)	(0.88)	(0.54)	(0.00)
Z-score	0.02	0.42	0.42	0.04	1.00	0.09	1.00	0.06
	(0.73)	(0.00)	(0.00)	(0.49)		(0.15)	(0.00)	(0.35)
CA/TA	-0.24	0.20	0.00	0.01	0.09	1.00	0.09	0.08
	(0.00)	(0.00)	(0.96)	(0.88)	(0.15)		(0.18)	(0.23)
EBIT/TA	0.02	0.43	0.42	0.04	1.00	0.09	1.00	0.07
	(0.73)	(0.00)	(0.00)	(0.54)	(0.00)	(0.18)		(0.31)
TL/TA	0.02	-0.02	-0.11	-0.39	0.06	0.08	0.07	1.00
	(0.74)	(0.73)	(0.09)	(0.00)	(0.35)	(0.23)	(0.31)	

4.2 Holding period return (HPR)

Table 3 contains statistics for our S-HPR, C-HPR, and alpha. To make the results comparable, we also calculate the annualized HPR for S-HPR and C-HPR. Not surprisingly, we find negative returns over the holding period overall. The average annualized S-HPR, which only uses the stock price information, is -25.1%, with a median of -78.9%. The average annualized C-HPR, which involves both the stock price and the final distribution from the company to existing shareholders, is -76.9%, with a median of -100.0%. We find that the way we calculate the C-HPR generates a more severe loss compared to S-HPR. Therefore, looking at the stock price alone is not sufficient

and will produce a biased (too optimistic) result. If an investor holds the stock until the final resolution date, the distributions specified in the reorganization or liquidation plans are usually not favorable to the common stockholders, as they have the lowest priority status among the claims. Secured claims, secured tax claims, priority non-tax claims, and some DIP claims, enjoy first priority. Usually their status will be unimpaired and they will be paid in full. Other creditor claims come next followed by preferred stock. Under absolute priority they are entitled to a full recovery before any distribution to common. Common stock, which is in the class of equity interest, is at the end of the distribution list. Not only is the equity class impaired, the common stock will usually be extinguished or cancelled on the effective date, and will thereby become worthless. In the worst (but likely) scenario of being cancelled, the shareholders will lose every penny they have invested (-100% return).

Table 3: Returns of Bankrupt Stocks

	S-HPR		C-HPR		Alpha
	HPR	AHPR	HPR	AHPR	
Mean	-22.3%	-25.1%	-69.7%	-76.9%	-2.8%
Median	-40.0%	-78.9%	-100.0%	-100.0%	-1.8%
Min	-99.4%	-100.0%	-100.0%	-100.0%	-75.0%
Max	528.6%	250.1%	206.9%	78.8%	92.4%
StdDev	82.1%	110.8%	74.3%	48.4%	10.7%
Skewness	3.96	1.67	3.07	2.26	0.99
Kurtosis	21.46	1.49	8.95	4.26	33.22
t-statistics	-4.65	-3.88	-7.90	-13.38	-4.20
N	295	295	71	71	266

4.3 Regression Results

Although investing in bankrupt stocks is very likely to produce overall losses, 60 firms enjoy a positive S-HPR and 52 firms enjoy positive alphas. In this section, we explore what factors contribute to whether an investor can profit by investing in bankrupt stocks. We categorize our HPR into positive and negative groups. Our first regression focuses on the accounting performances only, which is estimated as

$$HPR_i = \alpha + \beta_1 * CA/TA_{i,pre1} + \beta_2 * EBIT/TA_{i,\,pre1} + \beta_3 * TL/TA_{i,\,pre1} + \beta_3 * TL/TA_{i,\,pre1} + \beta_4 * \text{Log (Total Assets)}_{i,\,pre1} + \beta_5 * B/M_{i,\,pre1} + \varepsilon_i \quad (4)$$

in which we investigate three major measures of accounting performance, liquidity which is represented by CA/TA, profitability which is represented by EBIT/TA, and leverage which is represented by TL/TA, in one year before the bankruptcy filing. We also control for size and book-to-market at the same time. We run the regression for all HPR and for both positive and negative HPR. The results are shown in Table 4. For all the HPR, we obtain significant regressions for S-HPR and alpha. For both of these two measures, CA/TA, which is our liquidity measure, is significantly positively related to S-HRR with a coefficient of 0.435 and alpha with a coefficient of 0.079, indicating that firms with higher liquidity before filing for bankruptcy tend to generate a higher stock returns during the Chapter 11 period. These results show that, overall, liquidity is more likely to be a key factor in determining the holding period returns for the distressed stocks.

EBIT/TA, our profitability measure, is only significantly positively linked to alpha, and TL/TA, our leverage factor is not significant in our regression results.

Further, we categorize our returns into groups of positive and negative ones to test whether our explanatory factors play different roles between these two groups. For C-HPR, we only have five firms that offer positive HPR, therefore, we are not able to run the regression for positive C-HPR. For the positive returns, our model is good for S-HPR, but not for alpha. For S-HPR, profitability measure EBIT/TA is the key explanatory factor. The coefficient estimate is 1.718 and significant at 5% level, showing that higher profitability generally contributes to higher returns. However, liquidity and leverage are not significant in explaining the positive S-HPR. For the negative returns, the three regressions are significant at least at the 10% level. Liquidity is a key factor here as it is significant for S-HPR, C-HPR, and alpha. All three coefficient estimates are significantly positive, 0.202 for S-HPR, 0.207 for C-HPR and 0.045 for alpha, revealing that greater liquidity tends to contribute to higher returns for investors. Profitability is also an important factor for C-HPR and alpha. We find a coefficient of 0.003 for C-HPR and 0.028 for alpha and both a significant, demonstrating that higher profitability is also associated with higher returns. Leverage is only significant in the regression for S-HPR, 0.081, indicating that higher leverage will lead to higher returns for investors. The results for C-HPR and alpha are quite comparable, as we believe that C-HPR and alpha are more comprehensive ways to show the returns, compared to S-HPR which only takes account of the stock price. Another surprising finding is that the three accounting variables along with the two control variables produce a useful model for the positive S-HPR, as it explains 23% of the return, while for the negative return, the same model can only explain about 6%-8% of the returns.

Table 4: Regression - Accounting Performances Only

	Overall			Positive		Negative		
	S-HPR	C-HPR	Alpha	S-HPR	Alpha	S-HPR	C-HPR	Alpha
Intercept	-0.282	-1.028	0.056*	0.378	0.203*	-0.467***	-0.355***	0.002
	(0.2085)	(0.1009)	(0.0679)	(0.5406)	(0.0726)	(<.0001)	(0.0002)	(0.9360)
CA/TA	0.435**	0.475	0.079***	0.009	0.195*	0.202**	0.207**	0.045*
	(0.0507)	(0.5049)	(0.0071)	(0.9887)	(0.0571)	(0.0175)	(0.0265)	(0.0543)
EBIT/TA	0.003	0.001	0.028**	1.718**	0.031	0.001	0.003*	0.028***
	(0.5619)	(0.9328)	(0.0470)	(0.0318)	(0.7238)	(0.4400)	(0.0542)	(0.0087)
TL/TA	0.132	0.041	0.002	0.587	0.011	0.081**	0.020	-0.016
	(0.2015)	(0.8480)	(0.9049)	(0.1659)	(0.8065)	(0.0386)	(0.6392)	(0.2050)
Log(Total Assets)	0.028	0.092	-0.008*	0.080	-0.011	-0.010	-0.044***	-0.001
	(0.3641)	(0.2000)	(0.0592)	(0.5054)	(0.5919)	(0.3826)	(0.0007)	(0.7327)
B/M	0.003	0.002	0.000	0.029**	0.000	0.002*	0.000	-0.001
	(0.2941)	(0.6805)	(0.9633)	(0.0436)	(0.6068)	(0.0643)	(0.9507)	(0.1306)
R-Square	4%	8%	5%	23%	11%	6%	8%	7%
F-Value	2.17*	0.91	2.25**	2.62**	0.86	2.14*	3.10**	2.56**
N	238	56	214	49	40	175	42	174

Investing in bankrupt stocks involves high risks, which mainly results from the information uncertainty inherited in the stocks and the situation for the company. As discussed by Li and Zhong (2013), the uncertainty comes from two parts. First, as many firms are delisted from major exchanges due to their inability to meet the requirement for continued listing, and many institutional investors are restrained from holding bankrupt stocks, public information coverage becomes very limited after the official bankruptcy filing. Second, the complexity of the Chapter 11 process adds more uncertainty to the investment due to the nature of the legal process and the lower rank status of common stock holders. Therefore, we want to incorporate information uncertainty into our analysis. Zhang (2006) noted that information uncertainty mainly results from two sources. One is the volatility of a firm's underlying fundamentals and the other is poor information. He advances six proxies of information uncertainty: firm size, firm age, analyst coverage, dispersion in analyst forecasts, return volatility, and cash flow volatility. Following his methodology, weuse Stdev Pre-1 Ret, which is the standard deviation of daily returns in the year prior to the bankruptcy filing as our proxy for the information uncertainty inherent in our bankrupt company stocks.

Another interesting factor is the motivation for the bankruptcy filing. Traditionally, firms may file bankruptcy because of severe financial difficulties, such as an inability to pay its financial obligations as they come due. As discussed in the previous literature, some bankruptcy cases may be filed as a tactic for dealing with legal disputes, labor contracts, or for other strategic purposes. The troubled firms may be doing well financially, but need or prefer to file bankruptcy in order to address operating troubles from the vantage point of debtor under the protection of the bankruptcy court. Therefore, in our second regression, we add a dummy variable, Distress, which takes the value of 1 if the EBIT becomes negative a year before bankruptcy, indicating that the firm suffers extreme financial distress, and zero otherwise. Our second regression is estimated (Table 5),

$$HPR_i = \alpha + \beta_1 * CA/TA_{i,pre1} + \beta_2 * EBIT/TA_{i,\,pre1} + \beta_3 * TL/TA_{i,\,pre1} + \beta_3 * TL/TA_{i,\,pre1} +$$

$$\beta_4 * Distress_{i,\,pre1} + \beta_5 * (Stdev\ Pre\text{-}1\ Ret)_{i,\,pre1} +$$

$$\beta_6 * Log\ (Total\ Assets)_{i,\,pre1} + \beta_7 * B/M_{i,\,pre1} + \varepsilon_i \qquad (5)$$

The overall results are quite similar to what we have obtained in Table 5. Our model is good for S-HPR and alpha, but not for C-HPR. Liquidity still plays a positively significant role in explaining the holding period returns. One of our newly added variables, Distress, is significant in explaining alpha. With coefficient of -0.028, the result suggests that firms that file for bankruptcy due to the real financial distress, rather than strategic purposes, do tend to suffer worse stock performance. For the positive HPR, similar to the results from our first regression, the profitability measure, EBIT/TA is still significantly positive for S-HPR. The coefficient is 1.530 and significant at 5% level. The stdev pre-1 ret is also an important explanatory factor in S-HPR. The coefficient is -17.891 and highly significant at the 1% level, revealing that the higher the volatility, the higher the information uncertainty inherent in the stock, which contributes to more negative returns. Compared to our previous regression, adding distress and stdev pre-1 ret variables make the entire regression explain 35% of the positive returns in S-HPR, increasing from 23% in our first regression. Therefore, profitability and information uncertainty are two important factors in explaining the positive HPR. For the negative returns, the results are quite similar to what we have obtained in our first regression. We still find a significantly positive coefficient for our liquidity measures, CA/TA, and profitability measure, EBIT/TA, for C-HPR and alpha. C-HPR has 0.197 as the coefficient for CA/TA and 0.003 for EBIT/TA, while alpha has 0.042 as the coefficient for CA/TA and 0.023 for EBIT/TA. However, the distress dummy and the return volatility one year prior to bankruptcy do not reveal a significant effect in explaining the negative returns. Therefore,

profitability and information uncertainty play a significant role in explaining the positive returns, while liquidity and (un)profitability are the major key issues in negative returns.

Table 5: Regression – Accounting, Distress and Uncertainty

	Overall			Positive		Negative		
	S-HPR	C-HPR	Alpha	S-HPR	Alpha	S-HPR	C-HPR	Alpha
Intercept	-0.324	-0.767	0.043	-1.400	0.190	-0.505***	-0.381***	0.029
	(0.2646)	(0.3282)	(0.2677)	(0.1631)	(0.1762)	(<.0001)	(0.0014)	(0.3597)
CA/TA	0.396*	0.326	0.067**	0.364	0.194	0.196**	0.197**	0.043*
	(0.0815)	(0.6535)	(0.0252)	(0.5646)	(0.0743)	(0.0253)	(0.0412)	(0.0727)
EBIT/TA	0.003	0.000	0.020	1.530**	-0.013	0.001	0.003*	0.023**
	(0.5459)	(0.9679)	(0.1757)	(0.0495)	(0.9030)	(0.4126)	(0.0536)	(0.0434)
TL/TA	0.117	-0.038	-0.002	0.322	0.000	0.076*	0.014	-0.013
	(0.2663)	(0.8693)	(0.8682)	(0.4305)	(0.9977)	(0.058)	(0.7517)	(0.3214)
Distress	-0.136	-0.439	-0.028*	0.018	-0.051	-0.008	-0.028	-0.014
	(0.2280)	(0.1175)	(0.0752)	(0.963)	(0.4807)	(0.8384)	(0.5417)	(0.2325)
Stdev Pre-1 Ret	1.998	1.590	0.377	-17.891***	0.519	0.540	0.598	-0.243
	(0.2860)	(0.7943)	(0.1258)	(0.0099)	(0.4482)	(0.4123)	(0.4147)	(0.3221)
Log(Total Assets)	0.027	0.071	-0.008*	-0.254*	-0.012	-0.008	-0.043***	-0.003
	(0.4260)	(0.3544)	(0.0997)	(0.0733)	(0.6022)	(0.5374)	(0.0023)	(0.3735)
B/M	0.003	0.001	0.000	0.036**	0.001	0.002**	0.000	-0.001
	(0.2148)	(0.8160)	(0.7764)	(0.0102)	(0.4438)	(0.0493)	(0.9054)	(0.1834)
R-Square	5%	13%	8%	35%	15%	6%	8%	9%
F-Value	2.12*	1.02	2.38**	3.18***	0.75	1.59	2.24**	2.19**
N	238	56	214	49	40	175	42	174

We also investigate the influence of hedge funds on bankrupt stock performance. Hedge funds have become more and more active in corporate investment. Brav, Jiang, Partnoy, and Thomas (2008) investigate the involvement of hedge funds in corporate governance and whether their efforts impact the firm's performance. They find that hedge fund activists propose strategic, operational and financial solutions to the corporate firms and, in a majority of the cases, achieve at least partial success. Hedge funds play a significant role in increasing the target firms' payout, operating performance, and CEO turnover. Clifford (2008) compiles a sample of active and passive hedge fund activists based on their Schedule 13D or 13G filings. He finds that the target firms of active hedge fund activists enjoy larger excess returns and increases in operating performance than the ones of passive hedge fund activists. The results imply that hedge fund

activism has a positive effect on wealth creation. Boyson and Mooradian (working paper, 2010) focus on intense hedge fund activists. They document improvements in operating performance for up to three years following activism. Specifically they find such activism is associated with reduced cash position, growth in sales, reduced expenses, and increases leverage. The target firms also experience better short-term stock performance following the announcement of hedge fund involvement.

In our sample of 295 firms, we are able to identify 27 firms with 43 hedge fund investment in the year prior to the bankruptcy filing from 13D/13G filings with the SEC. They include some of the most famous hedge funds, such as Citadel, D. E. Shaw, Atticus Capital, and Amaranth Capital. If investors believe that hedge funds have hot hands and they can pick up the winning stock, they will be more willing to invest in the firms with hedge fund investment.

Table 6 shows the results of the following regression,

$$HPR_i = \alpha + \beta_1 * CA/TA_{i,pre1} + \beta_2 * EBIT/TA_{i,\,pre1} + \beta_3 * TL/TA_{i,\,pre1} + \beta_3 * TL/TA_{i,\,pre1} +$$

$$\beta_4 * Distress_{i,\,pre1} + \beta_5 * (Stdev\ Pre\text{-}1\ Ret)_{i,\,pre1} +$$

$$\beta_6 * Log\ (Total\ Assets)_{i,\,pre1} + \beta_7 * B/M_{i,\,pre1} + \beta_8 * HF_{i,\,pre1} + \varepsilon_i \qquad (6)$$

We add one more dummy, $HF_{pre1}$to our regression, which takes the value of 1 if a firm has hedge fund investment one year prior to its bankruptcy filing, and zero otherwise. The results of three accounting variables and two dummies of Distress and Stdev Pre-1 Ret are pretty similar to the ones we obtained in Table 5. The first result to notice is that, by adding HF dummy into our regression, we obtain higher R-squares and more significant models. For example, for negative alpha, the R-square increases from 9% in Table 5 to 24% in this table, and the F-Value also increases from 2.19 to 6.33, indicating that HF is indeed an important explanatory variables for the stock performance of bankrupt firms. Second is that receiving hedge fund investment does not necessarily indicate better stock performances. We have significant results for overall alpha, and negative C-HPR and alpha, with coefficient of -0.070, -0.157, and -0.105, which are all significant at least at the 5% level. The negative coefficients reveal that firms with hedge fund investments actually suffer from worse stock performances compared to the ones without. Therefore, we do not find evidence of hot hands from hedge funds when they are involved in bankrupt stocks.

Table 6: Regression – Accounting, Distress, Uncertainty and Hedge Fund

	Overall			Positive		Negative		
	S-HPR	C-HPR	Alpha	S-HPR	Alpha	S-HPR	C-HPR	Alpha
Intercept	-0.363	-0.808	0.029	-1.393	0.192	-0.506***	-0.414***	0.001
	(0.2131)	(0.2984)	(0.4449)	(0.1732)	(0.1825)	(<.0001)	(0.0005)	(0.9676)
CA/TA	0.365*	0.254	0.061**	0.362	0.195*	0.196**	0.173*	0.037*
	(0.0736)	(0.7235)	(0.0394)	(0.5726)	(0.0799)	(0.0270)	(0.0701)	(0.0956)
EBIT/TA	0.003	0.000	0.021	1.540*	-0.012	0.001	0.003*	0.022**
	(0.5635)	(0.9954)	(0.1532)	(0.0563)	(0.9108)	(0.4148)	(0.0605)	(0.0318)
TL/TA	0.131	0.054	0.003	0.325	0.001	0.077*	0.031	0.004
	(0.2165)	(0.8209)	(0.8285)	(0.4350)	(0.9832)	(0.0621)	(0.4871)	(0.7779)
Distress	-0.130	-0.386	0.361	0.019	0.537	0.538	0.481	-0.243
	(0.2497)	(0.1662)	(0.1354)	(0.9627)	(0.4545)	(0.4169)	(0.5081)	(0.2793)
Stdev Pre-1 Ret	1.932	0.678	-0.025	-17.861**	-0.053	-0.008	-0.020	-0.010
	(0.3018)	(0.9111)	(0.1069)	(0.0112)	(0.4836)	(0.8412)	(0.6616)	(0.3525)
Log(Total Assets)	0.034	0.080	-0.005	-0.253*	-0.013	-0.008	-0.038***	0.000
	(0.3238)	(0.2969)	(0.2579)	(0.0806)	(0.6051)	(0.5473)	(0.0076)	(0.9804)
B/M	0.003	0.002	0.000	0.037**	0.001	0.002**	0.000	0.000
	(0.1865)	(0.7298)	(0.6594)	(0.0210)	(0.4475)	(0.0500)	(0.8011)	(0.2673)
HF	-0.230	-0.439	-0.070***	0.042	0.009	-0.002	-0.157**	-0.105***
	(0.2188)	(0.1585)	(0.0042)	(0.9507)	(0.9195)	(0.9795)	(0.0257)	(<.0001)
R-Square	5%	17%	11%	35%	15%	6%	11%	24%
F-Value	1.76*	1.17	3.21***	2.72**	0.64	1.38	2.64***	6.33***
N	238	56	214	49	40	175	42	174

5.CONCLUSION

We investigate the returns from investing in bankrupt stocks. Besides the traditional holding period rate and alpha from the Carhart four-factor model, we also calculate a comprehensive HPR that takes account of the final distribution specified in the reorganization or liquidation plan. This information also plays a significant role in determining the ultimate returns to the common stock holders. The low stock prices attract unsophisticated investors who rush into this extremely volatile and uncertain market. Not surprisingly, investing in bankrupt stocks tends to generate large annualized losses: an average of -25.1% simple holding period return, and -76.9% if we take account of the final distributions. However, we also find that achieving positive returns from investing in bankrupt stocks is possible. We run two regressions to see which factors contributed the most to whether we can make a profit or not. We find that liquidity is always a key factor in explaining the returns. Higher liquidity will help the firms generate higher stock returns. When separating the returns into positive and negative ones, profitability and information uncertainty

plays a significant role in explaining the positive returns, while liquidity and (un)profitability are the two key issues in negative returns. In addition, the involvement of hedge funds does not show signs of better stock performance.

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Journal of Business, Economics & Finance
Year: 2013 Volume: 2 Issue: 4

DIRECT AND INDIRECT EFFECTS OF PSYCHOLOGICAL CONTRACT BREACH ON ACADEMICIANS' TURNOVER INTENTION IN TURKEY[1]

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KEYWORDS

Perceived organizational support, psychological contract breach, psychological contract violation, turnover intention.

ABSTRACT

This study aims to investigate the assumed direct and indirect relationships between psychological contract breach and turnover intention through psychological contract violation and perceived organizational support. Data for the sample was collected from 570 academicians from a variety of universities in Turkey. Hierarchical regression analyses were conducted to test the hypotheses. The results show that psychological contract breach was positively related to turnover intention and psychological contract violation mediates the relationship between psychological contract breach and turnover intention. Moreover, perceived organizational support moderates the relationship between psychological contract breach and turnover intention, and relationship between psychological contract breach and psychological contract violation. By examining the relationship between psychological contract breach, psychological contract violation, perceived organizational support and turnover intention, this study allows university managers to predict why psychological contract breach results in increased turnover intention and provides some clues on how university organizations can deal with the damaging effects of psychological contract breach.

1. INTRODUCTION

The term 'psychological contract' which was first used in the early 1960s (Argyris, 1960; Levinson vd., 1962; Schein, 1965) has become a powerful tool in understanding the changing nature of employment relations. Hence, over the past 3 decades, there has been a great deal of research attention devoted to the study of employees' psychological contracts (Rousseau, 1989; Robinson et al., 1994; Shore and Tetrick, 1994; Sims, 1994; Rousseau, 1995; Herriot and Pemberton, 1997; McLean Parks, et al.,1998; Anderson and Schalk, 1998; Coyle-Shapiro and Kessler, 2002; Guest, 2004; Conway and Briner, 2005; Zhao et al., 2007). Psychological contract, defined as an individual's beliefs regarding the terms and conditions of a reciprocal exchange agreement between that focal person and the organization (Rousseau, 1989; Rousseau, 1995). These beliefs are predicated on the perception that a promise has been made (e.g., of employment or career opportunities) and a consideration offered in exchange for it (e.g., accepting a position, foregoing

[1] This manuscript is derived from Buyukyilmaz (2013)'s doctorate dissertation entitled "The Examination of Relationship between Academicians' Psychological Contract Breach and Intention to Leave".

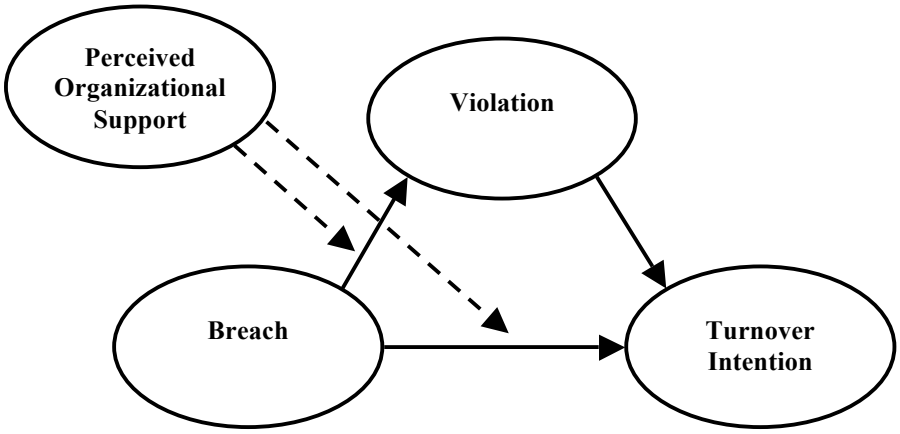
other job offers), binding the parties to some set of reciprocal obligations (Rousseau and Tijoriwala, 1998).

The psychological contract provides an opportunity to explore the processes and content of the employment relationship through a focus on more or less explicit deals. These deals are likely to be re-negotiated or modified over time, to be influenced by a range of contextual factors, and to have a variety of consequences (Guest, 2004). Studies show that when an employee perceives that the organization has fulfilled its promises and obligations, he/she is likely to reciprocate in more positive attitudes and behaviors, like feel more satisfied, work harder, feel more committed to the organization, and so on. (Turnley et al., 2003; Lee et al., 2011; Conway and Coyle-Shapiro, 2012). In theory, an organization is considered willing to fulfill its promises and obligations. However, organization may sometimes fails to deliver on what the employee believes has been promised to him/her, resulting in psychological contract breach. (Gakovic and Tetrick, 2003; Suazo et al., 2005; Kiefer and Briner, 2006).

Psychological contract breach (PCB) refers to employee perceptions that the organization failed to fulfill one or more obligations associated with perceived mutual promises (Morrison and Robinson, 1997). Employee perceptions of PCB is considered as a regular situation in employment relations and have negative consequences for both individuals and organizations, such as reduced job satisfaction (Turnley and Feldman, 1999; Kickul and Lester, 2001; Tekleab and Taylor, 2003; Orvis et al., 2008), reduced organizational commitment (Lester et al., 2002; Restubog et al., 2006), lowered performance (Robinson, 1996; Suazo et al., 2005; Bal et al., 2010; Suazo and Stone-Romero, 2011), lowered organizational citizenship behavior (Robinson and Morrison, 1995; Robinson, 1996; Suazo et al., 2005; Restubog et al., 2008), increased burnout (Gakovic and Tetrick, 2003), increased deviant behaviors (Kickul, 2001; Restubog et al., 2007), and heightened turnover intention (Robinson and Rousseau, 1994; Turnley and Feldman, 2000; Tekleab and Taylor, 2003; Raja et al., 2004).

The purpose of this study was to examine the process how PCB affects employee's turnover intention (TI). Specifically, this study examined psychological contract violation (PCV), defined as the negative affective state that can arise from the perception of PCB (Morrison and Robinson, 1997), as a mediating variable (1), and perceived organizational support (POS), defined as employees' beliefs concerning the extent to which the organization values their contributions and cares about their wellbeing (Eisenberger et al., 1986), as a moderating variable (2) in the relations between PCB and TI. Besides, this study investigated POS as a moderating variable (3) in the relations between PCB and PCV. Figure 1 depicts the hypothesized relationships examined in this study.

Figure 1: Hypothesized Model



This study makes three important contributions to the literature. First, researchers have generally accepted the distinction between PCB and PCV (Morrison and Robinson, 1997; Conway and Briner, 2005). However, only a few studies have empirically examined this distinction (Robinson and Morrison, 2000) and there are very few studies that have examined PCV as a mediating variable on the relations between PCB and TI (Suazo et al., 2005; Raja et al., 2004; Dulac et al., 2008; Suazo, 2009). This study will extend the emerging empirical work on PCV by examining PCV as a mediating variable.

Second, in recent years, researchers show more interest in situational factors (e.g., personality, justice, trust, equity sensitivity) that could affect the relationship between PCB and attitudes and behaviors (Kickul et al., 2001; Kickul and Lester, 2001; Restubog and Bordia, 2006; Orvis et al., 2008; Bal et al., 2010; Restubog et al., 2010). However, studies have not considered how this relation affected from social exchange relationship. In this context, some conceptual (Aselage and Eisenberger, 2003) and empirical (Wayne et al, 1997; Coyle-Shapiro and Conway, 2005) studies have been supportive of the distinction between POS and PC, and examined the relationship between these constructs. However, only a few studies have empirically examined POS as a situational factor in the relationship between PCB and attitudes and behaviors (Dulac vd., 2008; Bal vd., 2010; Suazo ve Stone-Romero, 2011) and there has been no simultaneous examination of how POS moderates the relationship between PCB and PCV. This study makes an important contribution by examining POS as a moderating variable in the relationship between PCB, PCV and TI.

Finally, the majority of studies on PCB have been conducted with managers (Turnley and Feldman, 2000; Lester et al., 2002), master of business administration (MBA) graduates (Robinson and Rousseau, 1994; Restubog and Bordia, 2006) and other occupational elite categories of employees. This has led to questions about the generalizability of the findings to other populations of the workforce (Robinson and Morrison, 2000; Turnley and Feldman, 1999). Thus, there is clearly a need for research that examines non-management and non-MBA employees in order to advance the literature on PCB (Suazo, 2009). This study addresses this issue by sampling academicians that were in non-management positions.

2. LITERATURE REVIEW

2.1. The Relationship between PCB, PCV and TI

It has been determined that the organization's failure to fulfill its promises have negative effect on both employee attitudes (Robinson and Rousseau, 1994; Kickul, 2001; Gakovic and Tetrick, 2003) and behaviors (Robinson and Morrison, 1995; Kickul et al., 2001; Restubog et al., 2007; Restubog et al., 2008). In general, social exchange theory has been used to understand the relationship between PCB and employee attitudes and behaviors (e.g., Rousseau, 1995; Morrison and Robinson, 1997; Suazo et al., 2005; Zhao et al., 2007).

Social exchange theory suggests that employees are motivated to seek a fair and balanced relationship between themselves and their organization (Homans, 1961; Blau, 1964). When employees perceive that their organization has failed to provide what is due to them, an imbalance has occurred in the social exchange relationship. In order to restore balance to the exchange relationship after PCB occurs, employees decrease the contributions that they make to their organizations (e.g., Robinson and Rousseau, 1994; Suazo et al., 2005). Robinson (1996) found that PCB leads employees to believe that the organization does not care about their well-being and that the organization cannot be trusted to honor its obligations. Prior research has determined PCB negatively related to job satisfaction (Turnley and Feldman, 1999; Tekleab and Taylor, 2003) and negatively related to organizational commitment (Lester et al., 2002; Restubog et al., 2006).

In particular, prior research has suggested that instances of PCB are likely to make employees question whether remaining in the employment relationship will be mutually beneficial (Turnley and Feldman, 1999). In some instances, employees are likely to perceive the imbalance to be so great or the chance of future mistreatment to be high enough that they decide to seek employment elsewhere (Suazo, et al., 2005). Therefore, PCB is likely to be positively related to employees' TI.

H1. PCB will be positively related to TI.

In the early stages of research on psychological contracts, researchers used the terms PCB and PCV interchangeably (Rousseau, 1989; Robinson and Rousseau, 1994). Both concepts were used to describe all instances in which employees received less than they were promised. However, Morrison and Robinson (1997) explicitly distinguished the concepts of PCB and PCV. In this context, PCB refers to the cognitive state that an individual has not received all that he/she was promised. On the other hand PCV refers to a negative and relatively intense emotional reaction that sometimes follows PCB (Morrison and Robinson, 1997). PCV is an emotional experience which arises from cognitive interpretation. Therefore, PCV refers to the feelings of anger and betrayal of an employee when he/she believes that the organization has failed to keep its promises (Morrison and Robinson, 1997; Robinson and Morrison, 2000).

Based on the distinction which was performed by Morrison and Robinson (1997), researches revealed the relationship between PCB and PCV. In this context, Suazo et al. (2005) found a positive and strong relationship between PCB and PCV. Different researches has also confirmed this strong relationship (Dulac et al., 2008; Suazo, 2009; Suazo and Stone- Romero, 2011; Cassar and Briner, 2011). Thus, PCB is likely to be positively related to PCV.

H2. PCB will be positively related to PCV.

Research has suggested that PCB has more powerful impact on attitudes and behaviors in the case of the experience of negative emotional reactions (Robinson and Morrison, 2000; Suazo and Stone-Romero, 2011). Therefore, PCV is one of the mechanisms through which PCB is translated into outcomes such as low job satisfaction, low organizational commitment, low performance and

low citizenship behavior, and high turnover intention (Suazo et al, 2005; Dulac et al., 2008; Suazo, 2009; Cassar and Briner, 2011).

Employees, who realize that their organization has failed to provide them something that they were promised, experience feelings of anger, mistrust, and betrayal. These feelings in turn make the employees react in negative attitudes and behaviors (Raja et al., 2004). Zhao et al., (2007) revealed that on average PCB explained approximately 12% of the variance in several attitudinal and behavioral outcomes while PCV explained over 22%. Thus, both theory and previous empirical findings suggest that PCV is a mediating variable in the relationship between PCB and employee attitudes and behaviors.

H3. PCV mediates the relationship between PCB and TI.

2.2. POS as a Moderating Variable in the Relationship between PCB, PCV and TI

PCB does not necessarily result in the experience of PCV (Morrison and Robinson, 1997). Empirical evidence indicates that not all instances of PCB are followed by the strong emotional reactions associated with PCV (Morrison and Robinson, 1997; Turnley and Feldman, 1999; Turnley et al., 2003). Morrison and Robinson (1997) argue that the magnitude and the salience of the broken promise play a role in the escalation of PCB to PCV.

Another factor that play an important role in the escalation of PCB to PCV is the degree of support that employee perceived from organization which is named as perceived organizational support (Dulac et al., 2008; Suazo and Stone-Romero, 2011). POS is defined as employees' beliefs concerning the extent to which the organization values their contributions and cares about their wellbeing (Eisenberger et al., 1986). The theory of POS suggests that employees reciprocate with commitment, effort and performance when they perceive high levels of support (Eisenberger et al., 1997; Eisenberger et al., 2001). POS is important to the maintenance of the employment relationship because it is a crucial element in helping employees executes their jobs effectively (Eisenberger et al., 1986; Rhoades and Eisenberger, 2002).

Research has suggested that PCB is followed by strong emotional reactions associated with PCV when individuals perceive low support from their organization (Dulac et al., 2008). Dulac et al (2008) stated that individuals who perceived high support from organization may seek out information and interpretations that facilitate the conclusion that although breach has occurred, their organization has been fair in the process and therefore, these individuals may have less intense negative emotional responses to breach than individuals who perceived low support. Thus, POS may moderate the relationship between PCB and PCV. The relationship between PCB and PCV is stronger for individuals with low POS than high POS.

H4. POS moderates the positive relationship between PCB and PCV: the relationship is stronger for individuals who perceive low support from their organization.

Research has suggested that POS also moderates the relationship between PCB and attitudes and behaviors (Bal et al., 2010; Suazo and Stone-Romero, 2011; Conway and Coyle-Shapiro, 2012). Conway and Coyle-Shapiro (2012) stated that individuals who perceived high support tend to forgive misdemeanors by the organization and inhibit responses that might harmful to the organization. In this context, PCB is followed by negative attitudes and behaviors when individuals perceive low support from their organization. Thus, POS may moderate the relationship between PCB and TI. The relationship between PCB and TI is stronger for individuals with low POS than high POS.

H5. POS moderates the positive relationship between PCB and TI: the relationship is stronger for individuals who perceive low support from their organization.

3. METHODOLOGY AND DATA

3.1. Sample and Procedure

Data were collected from full-time academicians labored in Turkish universities via on-line survey. Researchers suggest that using on-line surveys is generally acceptable to survey participants and does not impact data quality when compared with paper-and pencil surveys (Kickul and Lester, 2001). We sent our survey's link via e-mail to 3500 employees who volunteered to participate in the study. These employees accessed the survey via a secure internet address and submitted responses to a secure internet database. The questionnaire assessed demographic variables, PCB, PCV, TI and POS. The survey has arrived only 3121 employees due to server errors. From 3121 employees who received survey, A total of 641 respondents completed the survey for a response rate of 20.5 per cent. Of the 641 respondents, 570 employees provided complete data on the variables of interest. Therefore, the final sample used to examine the hypotheses was 570 participants. Participants were 56 per cent male, 60 per cent married and 40 per cent worked as academician more than 10 years. Respondents' age ranged between 24 and 72 years, with a mean of 36 years.

3.2. Measures

All measures were anchored on a Likert-type scale, ranging from *1 = strongly disagree* to *5 = strongly agree*. Items coded such that a higher score indicated a greater value for the focal construct. To obtain participants' scores on the measures, items within each measure were averaged. The reliability coefficients for the study variables are also reported below.

3.2.1. Psychological Contract Breach

PCB was measured by asking the employees to rate the extent to which the organization fulfilled or not its obligations to the employees. We used Robinson and Morrison's (2000) five-item global scale to measure perceptions of contract breach. A sample item is 'So far my university has done an excellent job of fulfilling its promises to me' (reverse coded). A Cronbach's alpha of 0.94 was obtained for this measure.

3.2.2. Psychological Contract Violation

PCVwas measured by Robinson and Morrison's (2000) four-item PCV scale. The violation measure assesses the extent people feel angry, frustrated and betrayed by their university in the course of their deal with the organization. A sample item for this scale is 'I feel a great deal of anger toward my university'. The Cronbach's alpha obtained for this measure was 0.95.

3.2.3. Turnover Intention

TI was measured with a three-item scale extracted from the Michigan Organizational Assessment Questionnaire (Cammann et al., 1983). A sample item is 'I will probably look for a new job in the next year'. The Cronbach's alpha obtained for this measure was 0.95.

3.2.4. Perceived Organizational Support

POS was measured with an eight-item shortened version of Eisenberger et al. (1986) scale (Eisenberger et al., 1997). A sample item for the scale is 'My university cares about my opinions'. A Cronbach's alpha of 0.92 was obtained for this measure.

4. RESULTS

Prior to testing the hypotheses, a confirmatory factor analyses using AMOS.19 software was performed to examine the construct validity of the studied constructs (PCB, PCV, TI and POS). Fit statistics, $\chi2(111)= 236.28$; root mean square error of approximation (RMSEA) = .05; goodness of fit index (GFI) = .95; adjusted goodness of fit index (AGFI) = .94; normed fit index (NFI) = .98; Tucker-Lewis index (TLI) = .99; comparative fit index (CFI) = .99; all indicated adequate fit for our model. We also compared the final measurement model with alternative models comprising one, two and three factors. The four-factor model had the best fit (Table 1).

Table 1: Comparison of Measurement Models

Model	χ2 (df)	Δχ2 (Δdf)	RMSEA	GFI	AGFI	NFI	TLI	CFI
Four-factor	236.28 (111)	-	.05	.95	.94	.98	.99	.99
Three-factor	862.55 (113)	626.27 (2)	.11	.85	.79	.92	.91	.93
Two-factor	1385.16 (114)	1148.88 (3)	.14	.79	.72	.87	.85	.88
One-factor	2135.95 (115)	1899.67 (4)	.18	.64	.52	.79	.76	.80

† RMSEA=root mean square error of approximation, GFI=goodness of fit index, AGFI=adjusted goodness of fit index, NFI=normed fit index, TLI=Tucker-Lewis index, CFI=comparative fit index

Additionally, the convergent and discriminant validity was assessed of the scales by the method outlined in Fornell and Larcker (1981). For convergent validity, the composite reliability (CR) and the average variance extracted (AVE) were calculated in order to determine whether the measurement variable was representative of the related construct. As seen in Table 2, all AVEs were 0.66 or higher, and exceeded the cutoff value of 0.50 (Fornell and Larcker, 1981; Hair et al., 1998), and all CRs were 0.92 or higher and exceeded the cutoff value of 0.70 (Fornell and Larcker, 1981; Hair et al., 1998). These results provided evidence for convergent validity of each of the constructs involved in the research model of this study.

The evidence of discriminant validity can be demonstrated when measures of conceptually different constructs are not strongly correlated among themselves as compared to similar constructs. In order to evaluate the discriminant validity, the square root of the AVE in each construct is compared with the correlation coefficients between two constructs (Fornell & Larcker, 1981; Hair et al., 1998). In Table 2, the square root AVE in each construct that appear on the diagonal in parentheses was larger than any correlation between the associated construct and any other construct. These results provided evidence for discriminant validity.

The means, standard deviations, zero-order correlations, and reliability estimates (Cronbach's alpha) for the measures used in the study are reported also in Table 2. As seen in this table, zero-order correlations were all in the expected direction and the internal consistency (α) for each measure was above the .70 as recommended by Nunnally and Bernstein (1994). In addition to this, correlations between measures never exceeded 0.85, suggesting that no bivariate multicollinearity exists between scales (Kline, 2011).

Table 2: Descriptive Statistics

		Mean	SD	α	CR	AVE	1	2	3	4	5	6	7	8
1	**Gender**	1.57	0.50	-	-	-	-							
2	**Age**	36.31	8.86	-	-	-	.12**	-						
3	**Marital Status**	1.39	0.49	-	-	-	-0.08	-.38**	-					
4	**Tenure**	2.08	0.84	-	-	-	.10*	.72**	-.39**	-				
5	**PCB**	3.07	1.06	0.94	0.94	0.76	-.05	-.21**	.15**	-.14**	**(0.87)**			
6	**PCV**	2.26	1.18	0.95	0.95	0.87	-.06	-.19**	.11**	-.11*	.72**	**(0.94)**		
7	**TI**	2.39	1.26	0.95	0.96	0.88	.01	-.18**	.10*	-.11**	.63**	.68**	**(0.94)**	
8	**POS**	2.95	0.97	0.92	0.92	0.66	.05	.18**	-.11**	.10*	-.65**	-.64**	-.63**	**(0.81)**

[a] N=570, *p < .05; **p < .01

[b] The square root of the constructs' AVE appear on the diagonal in parentheses,

[c] PCB=psychological contract breach, PCV=psychological contract violation, TI=turnover intention, POS=perceived organizational support

Hierarchical regression analyses were conducted to test the hypotheses (Table 3 and Table 4). Because they may affect the variables and relationships of interest, gender, age, marital status and tenure were included as control variables. Hypotheses 1 and 2 predicted that PCB would be related to TI and PCV. As shown in Table 3, PCB was significantly and positively associated with TI (β=.62, p<.01) and PCV (β=.71, p<.01). Thus, Hypotheses 1 and 2 were supported.

Three-step mediation regression procedure outlined by Baron and Kenny (1986) was followed to test the mediating role of PCV (Hypotheses 3). Baron and Kenny (1986) stipulate three requirements for establishing mediation effect.

1. The independent variable (PCB) must be significantly related to mediator variable (PCV).

2. The independent variable (PCB) must be significantly related to dependent variable (TI).

3. When the mediator variable (PCV) is included in the second step, the effect of independent variable (PCB) on dependent variable (TI) should be non-significant (full mediation) or significantly weaker (partially mediation).

The first and second requirements were met as indicated by the support for Hypotheses 1 and 2 (Table 3, Step 1 and 2). The third requirement for establishing mediation was examined by including PCV (Table 3, Step 3) in the regression equation for TI. When PCV was included in the regression equation as a mediator variable, PCB still remained as a significant predictor, but its beta weight decreased significantly (β=.29, p<.01). Finally, the Sobel test revealed that the indirect path from PCB to TI through PCV was significant (Z=10.12, p<.01). Thus, PCV partially mediated the relationship between PCB and TI, providing support for Hypotheses 3.

Table 3: Hierarchical Regression Analyses to Testing the Mediating Role of PCV

	PCV	**TI**	
	Step 1 *β*	*Step 2* *β*	*Step 3* *β*
Control Variables			
Gender	-.02	.05	-.05
Age	-.06	-.08	-.06
Marital Status	-.01	-.01	-.01
Tenure	.03	.02	.01
Independent Variable			
PCB	.71**	.62**	.29**
Mediator Variable			
PCV			-.47**
F Value	119.67**	76.20**	98.01**
R^2	.52	.40	.51
Adjusted R^2	.51	.40	.51
ΔR^2			.11**

[a]N=570, *p < .05; **p < .01

[b] PCB=psychological contract breach, PCV=psychological contract violation, TI=turnover intention

To test the moderating role of POS (Hypotheses 4 and 5), study variables were centered prior to their inclusion in the regression analyses (Aiken and West, 1991). In the first step, control variables were entered. Independent variable was entered in step 2 and moderator variable was entered in step 3, followed by the interaction term in step 4. Hierarchical regression analyses tests for the significance of the increment in criterion variance explained by the interaction term over and above the contribution of the main effects. When a significant interaction was found, we followed up by graphing and performing a simple slope test (Aiken and West, 1991).

Table 4: Hierarchical Regression Analyses to Testing the Moderating Role of POS

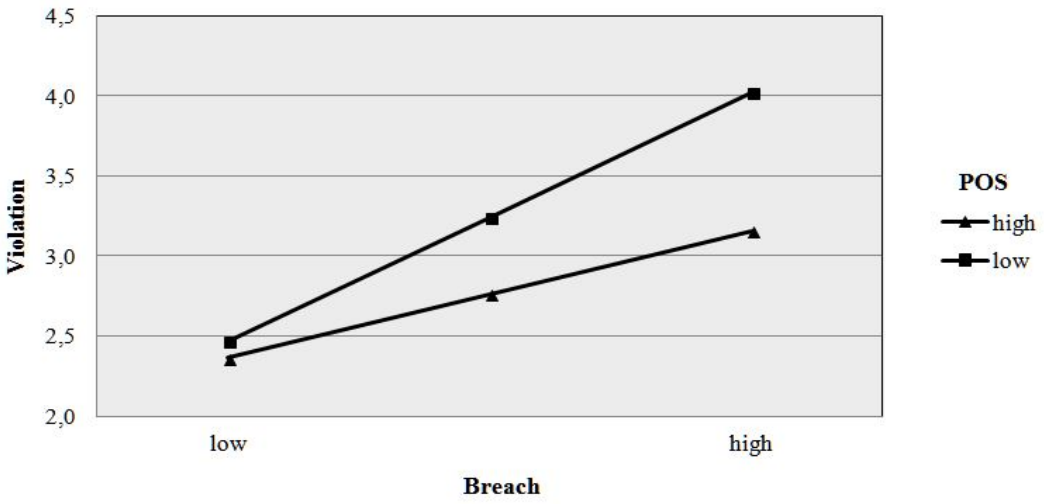
	PCV				TI			
	Step 1 *β*	*Step 2* *β*	*Step 3* *β*	*Step 4* *β*	*Step 1* *β*	*Step 2* *β*	*Step 3* *β*	*Step 4* *β*
Control Variables								
Gender	-.04	-.02	-.02	-.02	.03	.05	.05	.05
Age	-.21*	-.06	-.04	-.06	-.21*	-.08	-.05	-.06
Marital Status	.06	-.01	-.01	-.01	.05	-.01	-.01	-.01
Tenure	.07	.03	.02	.03	.05	.02	.01	.01
Independent Variable								
PCB		.71**	.51**	.58**		.62**	.38**	.42**
Moderator Variable								
POS			-.31**	-.23**			-.37**	-.32**
Interaction								
PCB X POS				-.21**				-.13**
F Value	5.85**	119.67**	125.00**	126.22**	5.51**	76.20**	87.45**	79.31**
R^2	.04	.52	.57	.61	.04	.40	.48	.50
Adjusted R^2	.03	.51	.57	.61	.03	.40	.48	.49
ΔR^2		.48**	.05**	.04**		.36**	.08**	.02**

[a] N=570, *p < .05; **p < .01

[b] PCB=psychological contract breach, PCV=psychological contract violation, TI=turnover intention, POS=perceived organizational support

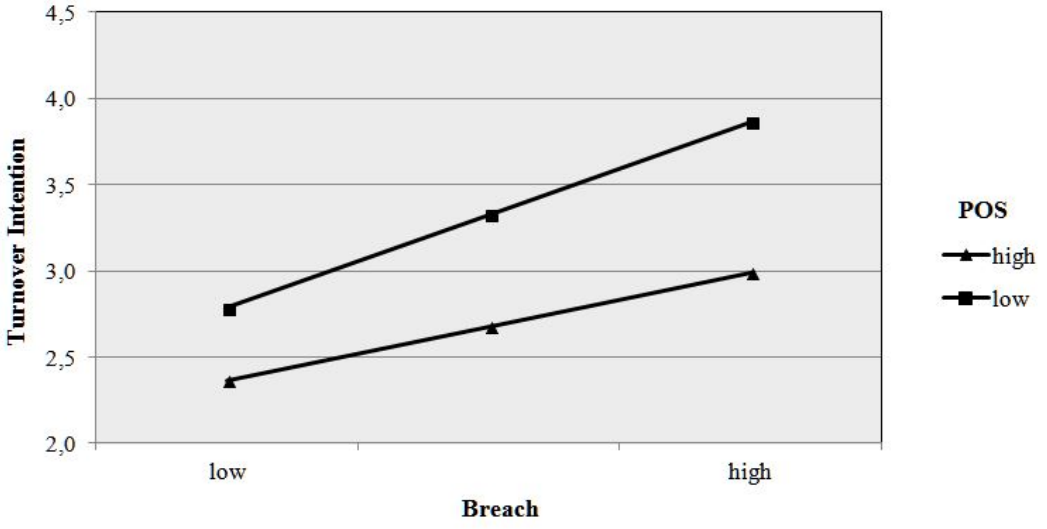
Hypotheses 4 stated that POS would moderate the positive relationship between PCB and PCV, such that the relationship would be stronger for individuals who perceive low support from their organization. Results in Table 4 show that, the interaction term was significantly related to PCV (β= -.21, p<.01) and accounted for an additional %4 of the variance in violation (ΔR^2=.04, p<.01). We employed simple slope for high and low levels of POS to further analyze the interaction. Figure 2 provides a graphical representation of interaction. The test of the simple slope for lower POS was significant (t = 4.06, p<.01), whereas the slope for higher POS was not significant (t = 0.58, p>.05). Thus, Hypotheses 4 was supported.

Figure 2: POS as a Moderator of the Relationship between PCB and PCV



Hypotheses 5 proposed that POS would moderate the positive relationship between PCB and TI, such that the relationship would be stronger for individuals who perceive low support from their organization. As shown in Table 4, the interaction term was significantly related to TI (β= -.13, p<.01) and accounted for an additional 2% of the variance (ΔR^2=.02, p<.01). Simple slope was employed to further analyze the interaction and Figure 3 shows the graphical representation of this interaction. For people with lower POS, the positive relationship between PCB and TI was stronger (t = 2.82, p<.01), whereas the relationship for those with higher POS was non-significant (t = 0.67, p>.05). Therefore, Hypotheses 5 gained support.

Figure 3: POS as a Moderator of the Relationship between PCB and TI



5. DISCUSSION

The main objective of this study was to advance the research on direct and indirect relationship between PCB and TI. The results of this study confirm and extend prior findings on the relationship between PCB, PCV, POS and TI. First, predictions relating to the direct effects of psychological contract breach on TI and PCV were confirmed. These results were similar to that of prior studies investigating the role of PCB on TI (Robinson and Rousseau, 1994; Turnley and Feldman, 2000; Tekleab and Taylor, 2003; Raja et al., 2004) and the role of PCB on PCV (Suazo et al., 2005; Dulac et al., 2008; Suazo, 2009; Suazo and Stone-Romero, 2011; Cassar and Briner, 2011). That is, employee's cognitive perception of broken promises in the workplace more likely to increases sense of anger and betrayal against the organization and more likely to increases intent to leave the organization. This finding also supports the notion of social exchange theory (Homans, 1961; Blau, 1964).

Second, this study confirms prior research in the process of examining the mediation role of PCV on the relationship between PCB and employee attitudes and behaviors (Robinson and Morrison, 2000; Zhao et al., 2007; Dulac et al., 2008; Suazo, 2009; Cassar and Briner, 2011). In this context, results suggest that PCV partially mediated the relationship between PCB and TI. That is, employee's perception of contract breach may have more powerful impact on employee's intent to leave the organization in the case of the experience of negative emotional reactions.

Third, this study makes an important contribution by examining the role of perceived support as a moderator of the relationship between breach and negative emotions associated with breach, and relationship between breach and intention to leave the organization. The results suggest that perceived support strengthened the negative relations between PCB and PCV, and between PCB and TI. That is, individuals with lower-quality social exchange relationships respond with stronger feelings of violation and stronger intention to leave the organization following perceived breach than do individuals with higher-quality relationships. However, contrary to the research that has examined in USA (Bal et al., 2010; Suazo and Stone-Romero, 2011), this result validated findings obtained in previous research which was conducted in Europe (Dulac et al., 2008; Conway and Coyle-Shapiro, 2012). These results suggest that PCB does indeed help explain why social exchange relationships are related to TI.

5.1. Practical implications

This study was conducted on full-time academicians labored in Turkish universities. Thus, the present findings have important implications for university organizations. Universities should be aware that by failed to fulfill one or more obligations associated with perceived mutual promises, employee's intent to leave the organization and emotional reactions are influenced, but these are also affected by the degree of support that the employee perceive from university. Especially employees' which perceive low support may respond to breach by becoming less attached to the organization and increased sense of anger and betrayal than the employees' which perceive high support. Therefore, through developing high quality relationships with employees, universities can decrease the negative consequences of PCB.

However, psychological contract is an individual fact and organization is not always able to fulfill all obligations. It is impossible to completely prevent from PCB. Hence, employee perception of PCB is considered as a regular situation in employment relations. In this context, the most important aspect of managing the psychological contract is the management of the breach after it has occurred. One way of doing so is to prevent breach to turn into violation. This may be possible through open and honest communication with employees and the explanation of the circumstances

for the breach by university management. In this way, management can prevent, or at least minimize the negative emotional reactions to breach.

5.2. Limitations and future research

There were a number of methodological limitations to the current study. First, data were collected at a single point in time. Thus, the use of cross-sectional research design limits the ability to make firm conclusions about the causal relationships among the study variables. Future research can rely on experimental or longitudinal designs and provide more convincing evidence on causation.

Second, this study was unable to measure certain contract dimensions which are important for understanding the negative consequences of breach. Researchers have noted that the outcomes of breach may be dependent on the type of psychological contract in effect (Morrison and Robinson, 1997; Restubog et al., 2008). A consideration of this contract dimension will enable future research to better understand what type of psychological contract breach is destructive to employee's attitudes and behaviors.

Third, this study focused solely on academicians, which consequently raises the issue of generalizability of the findings. Future studies may be necessary to validate the findings by obtaining data from different employees of different sectors.

6. CONCLUSIONS

The purpose of this study is to expand growing research on PCB and TI, which has relied heavily on social exchange theory. Specifically, this study found evidence that negative emotional reactions to breach may be a critical intervening factor in the relationship between PCB and TI. In addition, the results showed that POS moderates the relationship between PCB and PCV and between PCB and TI, such that the relationships are stronger for employees' which perceive low support than high support. In sum, by examining the relationship between PCB, PCV, POS and TI, this study allows better positioned to predict why PCB results in increased TI and provides some clues on how organizations can deal with the damaging effects of PCB.

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Journal of Business, Economics & Finance ISSN: 2146-7943

Journal of Business, Economics & Finance
Year: 2013 Volume: 2 Issue: 4

EXAMINING THE PERFORMANCE OF A VALUE INVESTING HEURISTIC: EVIDENCE FROM THE S&P/TSX 60 FROM 2001-2011

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KEYWORDS

Value investing, heuristic, value premium, skewness.

ABSTRACT

Heuristics are useful practical tools for cutting through the complex confluence of uncertainty, limited information and bounded rationality. We develop a simple heuristic for making value investing decisions based on profitability, financial stability, susceptibility to bankruptcy, and margin of safety. As an empirical test, we apply this heuristic to the S&P/TSX 60 group of companies of the Toronto Stock Exchange. Analysis of the data shows that the portfolio that is picked from the S&P/TSX 60 by the heuristic has desirable characteristics required of value portfolios. Thus the heuristic can be viewed as a reliable set of value investing decision criteria.

1. INTRODUCTION

Value investing is an investment paradigm proposed by Benjamin Graham (Graham and Dodd, 1934; Graham, 1949). According to Graham and Dodd (1934), "An investment operation is one which, upon thorough analysis, promises safety of principal and a satisfactory return. Operations not meeting these requirements are speculative."[1] There are three essential components of this definition to take note of. First, an investment must be based on thorough analysis; second, it should have an assurance of safety of principal; third, it should entail an expectation of satisfactory return. Benjamin Graham further proposed the concept of "margin of safety" as the cornerstone principle for operationalizing this definition of investment. Margin of safety is a measurement of the degree to which an asset is trading at a discount to its intrinsic value. While there is no standardized method for making value investing decisions, Benjamin Graham's definition of investment and the accompanying philosophy of investment enable value investors to make their investment decisions in a consistent manner. The purpose of this paper is twofold. First, it presents a stock analysis system, based on value investing principles, for making investment decisions.[2] Secondly, we carry out an empirical validation of the system using the Toronto Stock Exchange S&P/TSX 60 Index from January 2001 to May 2011. We propose a simple heuristic that incorporates the key tenets of value investing as propounded by Benjamin Graham. The heuristic is designed to identify and select common stock of companies with three salient features: that they

[1]p.54 of Graham and Dodd (1934); see also Graham (1949), p 3.

[2] The ratioanales for the choice of metrics in our stock selection system is provided in details in the paper, "Overcoming Cognitive Biases: A Heuristic for Making Value Investing Decisions," forthcoming in the *Journal of Behavioral Finance*. (http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2297170)

(i) have good history and prospects of continued profitability, (ii) are financially stable, and (iii) are priced significantly below their intrinsic values. We hypothesize that a consistent and disciplined application of such a heuristic will generate common stock portfolios whose returns will outperform the market average over long periods of time. To facilitate easy discussion, we call this heuristic the O-S heuristic.[3]

We did the study on stocks that are members of the S&P/TSX 60. We reckon that since the S&P/TSX 60 index is made up of well established companies, if the O-S heuristic demonstrates value added in that group then it is even more likely to demonstrate value added when it is applied to the entire market. Focusing on this group of companies is consistent with Benjamin Graham's (1949) recommendation to the defensive investor that "each company selected should be large, prominent, and conservatively financed" (p. 65).

The contribution of this paper is threefold. First, it attempts to give some clarity as to what constitutes value investing when it comes to implementation. Second, it contributes to the discussion on the sources of the value premium – the observation that portfolios formed on the basis of value criteria tend to outperform other portfolios. A common explanation of this observation is that value portfolios assume higher risk than their counterparts and that is why they earn higher returns. However, evidence from empirical studies suggests that risk explanations may not be supported by the data but rather behavioral explanations could hold the key to understanding the value premium. The third contribution of this paper is that it demonstrates the simplicity and power of value investing by showing how a simple heuristic based on very familiar financial ratios and data from public sources can be used to make effective portfolio selection decisions.

2. EVIDENCE AND EXPLANATION OF THE VALUE PREMIUM

Academic research has shown consistently that value investing outperforms other investment styles.[4] Benjamin Graham (1976) showed in a 51-year performance study (1925-1975) that the value approach consistently resulted in a 15 per cent or better per annum return, which is twice the record of the DJIA for that period. Buffett (1984) tracked the performance of nine successful investment funds,[5] that were managed using value investing principles learned either directly or indirectly from Benjamin Graham. Out of these funds, seven investment partnerships demonstrated long-term returns with a double-digit lead over the market average. Even the pension funds, expected to have more conservative portfolio mix, showed 5 per cent to 8 per cent return above the market.

Oppenheimer (1984) selected stocks listed on NYSE and AMEX from 1974 to 1981 using Graham's criteria and reported that an investor who had used Graham's criteria would have achieved a mean annual return of 38 per cent against the CRSP Index of NYSE-AMEX securities return of 14 per cent. Ibbotson and Riepe (1997) documented the performance of various value andgrowth indexes, such as Wilshire, Frank Russell, S&P/BARRA, and Barclays Global Investors and found that regardless of capitalization, every value index provided higher returns with less volatility than their growth counterparts. Dhatt, Kim, and Mukherji (1999) confirmed that value

[3] O-S represents the initials of the last names of the authors.
[4] See, for example, Athanassakos (2011); Chan and Lakonishok (2004); Fama and French (1998).
[5] WJS Limited Partners; TBK Limited Partners; Buffett Partnership Ltd.; Sequoia Fund Inc.; Charles Munger Ltd.; Pacific Partners Ltd.; Perlmeter Investments Ltd.; Washington Post Master Trust; and FMC Pension Fund.

stocks during 1979-1997 outperformed growth stocks by 5.28 to 8.40 percentage points a year and had lower standard deviations and lower coefficients of variation than growth stock. Kwag and Lee (2006) show that investors, on average, always benefit from value investing regardless of economic conditions (both expansion and contraction periods), but benefit more when they pursue a value investing strategy during a period of economic contraction.

The existence of value premium is not confined to the US market. Fama and French (1998) confirmed that value premium exists in the twelve major EAFE markets (Europe, Australia, and the Far East). Chan and Lakonishok (2004) summarized the various explanations of the superior performance of value over growth stocks, and provide some new results on the profitability of value strategies based on an updated (incorporating data through 2001) and expanded sample (included developed markets outside the United States). Using a short sample period (10 years), Capaul, Rowley, and Sharpe (1993) confirmed that the value premium is pervasive in international stock returns. Chan, Hamao, and Lakonishok (1991) documented a strong value premium in Japan. Using four valuation ratios (i.e. P/E, price to cash flow, P/B and Dividend yield), Bauman, Conover and Miller (1998) found that value stocks generally outperformed growth stocks both on total-return and risk-adjusted basis in 21 countries for a 10-year period. Chen and Zhang (1998) documented that value stocks offer reliably higher returns in the US, Japan, Hong Kong and Malaysia, but not in the high-growth markets of Taiwan and Thailand. Capaul et al. (1993) analyzed value (defined as low price/book ratios) and growth (defined as high price/book ratios) for six countries over the period from January 1981 through June 1992 and confirmed that value stocks outperformed growth stocks on average in each country during the period studied, both absolutely and after adjustment for risk.

Although academia is in agreement that value stocks outperform growth stocks, much less consensus exists about the underlying reasons behind this superior performance. For example, Fama and French (1992, 1996) reported that higher returns of value stocks relate to their higher levels of risk because these stocks are more prone to financial distress. Chen and Zhang (1998) concluded that value stocks are riskier because they are usually firms under distress, have high financial leverage, and face substantial uncertainty in future earnings. Just like the Fama-French model, the findings of Rozeff and Zaman (1998) also characterize growth stocks as less risky and value stocks as more risky.

However, these explanations of value premium are in contradiction to some other studies like Lakonishok, Shleifer and Vishny (1994) and Ibbotson and Reipe (1997). For example, Lakonishok et al. (1994) suggested that investors' cognitive biases and agency costs of professional investment management were the reasons for the superior performance of value portfolios. La Porta, Lakonishok, Shleifer and Vishny (1997) report that the superior return of value stocks is due to the expectational errors made by investors. Chan and Lakonishok (2004) documented that the market betas of both the value and glamour portfolios are very close to each other, so systematic risk is not an obvious suspect for explaining the value premium. Chan, Karceski, and Lakonishok (2000) examined the relative performance of value and growth stocks in the late 1990s and concluded that only a behavioral thesis can explain the recent relative stock price performance of the equity asset classes, not the rational-asset-pricing hypothesis or the new-paradigm thesis.

To our knowledge, only two studies (Athanassakos, 2009, 2011) have been conducted so far to test the existence and pervasiveness of value premium in the Canadian market. Athanassakos (2009) documented a consistently strong value premium using Canadian data from 1985-2005, which persisted in both bull and bear markets, as well as in recessions and recoveries. Unlike Fama and French (1992), Athanassakos (2009) showed that value portfolios have lower betas than the

growth portfolios, regardless of whether sorting is based on P/E or P/BV. However, he used the risk argument to explain the value premium like Fama and French (1992), Chen and Zhang (1998) and Rozeff and Zaman (1998) in the sense that higher returns observed from value portfolios is due to higher risk inherent in those portfolios. On the contrary, Athanassakos (2011) showed that value analysis (what value investors do) does add value and furthermore that value portfolios are not riskier than their non-value counterparts.

The higher risk explanation of value premium may be plausible if "value" is narrowly defined as low P/E or other similar price ratios, such as low P/B or low price to cash flow ratios. However, we do not think this is a valid explanation for the value premium since stocks with poor performance in terms of earnings, cash flow or sales growth will not fulfill the criteria used by true value investors and thus would not normally be among the stocks that value investors will select for their portfolios. Value investors do not select stocks solely on the basis of low P/E or other price ratio. In fact such an approach to investment will be regarded as antithesis to value investing because it does not meet Benjamin Graham's requirement of "thorough analysis." A true value investor may buy a stock that is momentarily experiencing a downturn in earnings but not one with a persistent past history of poor earnings. Chan et al. (2000) argued that the high prices of growth stocks did not reflect their fundamentals; rather, they reflected investors' rosy expectations of future growth and of the companies' ability to sustain growth.

3. A HEURISTIC FOR MAKING VALUE INVESTING DECISION

We develop a simple heuristic for making stock selection decisions. The philosophical underpinning of the O-S heuristic is that it is possible to create a simple value investing decision making tool using criteria based on earnings potential, financial stability, and fair valuation. Furthermore, application of this tool will help the user to develop a consistent and disciplined approach to value investing decision making that will yield very satisfactory results. We hypothesize that portfolios that are created from this heuristic will yield returns above the market average. The market return is the average returns from two sets of portfolios: those with above average returns and those with below average returns. We reason that if the stock selection criteria of the O-S heuristic are carefully applied, the resulting portfolios should be among the group with above average returns.

The way the O-S heuristic works is that prospective stocks that an investor is interested in will be subjected to a set of screening criteria. At the end, the investor will make one of three decisions: (i) reject the stock, (ii) put it on a watch list, or (iii) buy it. If a company is not investment worthy then the decision to reject it will be made immediately at the stage that the screening criteria point to that. A company will be put on the watch list if all the financial metrics are sound as revealed by the screening criteria but the stock price fails to meet the margin of safety criterion. Failing the margin of safety criterion means either the stock is selling above the intrinsic value or there is not sufficient margin of safety to classify it as a safe investment. A recommendation to buy a stock means that all the financial metrics are sound and the "price is right" (i.e. it is selling at a price that gives a good margin safety, as explained below). There are two main parts to executing the heuristic: the preliminary stock selection criteria (referred to as the "5-Minute QuickScan") and the full set of value investing criteria. The two parts are presented in the Appendix: Table 1 and Table 2 respectively.

The 5-Minute QuickScan is a preliminary screening tool to determine if a company is worth taking through the entire screening criteria. It is essentially a device for narrowing down the number and types of companies that we will process through the full set of value investing screening criteria.

Needless to say, an investor is only interested in good quality stocks. The 5-Minute QuickScan is the tool by which we focus our analysis only on companies that meet some minimum quality standards.

Companies that fulfill all these preliminary screening criteria will now be subjected to the full set of value investing criteria in Table 2. There is one point we need to make specifically about criterion number 2 in the 5-Minute QuickScan: that the market capitalization must be greater than $500 million. The O-S heuristic is designed with what Benjamin Graham (1949) calls the "defensive investor" in mind. Specifically, Benjamin Graham's (1949) recommendation to the defensive investor is that "each company selected should be large, prominent, and conservatively financed." (p. 65). Limiting our set to companies with market capitalization greater than $500 million satisfies the condition of excluding small companies.

4. DATA AND METHODOLOGY

We used the Infomart financial database for our study. We used the first five years (2001 to 2005) of financial statement data to make our portfolio selection decision. After that, we tracked the monthly performance of the portfolios from January 2006 to May 2011. We created three portfolios that we labeled "Value", "Watch" and "Other" from the S&P/TSX 60 index using the O-S heuristic approach. The companies that qualify according to the O-S heuristics we call "Value." The companies that have satisfactory financial stability and earnings potential but do not have an acceptable margin of safety we call "Watch." We used the label "Other" for the portfolio of companies which do not fall in either of the above two categories.

We used three portfolio performance tracking periods: the entire period (from January 2006 to May 2011); the recession period (from October 2007 to July 2009); and the period from October 2007 to May 2011.

We used the companies in the S&P/TSX 60 Index as our stock universe for two reasons. First, this group constitutes approximately 73 per cent of the Toronto Stock Exchange's equity market capitalization and addresses the needs of investment managers who require a portfolio index of the large-cap market segment of the Canadian equity market (Standard & Poor's, 2011). Secondly, we chose the S&P/TSX 60 for a first empirical test of the O-S heuristic because we hypothesize that if the heuristic can successfully extract a value portfolio from this group of relatively uniform high-end category of stocks then it will have more discriminating power when applied to the entire market with a wider quality range of stocks.

5. COMPARING PORTFOLIO PERFORMANCE

There are two main things we want to examine in order to make judgment as to whether the use of the heuristic adds value in the value investing context. First, we hypothesize that if the value portfolio derived using the O-S heuristic adds value then the distribution of the returns of that value portfolio should be more negatively skewed than the group (the S&P/TSX 60 Index) from which it is derived. That means if we assume a symmetric normal distribution, then the O-S value portfolio will have a return distribution where the mode and the median shift to the right of the mean of the parent population (in this case, the S&P/TSX 60 Index). If the original distribution of the Index is already negatively skewed then the O-S portfolio will be more negatively skewed than the index. What this will demonstrate is that the O-S heuristic is capable of selecting portfolios with the following characteristics: the stocks within the value portfolio that outperform market

average will do so by such a wide margin to more than compensate for the stocks within the value portfolio that yield returns below the market average.

The second criterion on which we intend to compare the performance of the O-S heuristic with the other portfolios is long-term returns. In the value investing paradigm, measuring and comparing returns on short-term basis is meaningless. While t-tests of differences in daily or monthly returns are common in the literature, that type of comparison is not in line with the philosophy of value investing. Value investors hold for long periods and they do not care about daily or monthly volatility of stock prices. As Warren Buffett put it in his 1988 letter to shareholders of Berkshire Hathaway "…when we own portions of outstanding businesses with outstanding managements, our favorite holding period is forever" (Buffett, 1988). Therefore, for purposes of comparing performance, we compare the cumulative returns over a five-year period of the value portfolio with the other portfolios.

6. RESULTS, ANALYSIS AND DISCUSSION

6.1 Descriptive Statistics

Tables 3 to 5 show the average monthly compounded means, medians, and variances of the four portfolios: the index, the O-S value portfolio, the watch list, and other. As already mentioned, month-to-month performance of value portfolios has little or no significance in value investing paradigm so these descriptive statistics are provided mainly for information.

Table 3: Mean Monthly Compound Return

Portfolio	Entire Period (Jan 06 – May 11)		Oct 07 – Jul 09		Oct 07 – May 11	
	Return	Rank	Return	Rank	Return	Rank
S&P/TSX 60 Index	0.0020	4th	0.0018	4th	0.0014	4th
Value	0.0102	1st	0.0033	2nd	0.0062	2nd
Watch	0.0059	3rd	0.0028	3rd	0.0040	3rd
Other	0.0083	2nd	0.0059	1st	0.0068	1st

"Value" is the portfolio created with the O-S heuristic; "Watch" is the portfolio with shares that meet the O-S financial soundness criteria but do not meet the margin of safety requirement. "Other" consists of stocks from the S&P/TSX 60 Index that are neither "Value" nor "Watch." The index has 60 stocks; Value has 5 members; Watch has 20 members and Other has 12 members. The ranks of the portfolios are in ascending order of mean returns. Since high return is a desirable attribute of a portfolio, 1st refers to the portfolio with the highest mean return. The number of stocks in the three portfolios – Value, Watch and Other – does not add up to 60 (the number of stocks in the index) because some companies (25 of them) had missing financial statement data and could not be analyzed using the O-S heuristic and thus not classified as either Value, Watch or Other.

From Table 3, we see that Value portfolio had the highest mean monthly return for the entire period but ranked second to "Other" during the October 2007 to July 2009 recession period as well as the October 2007 to May 2011 period. The fact that the value portfolio ranked first over the entire period but ranked second during the other sub-periods is interesting. We would expect that Value will rank first in each period. Another interesting observation is that the Index portfolio

ranked fourth in each period which means that the index as a whole ranks below each of the three portfolios that were derived from it. It appears the companies with missing data that were excluded had significant weight in the index and their aggregate returns were below the returns of the overall index.

Table 4: Median Monthly Compound Return

Portfolio	Entire Period (Jan 06 – May 11)		Oct 07 – Jul 09		Oct 07 – May 11	
	Median Return	Rank	Median Return	Rank	Median Return	Rank
S&P/TSX 60 Index	0.0018	4th	0.0037	4th	0.0010	4th
Value	0.0088	1st	0.0063	1st	0.0084	1st
Watch	0.0051	3rd	0.0043	3rd	0.0049	3rd
Other	0.0083	2nd	0.0056	2nd	0.0078	2nd

"Value" is the portfolio created with the O-S heuristic; "Watch" is the portfolio with shares that meet the O-S financial soundness criteria but did not meet the margin of safety requirement. "Other" consists of stocks from the S&P/TSX 60 Index that are neither "Value" nor "Watch." The index has 60 members, Value has 5 members, Watch has 20 members and Other has 12 members. The ranks of the portfolios are in ascending order of median returns. Since high return is a desirable attribute of a portfolio, 1st refers to the portfolio with the highest median return.

Table 4, shows that when the average is measured by median, the Value portfolio had the highest median monthly return for all three periods: the entire period, January 2006 to May 2011, October 2007 to July 2009, and October 2007 to May 2011 period.

The variances and their ranks are shown in Table 5.

Table 5: Variance of Monthly Compounded Returns

Portfolio	Entire Period (Jan 06 – May 11)		Oct 07 – Jul 09		Oct 07 – May 11	
	Variance	Rank	Variance	Rank	Variance	Rank
S&P/TSX 60 Index	0.005	2nd	0.006	2nd	0.005	2nd
Value	0.004	1st	0.005	1st	0.004	1st
Watch	0.008	4th	0.006	2nd	0.004	2nd
Other	0.007	3rd	0.008	4th	0.006	4th

The ranks of the portfolios according to their variances are given in parentheses. Since low volatility is a desirable characteristic, 1st refers to the portfolio with the ***lowest*** variance.

The Value portfolio has the lowest variance for all three periods. While low volatility is generally regarded as a nice feature to have, from a value investing perspective, we are indifferent to volatility once a desirable portfolio that meets all the criteria of the heuristic is created. As we pointed out earlier, we aim at holding our value portfolio for a long time. Month to month volatilities are not relevant for purposes of measuring risk of the portfolio. The riskiness of a portfolio is determined at the time of portfolio creation by checking for its financial soundness. Risk of a portfolio is not based on day-to-day volatility after the portfolio is created. The type of risk that we make an effort to avoid is the risk of permanent impairment of capital. It is for this reason that the O-S heuristic puts a lot of effort in screening explicitly on the basis of financial stability and susceptibility to bankruptcy. This perspective is in line with what is commonly

attributed to Warren Buffett as his two rules of investment: "Rule #1: Don't lose money" and "Rule #2: Don't forget rule #1." Or, as Seth Klarman (1991) puts it, "risk avoidance is the single most important element of an investment program" and therefore "loss avoidance must be the cornerstone of your investment philosophy" (p. 94). We endeavour to avoid risk at the time of setting up the portfolio not by dodging volatility after the portfolio is created.

6.2 Skewness

One of the more relevant statistics from a value investing perspective is skewness of the portfolio returns. Skewness measures the degree of symmetry of distribution of random variables about the mean. If the bulk of the data (frequency weighted) is greater than the mean then the distribution will have a long left tail and it is classified as negatively skewed. If the bulk of the data is less than the mean then the distribution will have a right long tail and the distribution will be positively skewed. It will be interesting to find out what happens to skewness when a portfolio is created on the basis of a sound value investing heuristic. The measure of coefficient of skewness that we used was:

$$Sk = \frac{n}{(n-1)} \sum_{i=1}^{n} \frac{(R_i - R_p)}{s^3}$$

Sk = coefficient of skewness

R_i = return on stock i

R_p = return on portfolio p (p = either "Index," "Watch" or "Other")

n = number of stocks in the portfolio

s = standard deviation of portfolio p's returns

The results are presented in Table 6.

Our hypothesis is that if a value investing heuristic adds value to the portfolio selection process then the selected value portfolio should be more negatively skewed than the parent population from which it was drawn (in this case the index). This is what is observed with the Value portfolio compared to the other portfolios as shown in Table 6. The Index is itself negatively skewed. The question then is whether the Value portfolio that is obtained by applying the O-S heuristic is more negatively skewed than the Index from which the portfolio was drawn. For the entire period (January 2006 to May 2011), the Watch portfolio ranks the highest in negative skewness and the Value portfolio is second. The Value portfolio has a coefficient of skewness that is 4 times as negatively skewed as the index during that period. The Watch portfolio has skewness that is 5 times that of the index. That means the better performance of the Value portfolio than the Index is attributed mainly to stocks that had returns above the median of the Value group. So the O-S heuristic is capable of selecting stocks with a bias towards outperformance, which is what we are looking for.

Table 6: Skewness

Portfolio	Entire Period (Jan 06 – May 11)		Oct 07 – Jul 09		Oct 07 – May 11	
	Skewness	Rank	Skewness	Rank	Skewness	Rank
S&P/TSX 60 Index	-0.175	3rd	-0.209	3rd	-0.004	4th
Value	-0.716	2nd	-0.564	1st	-1.380	1st
Watch	-0.864	1st	-0.364	2nd	-0.204	3rd
Other	0.256	4th	0.165	4th	-0.298	2nd

The ranks of the portfolios are given in parenthesis where high negative skewness is the desirable characteristic that is being sought.

6.3 Cumulative Returns

Apart from skewness, the other comparison that we consider to be meaningful in the context of value investing is the overall cumulative return over the entire period. For value investors that is what really matters. This is because the value investor sets an investment horizon and then structures a portfolio that will preserve the original investment and yield a "satisfactory" return at the end of the investment horizon. For this comparison, what we did was to find the percentage of the members of each of the three portfolios that beat the index performance. The results are given in Table 7. The Value portfolio ranked first in each of the three sub-periods. Another observation is that the Watch portfolio consistently ranked second in all three periods. Both of these observations support the notion that the O-S heuristic must be picking stocks not only in the manner desired by value investors but also producing desirable outcomes.

Table 7: Cumulative Returns

Portfolio	Entire Period (Jan 06 – May 11)		Oct 07 – Jul 09		Oct 07 – May 11	
Cumulative Return on S&P/TSX 60 Index	1.135		0.80		0.93	
	% of Stocks that Outperformed the Index	**Rank**	**% of Stocks that Outperformed the Index**	**Rank**	**% of Stocks that Outperformed the Index**	**Rank**
Value	4/5 = 80%	1st	3/5 = 60%	1st	5/5 = 100%	1st
Watch	11/20 = 55%	2nd	8/20 = 40%	2nd	14/20 = 70%	2nd
Other	6/12 = 50%	3rd	4/12 = 33%	3rd	8/12 = 67%	3rd

The percentages represent the percentage of the group of stocks in the portfolio that outperformed the index.

7. SUMMARY AND CONCLUSION

The paper presented a brief overview of value investing. Although there is no question that there is a value premium, there are conflicting explanations as to why it exists. Psychologists suggest that when decision makers find themselves with limited capacity to deal with complex data and high degrees of uncertainty (as in making investment decisions) they resort to the use of heuristics as a simplifying tool. We developed a value investing heuristic and applied it to stock selection using the Toronto Stock Exchange S&P/TSX 60 as the stock universe. A presentation of some pertinent descriptive statistics show that the value portfolio based on the heuristic ranks above the other portfolios. Thus this heuristic could potentially be used as a valid tool for making value investing decisions. Moreover, given the simplicity of the heuristic and that it can be implemented using only publicly available data, this process is accessible to all investors.

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APPENDIX

Table 1: Preliminary Stock Screening Criteria (The "5-Minute QuickScan" Screening Criteria)

No.	Criterion/ Question	Decision Rule	Rationale
1	Is the company listed on the OTC or on Pink sheet? Check whether the company's ticker symbol has a .OB (NASDAQ bulletin board stock) or .PK (pink sheet) extension	Reject if the ticker has either .OTCBB or .PK extension.	Information about .OB or .PK shares tends not to be up to date or always reliable. Although .OTCBB companies have to file regular forms with the SEC, they are still not as safe as stocks listed on the major exchanges.
2	Is the company's market capitalization below $500 million?	Include only companies with market cap > $500 million	The original intent of setting up this heuristic is to design a system that even investment novices can use and not lose money. For that clientele we felt it advisable to limit them to well established companies and this criterion increases the chances of that.
3	Recent IPO	Reject if the company does not have at least 5 years of public trading data.	Same reason as criterion # 2 – to limit the search to relatively well established companies with a reasonable (minimum 5 years) public trading history.
4	3 to 5 years of positive EBIT?	Include only companies with positive operating profit for at least 3 years but preferably 5 years or more.	A critical indicator of future profitability is a track record of past profitability. Operating profit is regarded as a sign that this company can sustain itself through its business operation and also an indicator that it has been operating a viable business model.
5	3 to 5 years of positive Cash Flow from Operating Activities?	Include only companies with positive cash flow from operating activities for at least 3 years but preferably 5 years or more.	This shows that the company is able to end up with positive cash flow of its own. Rationale similar to criterion # 4.
6	5 years of ROE >10%	Accept only companies with at least 3 continuous years of ROE > 10%. If one of the past three years has ROE < 10% then look for 3 years out of the past 5 years.	ROE is an indicator of profitability and a 3 to 5-year track record is an indicator that profitability has been sustained in the past.
7	5 years of Debt/Equity ratio < 1	Accept only companies that meet that condition.	The goal is to limit the set to low leverage companies. We prefer companies with zero debt.
9	Tangible Book Value > 0 for the past 3 years.	Accept only companies that meet the condition.	While companies with good business models and sustainable competitive advantage can have negative net tangible value, analysis of such companies might be beyond the scope of beginners who are part of the user group for whom this heuristic is designed.

Table 2: Value Investing Screening Criteria[6]

Screening Criterion # 2A: Earnings Strength, Earnings Stability and Moat Indicators		
No	**Financial Ratio or Value Indicator**	**Decision Rule**
1	Return on Invested Capital (ROIC)	ROIC must be at least 10% in each of the past five years.
2	Equity Growth Rate	The annual compounded equity growth rate (measured by the rate of growth of Book Value per Share) must be at least 10% for the past 5 years.
3	Rate of Growth of Earnings per Share (EPS)	The annual compounded EPS growth rate must be at least 10% for the past 5 years.
4	Sales Growth Rate	The annual compounded rate of growth of sales must be at least 10%.
5	Operating Cash Flow (OCF) Growth Rate	The annual compounded rate of growth for OCF must be at least 10%.
6	Free Cash Flow (FCF) Growth Rate	The annual compounded rate of growth for both FCF must be at least 10%.
7	Gross Margin	A gross margin greater than 40% is classified as an indicator of durable competitive advantage.
8	Operating Margin	First we find the average operating margin for the industry or a core group of competitors. And then we look at the company's operating margin, which must be above the average of the industry or its competitors.
9	Net Margin	Net margin greater than 20% is considered a sign of durable competitive advantage and net margin less than 10% is interpreted as the company being in a highly competitive environment.
10	Free Cash Flow (FCF) Margin	FCF margin greater than 10% is considered a sign of durable competitive advantage.
Screening Criterion # 2B: Financial Strength and Financial Stability		
Screening Criterion # 2B Part 1: Short-Term Financial Health		
11	Current Ratio	Current ratio has to be at least 2.
12	Quick Ratio	Quick Ratio has to be at least 1.5
13	Interest Coverage Ratio	Interest coverage ratio has to be at least 5.
14	Operating Cash Flow Ratio (OCF)	OCF ratio has to be at least 1.

[6] It is obvious to see how these criteria make common sense to an investor who is looking for god quality companies. We arrived at them from an amalgamation of various stock selection criteria alluded in writings and interviews of various value investors including Benjamin Graham, Warren Buffett, Walter Schloss, Joel Greenblatt, etc.

Screening Criterion # 2B Part 2: Long-Term Financial Health		
15	Leverage Ratio	Leverage ratio (measured by Debt to Total Assets) has to be less than 0.5 except utilities for which leverage ratio equal to or less than 1.0 is acceptable.
16	Debt to Equity Ratio	Debt-Equity ratio has to be less than 1.
17	Long-Term Debt to Operating Cash Flow Ratio	This ratio is used to measure how long it will take to pay off long-term debt using OCF and it has to be 3 years or less.
Screening Criterion # 3: Susceptibility to Bankruptcy		
18	Piotroski F-Score[7]	Companies are accepted if the F-Score is 8 or 9 and they are rejected if the F score is less than or equal to 2. However, for companies with F score between 3 and 7, the decision to accept or reject is more subjective and the overall profile of the company in light of the other ratios is considered in arriving at a decision.
19	Altman Z-Score	A company with Z score less than 1.8 is rejected. A Z-score of 3 or higher is accepted. For companies with Z scores between 1.8 and 3, the entire profile of the company is considered before a final "accept" or "reject" decision is made.
Screening Criterion # 4: Company Valuation and Margin of Safety		
20	Margin of Safety = (Intrinsic Value – Price)/Intrinsic Value	Margin of Safety must be at least 20%. (Intrinsic Value is estimated by two methods: the P/E ratio approach and Discounted Free Cash Flow approach)

Final Stock Selection Decision

If a stock meets all the benchmarks of Steps 1 to 19 then it is classified as "accepted" for inclusion in the portfolio. If in addition to fulfilling the requirements for Steps 1 to 19, the company also has a margin of safety of at least 20% then it will be recommended for purchase. Essentially, criteria 1 to 19 answer the question: is this a good company? And criterion 20 answers the question: is it a good time to buy the stock?

Sometimes the intrinsic value based on P/E ratio valuation method may yield an acceptable margin of safety whereas the Discounted Free Cash Flow method does not or vice versa. In those cases, we make the decision based on the overall profile of the company. If all other indicators are very good then the company may be included in the "buy" portfolio. But if the other indicators barely make it past the acceptable standards then it will be put on the watch list.

[7] See Piotroski (2000) and Altman (1968) on how these indices are calculated.

Journal of Business, Economics & Finance ISSN: 2146-7943

Journal of Business, Economics & Finance
Year: 2013 Volume: 2 Issue: 4

PUBLIC SPENDING ON HEALTH CARE AND HEALTH OUTCOMES: CROSS-COUNTRY COMPARISON

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KEYWORDS

Public expenditure on health, child mortality, infant mortality, health economics.

ABSTRACT

This study aims to analyze the effect of government spending on health-care on health outcomes with cross-national comparison. We run cross-sectional regressions to estimate the strength of association between child and infant mortality rate and public health expenditures in worldwide sample. We find statistically significant and robust results by various specifications. We found government health spending as a share of GDP is negatively associated with lower level of under-5 mortality by elasticities of from -0.17 to -0.22. The elasticity is -0.20 for infant mortality. When government spending as a share total health expenditures is used as estimator, elasticities are -0.33 for under-5 mortality and -0.23 and -.0.32 for infant mortality. We also found significant and negative coefficient a number of socio-political determinants such as the law and order, education level, population as well as income level as a main determinant. Compared to previous studies, we found the income level to be slightly less significant and the public health spending to be slightly more significant empirically.

1. INTRODUCTION

As apart from other markets in part, health care services have some unique characteristics such as prevalence of uncertainty and risk, the problem of asymmetric information, restricted competition and widespread externalities. Health care is also one of the largest industries in the global economy, so that health spending as share of GDP is approximately %6.83 on average (see Table 1). Government intervention to health sector is also common fact in the worldwide. Government share in health expenditure is 58.2% on average in the world (see Table 1). Governments not only spend money on health but also they use different intervention forms such as regulations and public provisions to intervene health care system of the country. Thus, the government hasinfluence on health sector by altering the of amount public money on health care or changing its social welfare system or regulating private health sector.Governments' role is also important to reform of health care systems because governments can alter their health care systems through altering amount of public funding. Governments in developing countries actively attempt to improve the social welfare of their citizens via to change in composition and direction of public expenditure. Health spending also has high potential of capacity to transfer and to redistribute income toward the poor, since the poor heavily consume public goods and services. Therefore, it can be considered that total public role on health is considerably substantial in the modern societies.

While health care is financed by a multiple sources in most countries, there is a fair amount of variation in the degree of public financing of health care across countries and over time. However, governments' role in the health market is considerably large in especially developed countries. Studies show that public health spending has powerful impact not only on components of health services that use by the poor but also on vital indicators such as infant mortality, access to safe water or sanitation in low income countries. Nevertheless, countries with low income has low amount of public spending on health care, although public spending which aimed at improving the health status is expected to leads to a better quality of life as well as positively influences economic development of a country.

The study aims at analyzing the government's role and government spending on health care by cross country comparison to understand how changes public spending among countries and how does public spending have effect on health outcomes. Section 2 discusses governments' role in health care and Section 3 and Section 4 analyze the level of public spending and health outcomes with cross-national data. Finally, Section 5 use regression analysis to estimate the associations between health outcomes and government health spending together with other socio-economic predictors.

2. GOVERNMENT INTERVENTION IN THE HEALTH CARE SECTOR

Government intervention in health care market has been justified in three main grounds; assuring the optimal production of public goods, offsetting market failures such as externalities, and subsidizing poor people who cannot finance out-of-pocket or buy private insurance (Musgrove, 1996; Self and Grabowski, 2003). Governments employ several instruments to intervene health markets; they can stimulate information distribution; take regulative activities; finance private health services with public funds and, supply health services itself through public facilities and staffs (Musgrove 1996). However a general and simple pattern on governments' role and their instruments in the health markets cannot be drawn from country practices. There is no a simple and valid prescription for all countries on whether governments intervene and how they do it. Nevertheless, some important points could be determined for decisions for whether governments intervene or not and which instruments they use. Musgrove (1999) determines the nine criteria based on economic efficiency (public goods, externalities, catastrophic costs and cost-efficiency), ethical reasons (poverty, vertical equity, horizontal equityand rule of rescue) and political considerations (public demands) related with government intervention to health sector.

Interventions based on the reason of economic efficiency are especially important to treat communicable diseases that create positive externalities when they have been cured, to ensure safety for food or water, and to correct insurance market failures. There are extremely important health-related activities which must be financed by the government to obtain socially optimum level of consumption for all countries. In these kinds of conditions, public provided health care is probably more efficient than private sector. At the same time, these types of health services are expected to have considerably important impacts on health outcomes such as life expectancy, infant or child mortality, although comprehension of services and its volume are related to income level of both people and country. Aside to improve income distribution through public funded health services, public health expenditures are matter more to the poor than the non-poor or to the low income countries than the high income countries to obtain vital health outcomes.

Empirical studies find that the poor are more strongly affected by public health expenditure in comparison with the non-poor, while the non-poor are more likely to obtain medical care when they are sick (Bidani and Ravallion, 1997; Castrol-Leal et al., 1999; Gwatkin, 2000; Wagstaff and Watanbe, 2000, Makinen et al., 2000). In a sample of Indonesian households, Deolalikar (1995)

finds that the marginal impact of public health spending on the incidence and duration of children's illness is slightly larger among the poor than the non-poor, from the data on Indonesia. Gakidou and King (2000) find that GDP per capita, health expenditure per capita, and the percent of the population earning less than one international dollar per day are all negatively correlated with health inequality. Furthermore, the relationship between health inequality and expenditure on health is strong at lower levels of income.Amaghionyeodiwe (2009) found from the study on Nigeria that income level of people is matter in health status and the poor are more strongly affected by public spending on health care relative to the non-poor. Public health spending has a consistent and significant influence on child mortality among the poor. Gupta et al. (2003) found the results that supporting the fact that the poor are more strongly affected by public spending on health care in comparison with the non-poor. The poor heavily rely on public health facilities and services compared to the rich. As a result, public health spending has obvious impact on health status of the poor.

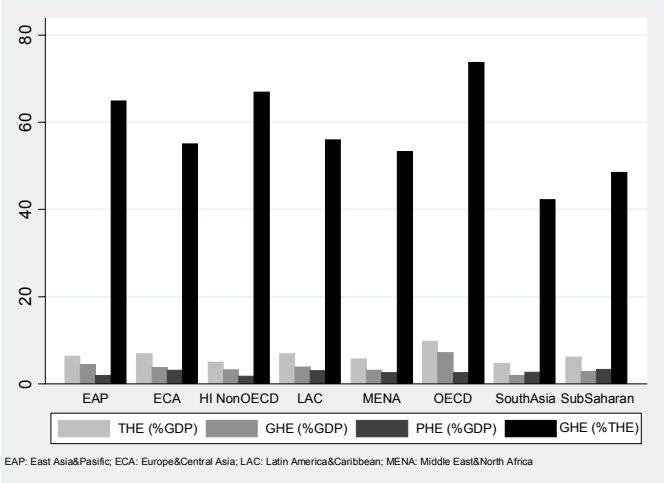
Therefore, not only amount of public health spending but also its composition is a matter. Public spending on essential health services such as immunization, communicable diseases, preventive health services, and food safety is justified by disease reduction. As these components of health care services have high level of externalities rather than curative services, a minimum package of these services provided by the government would reduce mortality rates (Gupta et al., 2002).

3. HEALTH FINANCING AND PUBLIC SPENDING ON HEALTH CARE

Alternative resources of financing for health-care expenditure are mainly public funds, mandated social insurance systems, private insurance systems and out-of-pocket payments. The first two of them are related to government intervention on health sector, while the last two of resources can be classified private health expenditures. In general, health care spending varies considerably by the country. The differences may be attributed to a variety of factors including income level, accepted role of government, demographic characteristics, incidence of illness, access to and type of insurance, market forces and practice patterns.

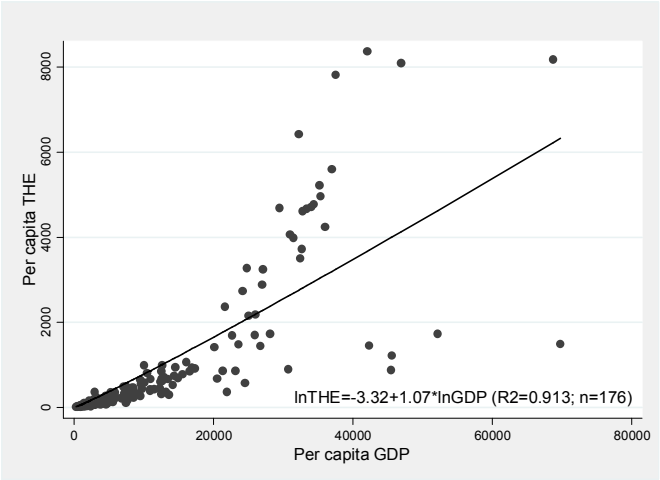
Graph 1 indicates private and government health-care spending with alternative classifications according to various regions. As can be seen from Graph 1, total health expenditures (THE) as share of GDP and government health expenditures (GHE) as share of total health expenditures are relatively low in the low income countries such as Sub-Saharan countries and South Asia Countries, compared to high-income countries such as OECD and high income non-OECD countries. As a share of GDP, health spending in the OECD region is 8.2 percent while in the Sub-Saharan countries which have the lowest level of health spending, it is 2.9 percent. These ratios considerably vary between countries within each region. Government share of total health spending in OECD and Sub-Saharan countries are respectively 64.9% and 45.3% and Sub-Saharan region has the lowest level of government health spending with below the world average (62.8 percent). The graph shows that in general, countries lower per capita income have considerably higher proportion of private expenditures and lower of total health spending for both per capita and as share of GDP. It can be assumed that health care spending rise as income rises, which suggests health-care as a *superior* or *luxury* good (Musgrove, 1996).

Graph 1. Health Expenditures Around the World



Graph 2 shows relationship and fitted values between per capita health expenditure and per capita GDP (PPP, international dollars) from a log-log regression. Variance of per capita health expenditures cross-country can be explained by per capita income of countries. As regression coefficients can be interpreted as elasticity in a log-log regression, we can say that income elasticity of health expenditures is larger from one in analysis of Graph 2. But it should be taken into consideration that this relationship may be a result of human capital which rises by health expenditures or it may be caused by demand triggered by raising income. In any case, this relationship between health expenditure and per capita GDP is not surprising. A numerous studies have found that income per capita explains most of the variance in health spending per capita and there are a strong and positive correlation between national income and national health care spending (For example, Newhouse, 1977; Cullis and West, 1979; Leu, 1986; Newhouse, 1987; Parkin et al., 1987; Milne and Molana, 1991; Gerdtham and Jonsson, 1991a; Gerdtham and Jonsson, 1991b; Hitiris and Posnett, 1992; Govindaraj et al., 1997).

Graph 2. Per capita Health Expenditure and Per capita Income

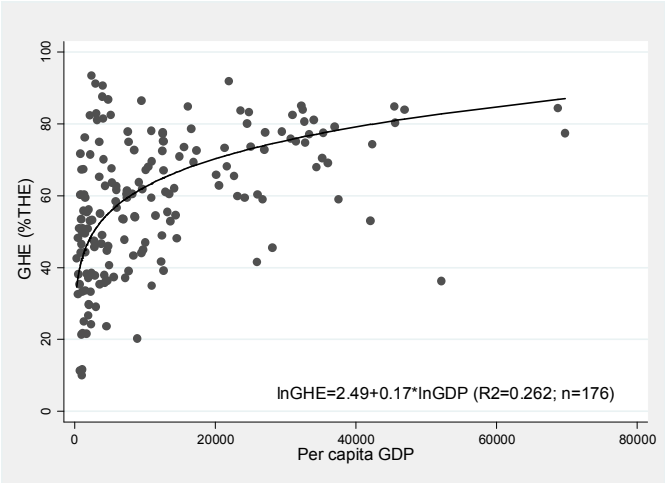


Similarly, studies have found the income elasticity of national health spending is greater than one at developed countries, although there is existence of studies presented evidence to the contrary to that[1]. This fact can be interpreted as health expenditures in countries with high income are used by people to buy luxury component of health services (caring) rather than a necessity components of them (curing) (Hansen and King, 1996; Parkin et al., 1987).

Interestingly, government share of health expenditures also rises with per capita GDP. Graph 3 that presents log-log regression relationship between government health expenditures as a share of health expenditures and per capita GDP (PPP, international dollars) demonstrates that government role tends to expand as national income increases. Of course, as this relationship does not reflect country-specific differences at instruments of government intervention, it does not also imply anything on efficiency of public spending. However, a general pattern exists: the high-income countries are different than the low-income countries with respect to the structure of financing and providing as well as the level of spending. In poorer countries, public money is mostly or entirely spent through public facilities while it goes to private providers in the way of service purchasing from private sector (Musgrove 1996).

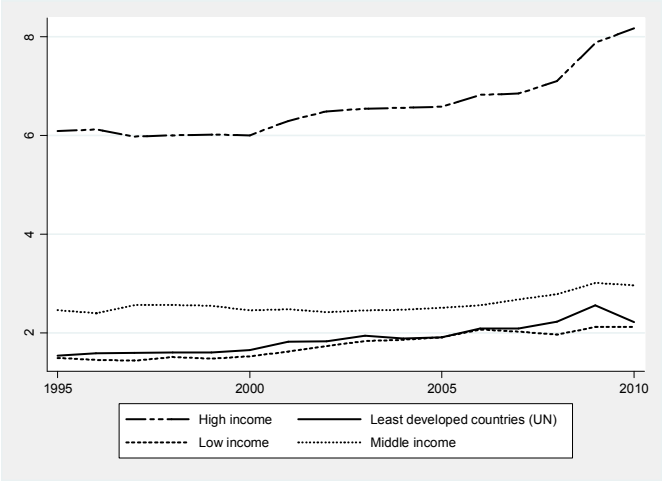
[1]Baltagi and Moscone (2012) have found evidences from panel data on OECD countries that health care has the elasticity much smaller than other studies. They interpreted health care as a necessity rather than a luxury good.

Graph 3. GHE as a Share of Total Health Expenditure and Per capita Income



Another important point is that government participation in health sector shows an increasing trend throughout 20th century. Graph 4 presents time trend in government health spending as a share of GDP by income groups of countries since 1995 that cross-country data available. Of course, the period between 1995 and 2010 may or may not be representative of the general long-term trend among countries. The long term analyses of health spending also display that particularly industrialized countries have experienced a steady increase in health spending in the manner of per capita and as share of GDP in the postwar era (Matteo and Matteo, 1998; Huber and Orosz, 2003). On the other hand, it is difficult to make any generalizations by income levels because different countries have different absolute levels of spending. Despite of all, there is a discernible patter of public health spending during 1995-2010: although GHE as a share of GDP has a trend to increase for all country groups, this tendency at high income countries is more pronounced and stronger. On the other hand, while there is a slight decrease in the middle and the low income countries after the crisis of 2008, for some countries, public health spending has continued to increase through the period of the crisis even.It should be noted that this time trend does not consider the changes in government health spending might have been substituted by corresponding changes in social security systems.

Graph 4. Time Trend of Public Health expenditures as % GDP

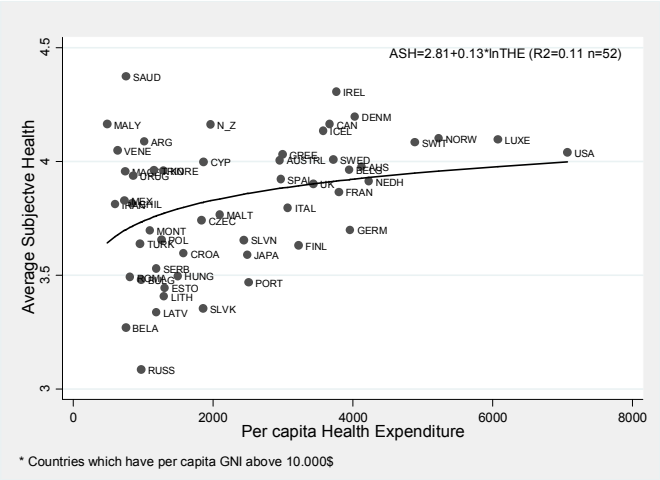


Self and Grabowski (2003) display that public health spending does not serve as an effective measure of the health for the developed countries which have the large public sector interventionsto health sector. On the other hand, public health spending is a significant determinant of health in the middle income and less developed countries. However, these countries have relatively small public spending on health care. Moreover, the low and the middle income countries badly use their limited resources,since public health spending goes to expensive and non-essential services rather than essential health services which have strong impact on mortality rates. Thus, it is a matter not only size of public spending but also its composition and scopeto improve health outcomes.

4. MEASURING HEALTH OUTCOMES AND THEIR RELATIONSHIP TO SPENDING

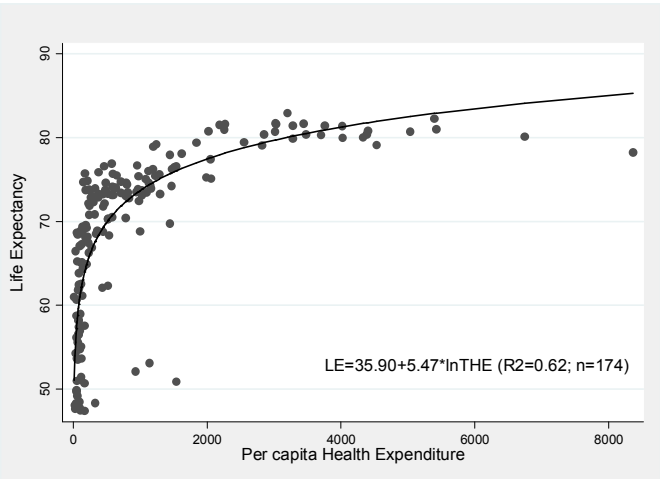
There is no a comparable general measurement on performance of health system or of health outcomes. Indeed health status can only be approximated through related factors that can be measured. In general, there may be two separate measurement of health status: *objective (observed) health status* and *subjective (perceived) health status* (Murray et al., 1994). Empirical studies on impacts of health expenditures mostly use objective health indicators such as life expectancy and mortality rate, although they are an inadequate proxy for health care performance since they just measure years of life but do not reflect the quality of the life. On the other hand, observable indicators are heavily influenced by factors external to the health care system.

Graph 5. Average Subjective Health and Total Health Expenditure



Subjective health status is based on health feeling self-assessment and self-reported. For instance Graph 5 uses a question from World Values Survey (WVS) and Europe Values Survey (EVS) to measure perceived health status. The question with five-point scaled (1 indicates very good; 5 indicates very poor) that indicates average subjective health statement is as following: "All in all, how would you describe your state of health these days?" The scale was coded reverse and then country averages were calculated for aims of the analysis in the Graph.

Graph 6. Life Expectancy and Health Expenditure

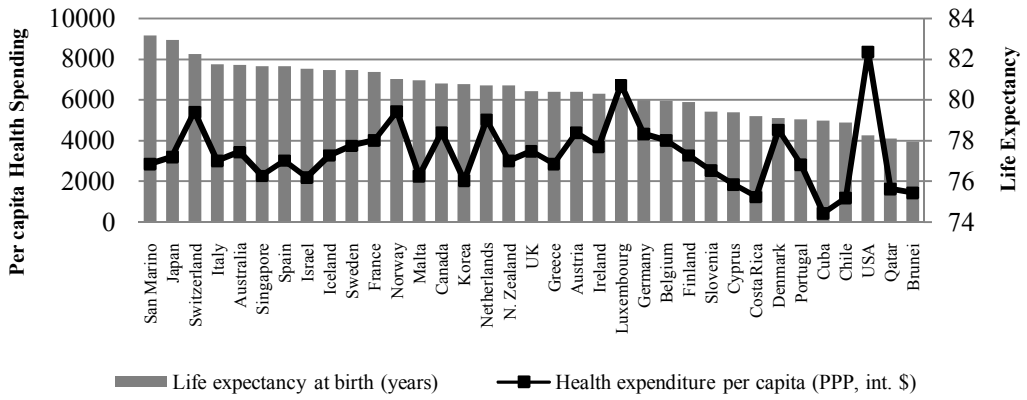


Undoubtedly, subjective evaluations are a measurement that has some problems. They are strongly influenced by emotional experiences and cognitive biases created through distinction between experiencing-self and remembering-self that introduced by Kahneman and Riis (2005). Despite of this, as can be seen from Graph 5, there is a linkage between subjective health status and health expenditures. Murray et al. (1994) argued that perception of ill health may increase with income because of more accessibility to health care and more education that makes people understand more about their health. As a result, health expenditures will be increase, although it is only loosely related to objective health. From this perspective, private health spending seems more likely to respond to subjective need while government health expenditure might be expected to derive more from objective need as measured mortality and disability (Murray et al., 1994).

In this section, it will only be evaluated the life expectancy at birth with relation to health spending as an objective health indicator, since infant mortality and child mortality will be analyzed in cross-sectional regressions in the next section.

Graph 6 shows the relationship between life expectancy and per capita health spending. As a general viewing, the life expectancy rises as health spending rise. However, these results must be interpreted with caution. First of all, since health status is very strongly related with income level, the effect of income should be taken into consideration in comparison of spending. Otherwise it may falsely appear that more health expenditure is extremely effective on better health outcomes (Musgrove, 1996).

Graph 7. Life Expectancy vs Per capita Health Spending



Graph 7 presents the life expectancy and per capita health spending at the top 35 countries ranked by the highest life expectancy. Despite the wide gaps, higher spending on health care does not necessarily prolong lives. For example the United States spent more on health care than any other country in the world (international $8361, PPP) but has 78.24 years of life expectancy. There are many countries achieved higher life expectancy with lower spending. Cuba which has 78.96 years of life expectancy spends only $431 per person on health care. It can easily be observed that some countries have fewer levels of expenditure and of income while they can have longer life. But this simple analysis does not consider income equalities in a country, genetic and geographic factors. The life expectancy varies not only by spending level but also by country-specific factors such as ethnic characteristics and environmental factors such as safe water and air. Of course, it should be also considered the differences at health policy between countries. Cuba has a universal health care

system and one of the highest doctor-to-patient ratios in the world, despite of economic problems in contrast to the United States. Despite all this, countries with higher spending generally tend to have longer life expectancy and we can expect as important income and spending on both objective and subjective health status.

5.CROSS-SECTIONAL REGRESSION ON PUBLIC HEALTH SPENDING AND HEALTH OUTCOMES

5.1. The Data and Variables

This section analyze the strength of association between health outcomes (infant mortality rate and under five mortality rate) and public health expenditures together with a set of some major socioeconomic determinants, using cross-national data available. Table 1 describes the variables and their summary statistics, which used in regression. This analysis seeks to answer question that do countries that do well in health performance have greater public spending on health. The data contains a sample of 131 countries data available.

Table 1: Descriptive Statistics and Definitions of Variables

Variable	Mean and Std. Dev.	Min-Max	Definition and Source
Mortality Under 5	41.06927 (45.33741)	2.6-188.8	The probability per 1,000 that a newborn baby will die before reaching age five, if subject to current age-specific mortality rates. (**Source**: WB, World Development Indicators)
Infant Mortality	28.95475 (27.90292)	1.8-120.9	The number of infants dying before reaching one year of age, per 1,000 live births in a given year (**Source**: WB, World Development Indicators)
GDP per capita	12286.41 (13467.83)	316.4715-9797.94	GDP per capita, PPP (constant 2005 international $) (**Source**: WB, World Development Indicators)
GHE (%GDP)	4.050765 (2.307055)	.5566954-2.90114	Ratio of public expenditure on health care to GDP (**Source**: WB, World Development Indicators)
GHE (%THE)	58.19151 (19.05018)	10.03447-93.38888	General government expenditure on health as a percentage of total expenditure on health (**Source**: WHO, Global Health Observatory Database)
Law and Order	3.695489 (1.305342)	1 - 6	A score that consists of two sub-components. The Law sub-component is an assessment of the strength and impartiality of the legal system, while the Order sub-component is an assessment of popular observance of the law. (**Source**: the PRS Group, International Country Risk Guide, www.prsgroup.com)
Expected Years of Schooling	12.30114 (2.988779)	4.4 - 18	Number of years of schooling that a child of school entrance age can expect to receive if prevailing patterns of age-specific enrolment rates persist throughout the child's life (**Source**: UN, Human Development Indicators)
Population 0-14	29.08645 (10.53455)	13.35815-48.96926	Population ages 0-14 (% of total) (**Source**: WB, World Development Indicators)
THE (%GDP)	6.831976 (2.674157)	1.810075-17.88733	Ratio of total health expenditure to GDP (**Source**: WB, World Development Indicators)

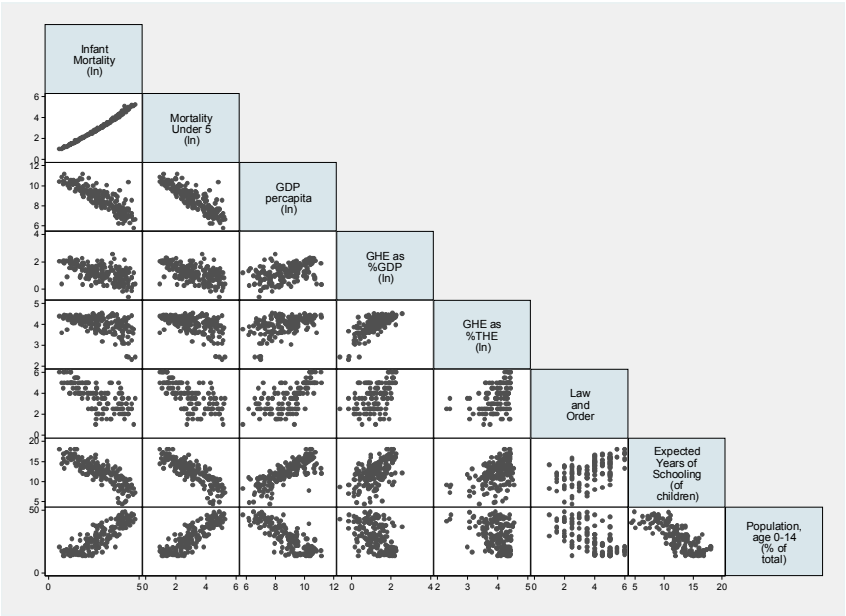
As mention earlier, a numerous empirical studies find income level of country (mostly per capita GDP) and health resource variables (such as physicians per capita, hospital beds per capita) as significant to explain health outcomes. According to empirical findings, while income is always significant, other variables rarely have large impacts (Kim and Moody, 1992; Musgrove 1996; Pritchett and Summers, 1996; Schell et al., 2007). However, studies on advanced countries find as weak relationship between health outcomes and income levels (e.g. Hitiris and Posnett, 1992; Judge et al., 1998). This fact caused some researchers to turn to differences in the distribution of income as a determinant of differences in health outcomes (e.g. LeGrand, 1987; Wilkinson, 1992; Smith, 1996).

Many studies on public health expenditures find that impact of public expenditures to health status is relatively small (Kim and Moody, 1992; McGuire et al., 1993; Aiyer et al., 1995; Musgrove, 1996; Filmer et al., 1998; Filmer and Pritchett, 1999; Schell et al., 2007). Furthermore interestingly, Berger and Messer (2002) found that increases in the publicly financed share of health spending are associated with higher mortality rates in OECD countries which have high level of health spending. However, Anand and Ravallion (1993), Bidani and Ravallion (1997), Jamison et al. (1996) and Hall et al. (2012) find a significant impact of public health expenditures on health outcomes.Bidani and Ravallion (1997) find public spending to have positive influence for the poor, despite of weak impact for the non-poor. Weak links between public spending and health comes steers some studies to use politic predictors such as governance, ethnic heterogeneity, politic system of country as a determinant of health outcomes. For example Rajkumar and Swaroop (2008) find that public health spending in countries that have good governance has a stronger negative impact on child mortality.Ghobarah et al., (2004) find civil wars and ethnic diversity in a country is significant political factors to explain the life expectancy.

$$\ln (H_i) = \beta_1 \ln (GDPi/Ni) + \beta_2 \ln (GHE_i) + \beta 3\ X_i \qquad (1)$$

To estimate the simple heath production function which described at equation 1, we use infant mortality rate and children (under 5) mortality rate as health outcomes (Hi); per capita GDP (GDP/N) as an indicator of income level; share of public expenditures (GHE) as a fraction of GDP and as a fraction of total health expenditures; structure oflaw and order as a proxy of governance at country leveland some socio-economic variables (expected years of schooling, population level of ages 0-14, region dummies, total health expenditures as share of GDP) to indicate country's social capability and structure (X_i). A visual analysis of scatter plots of dependent variables versus each predictor variable is presented at Graph 8.

Graph 8. Scatter-Plot Matrix of Variables



5.2. Statistical Procedures

While we are interested in effects of public health expenditures on health outcomes, we mainly use Ordinary Least Squares regression (OLS) to estimate equation 1. However, in order to address the issues of robustness, we use additional econometric procedures. We used the Shapiro-Wilk W test to check normality of residuals, the Cook-Weisberg test and White test for heteroscedasticity and Ramsey regression specification error test to detect specification error.

Our test of functional form suggests that the log-log specification is appropriate. We used log transformations for dependent variables, income variable and expenditure variables. Empirical literature on health production function has also used commonlythe log-log specification which follows Cobb-Douglas production function(e.g. Pritchett and Summers, 1996; Filmer et al., 1998; Wang, 2002; Gupta et al., 2002; Berger and Messer, 2002; Hall et al., 2012).Log-log function not only allows determining non-linear relationship between mortality and income/spending but also it may be needed to correct skewness of the data. On the other hand, this convenient transformation makes easy interpreting of coefficients because they provide elasticities that be reported the percentage change in dependent variable for a 1% change in independent variable. This is a useful way to compare empirical results because it is scale neutral.

We adapted two main robustness checks to correct problem of ‘outlier’ countries, following Filmer and Pritchett (1999). Firstly, the two country observations with the largest impact on the parameter vector are dropped from the analysis. Secondly, we used median regression in order to minimize

the sum of absolute derivations. As it is be known, median regression is much less sensitive to influential observations than OLS.

In order to verify importance of impact, we use various specifications. The health regressions are robust to various specifications. When dummy variables for regions are added, total health spending remains significant, with estimated elasticity of health status with respect to spending roughly about the same. The signs of the dummy variables also suggest that other regions have better health status than Sub-Saharan Africa, on average.

5.3. Results

Table 2 presents results for regressions performed in analyses. The OLS regression in Column 1 of Table 2 shows that higher public expenditures on health (as share of GDP) appear to be associated with lower under-5 mortality. Elasticity is –0.22. Furthermore, the effect is statistically significant at the 1% level. To check robustness of this result, we can look at results of median regression presented in column 2 of Table 2. Although slightly smaller in absolute terms (-0.165 vs. -0.22), results are similar and still significant (at 5% level).

Column 3 and 4 use infant mortality as dependent variable. Moreover, in column 4, 5 and 6, it was used public health expenditures as a share of total health expenditures to see if public share in health sector has effect on health outcomes. We are more interested in this variable if cross country differences on health financing system can explain differences at health outcomes. Results for Column 3 are similar to column 1 with elasticity of -0.20,at 1% significant level. This implies that a 1% increase in government health spending as a share of GDP is associated with a 20% decrease in infant mortality. Results for column 4, 5, 6 indicates that GHE (%THE) has more empirical significant than GHE (%GDP). When it is used GHE (%THE) as a predictor, elasticities have raised to -0.23, -0.33 and -0.32 for column 4, 5 and 6, respectively. A 1% increase in government share of total health spending is associated with a 33% decrease in child mortality and with 32% decrease in infant mortality at full specifications. Results are still statistically significant.

Table 2: Health Outcomes and Public Health Expenditures (2010)

	(1) OLS	(2) Median Regression	(3) OLS	(4) OLS	(5) OLS	(6) OLS
Dependent Variable →	Mortality Under 5 (ln)	Mortality Under 5 (ln)	Infant Mortality (ln)	Infant Mortality (ln)	Mortality Under 5 (ln)	Infant Mortality (ln)
Independent Variables ↓						
Constant	5.69*** (10.67)	5.50*** (9.48)	5.22*** (9.81)	5.65*** (9.89)	6.61*** (10.23)	6.03*** (9.42)
GDP per capita (ln)	-0.25*** (-4.70)	-0.23*** (-3.97)	-0.23*** (-4.39)	-0.19*** (-3.50)	-0.19*** (-3.01)	-0.16*** (-2.67)
GHE (%GDP) (ln)	-0.22*** (-3.13)	-0.17** (-2.13)	-0.20*** (-2.90)			
GHE (%THE) (ln)				-0.23** (-2.48)	-0.33*** (-3.69)	-0.32*** (-3.60)
Law and Order	-0.11* ** (-3.13)	-0.10*** (-2.63)	-0.11*** (-3.24)	-0.11*** (-3.13)	-0.07* (-1.90)	-0.07* (-1.91)
Expected Years of Schooling	-0.06*** (-2.68)	-0.05** (-2.12)	-0.04** (-2.08)	-0.05*** (-2.68)	-0.06*** (-2.95)	-0.05** (-2.42)
Population 0-14	0.03*** (4.13)	0.02*** (3.31)	0.02*** (3.99)	0.03*** (4.25)	0.03*** (4.20)	0.03*** (4.08)
Dummy for Sub-Saharan	0.62*** (5.59)	0.66*** (5.30)	0.46*** (-3.38)	0.44*** (-4.51)	0.63*** (5.64)	0.47*** (4.22)
Dummy for OECD	-0.27** (-2.49)	-0.36*** (-2.97)	-0.36*** (-3.38)	-0.46*** (-4.51)	-0.40*** (-3.28)	-0.51*** (-4.19)
Dummy for High In. Non-OECD					-0.30** (-2.11)	-0.34** (-2.35)
THE (%GDP) (ln)					-0.21** (-2.34)	-0.20** (-2.18)
R-squared	0.9287	0.7538	0.9178	0.9164	0.9317	0.9220
n	129	129	129	129	129	129

Notes: * Indicates significance at the 10% level. ** Indicates significance at the 5% level. *** Indicates significance at the 1% level.
The R-Squared in column 2 is the pseudo R-Squared.
t-statistics are shown in parentheses
It has dropped Singapore and Azerbaijan for specifications in Columns (1), (2), (3) and (4); Singapore and Trinidad-Tobago for those in Columns (5) and (6) as countries with largest influence on parameter vector due to being extreme outliers.
In classification of countries, it was used World Bank classification. Turkey, Chile and Mexico were not included in dummy for OECD, since they were handled in their geographical classification.

In order to check robustness, when two new predictors are added in Column 5 and Column 6, public health spending remains significant empirically and statistically. Also these two variables (a dummy for high income non-OECD countries and total health expenditures as percentage of GDP) are significant at 5% level.

It was used three dummy variables in regressions. The signs of the dummy variables suggest that other regions have better health status than Sub-Saharan Africa, on average. The coefficient on the variable Sub-Saharan is very strong for under-five mortality, implying that a child mortality rate higher by 63% on average for Column 1, 2 and 5. For all specifications, coefficients are statistically significant. Also it should not come as a surprise that differences at health outcomes for high income countries (OECD and high income non-OECD) is significant.

When non-economic predictors are examined, increasing in expected education levels is associated with decreasing in mortality for both infant and under-five at all specifications. Higher levels of education in the society result in higher health outcomes. Increases in population rate of 0-14 ages are associated with increases in mortality. While findings on education and population are not novel, the score on the law and order that may be a proxy to country's societal governance is also a significant predictor of health outcomes.

Our results show that public health spending has statistically significant impact on both infant mortality and child mortality, albeit economic meaning of this impact is not large relatively. Undoubtedly, it should be taken into consideration of interpreting this results that impact of public spending on health is not an immutable parameter and results will be sensitive to the sample used (Filmer and Pritchett, 1999).

5.CONCLUSION

This study has employed the cross-country data set to examine determinants health outcomes and to discuss significance of public spending on health care. From cross-country regressions, we have found not only the income level as slightly less significant but also public health spending as slightly more significant compared with previous studies (for example Filmer and Pritcher, 1999). Regressions are robust with various specification and statistical procedures.

Although it is difficult to draw policy conclusions from cross-country data as much depends upon the country-specific situation, some points seem clear from discussion in this chapter. Government intervention on health care is a matter not only through the size of public spending on health but also the composition of spending and other instruments used for intervention. It cannot suggest a simple prescription for all countries. In developed countries which have high level of public health spending, increasing the level of public sector involvement would possibly not bring about improvement in heath. Elasticity of health spending in these countries displays the health care to be a luxury good.

Public health spending has especially significant impact for essential health services at the low income countries and the poor people who don't have chance health care services supplied by private sector. On the contrary, despite the potential importance of state intervention in poor countries, these countries have little amount of public health spending compared with developed countries. On the other hand, in countries with the low and the middle income, current public health expenditures are not used in an effective way because of heavy governance and decision-making problems which they suffer.

Also, the social and demographic factors other than spending and income variables have impact on desired health outcomes. Therefore, government intervention and public spending on health care should be used as targeted to essential health care, the poor according to country-specific situations instead of a general increasing or decreasing for all countries. The low and middle income countries should make their spending on health care productive, accessible and targeted for particular outcomes, considering their limited public sources.

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Journal of Business, Economics & Finance ISSN: 2146-7943

Journal of Business, Economics & Finance
Year: 2013 Volume: 2 Issue: 4

EVALUATING THE SHORT-TERM EXCESS-RETURN: A NEW METHODOLOGY

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KEYWORDS

Mutual funds, performance measurement, short-term alpha.

ABSTRACT

In this paper, a new methodology for evaluating short-term excess return is suggested. The intuition behind this methodology is derived from the forward rate calculation and it does not require that the betas remain constant over time. The new methodology is compared with other short-term estimators and substantial score and ranking differences are found. In addition, the short-term estimators are analyzed based onaspects of expected value and variance and the conclusion is that the new methodology is the better one. Simulation tests support this result. Finally, the new methodology also yields performance scores and rankings that are the most consistent with their long-term counterparts.

1. INTRODUCTION

In this paper, a new short-term alpha estimation methodology is suggested: the differences method. The new methodology is analyzed and compared with other short-term alpha estimation methods and the conclusion is that the new methodology should be adopted.

The main idea in most of the classical measures of investment performance is to compare the return of a managed portfolio over some evaluation period to the return of a benchmark portfolio. Early literature develops measures of portfolio performance that continue to be used in much of the performance literature.

The Capital Asset Pricing Model (Sharpe (1964)) implies that all investors should hold a broadly diversified portfolio - the market portfolio - and safe assets in a portion according to their tastes for risk. Jensen (1968) uses the intercept of the factor model regressions to measure abnormal returns generated from picking stocks that outperform a risk-adjusted benchmark[1]. Other measures of portfolio performance developed by the early literature on portfolio performance are the Sharpe ratio (see Sharpe (1966)) and Treynor's measure (see Treynor (1965)).

Following the CAPM, the Arbitrage Pricing model of Ross (1976) allows for several risk factors to determine assets' expected returns, but leaves it up to empirical research to identify the risk factors. Fama and French (1996) and Carhart (1997) evaluate performance using three-factor or four-factor models derived from empirically observed patterns in stock portfolio returns.

[1] In a recent paper Chance (2011) has suggested that traditional methods of measuring alpha may lead to positive bias.

Performance can be estimated over long-term as well as short-term horizons. In order to evaluate short-term excess return (short-term alpha) correctly, the performance evaluating method should be valid when implemented over a short period such as one-year or one-month. The common short-term excess-return estimation method researchers use is the out-of-sample alpha method. The method estimates alpha via an APT model that deviates from the standard APT model by using the betas from the preceding period.

Brennan, Chordia, and Subrahmanyam (1998) examine the relation among stock returns, measures of risk, and several non-risk security characteristics. They use the out-of-sample alpha to test the null hypothesis that expected returns depend only on the risk characteristics of the returns: that the loadings on Connor and Korajczyk (1988) or Fama and French (1993) factors are equal to zero. Chordia, Subrahmanyam, and Anshuman (2001) use the out-of-sample alpha to analyze the relation between expected equity returns and the level of trading activity as well as expected equity returns and the volatility of trading activity. Spiegel and Wang (2006) use the out-of-sample alpha to determine the degree to which idiosyncratic risk, liquidity, size, lagged returns and dollar volume explain cross sectional variation in stock returns. Chordia and Shivakumar (2006) use the out-of-sample alpha and find that a portfolio that is long in stocks with the highest earnings surprises and short in stocks with the lowest earnings surprises provides short-term excess return. Chordia, Huh and Subrahmanyam (2009) approach liquidity estimation from a theoretical perspective and recognize the analytic dependence of illiquidity on trading activity and information asymmetry. Then, they use the out-of-sample alpha methodology to compute risk-adjusted monthly returns and conclude that theory-based estimates of illiquidity are priced in the cross-section of expected stock returns. Ben-Rephael, Kadan and Wohl (2010) examine the profitability of buying illiquid stocks. They construct portfolios double sorted on both size and liquidity and then, for each size tercile and each month, they construct long-short liquidity-based portfolios. To evaluate the profitability of these portfolios, they estimate out-of-sample alphas relative to the four Fama-French factors[2].

Short-term alphas might also be important because of the momentum phenomenon (Jegadeesh and Titman (1993)) that predicts short-term persistence. A substantial body of research examines the persistence of mutual fund returns. Persistence is a crucial issue for investors who wish to find high-return funds: Can a fund that performed relatively well in the past be expected to do so again in the future? Persistence is also a crucial issue for fund managers since funds whose past returns are relatively high tend to attract relatively more new investment money.[3] This strand of research documents mutual fund return predictability over a longer horizon of five to ten years and attributes it to managers' exposure to different information or stock-picking talent. Over shorter-term horizons of one to three years, there is evidence of persistence, or momentum, in mutual fund performance that is attributed to "hot hands" or common investment strategies.[4] Much of this continuation seems to be explained by funds' holdings of momentum stocks (e.g., Carhart (1997),

[2] See also Brennan, Chordia and Subrahmanyam (2009).

[3] For example, see Ippolito (1989), Brown, Harlow and Starks (1996), Gruber (1996), Chevalier and Ellison (1997), Sirri and Tufano (1998), Zheng (1999), Busse (2001), Goriaev, Nijman and Werker (2005).

[4] Persistence and momentum have been noted by many authors: Sharpe (1966), Treynor(1965), Carlson (1970), Ippolito (1992), Grinblatt and Titman (1992), Brown, Goetzmann, Ibbotson and Ross (1992), Goetzmann and Ibbotson (1994), Shukla and Trzcinka (1994), Hendricks, Patel and Zeckhauser (1993, 1997), Brown and Goetzmann (1995), Malkiel (1995), Gruber (1996), Elton, Gruber and Blake (1996), Carhart (1997), Graham and Harvey (1997), Otten and Bams (2002), Berk and Green (2004), Wermers (2004), Bollen and Busse (2004), Kaplan and Schoar (2005), Kosowski, Timmermann, Wermers and White (2006), Cremers and Petajisto (2009).

Grinblatt, Titman and Wermers (1995)).[5] Although momentum appears to be a widespread phenomenon, it may be due to superior management rather than to statistical properties of asset prices. Chen, Jegadeesh and Wermers (2000), for example, find weak evidence that funds with the best past performance have better stock-picking skills than funds with the worst past performance. Hunter, Kandel, Kandel and Wermers (2009) note that better estimation of alpha by sophisticated estimation methods may actually imply lower predictability of future returns, if these superior abilities are non-existent. On the other hand, if superior abilities do exist, sophisticated methods for the estimation of alpha should improve the predictability.

Short-term alpha is also important for practitioners since a significant element of their compensation is often tied to short-term performance.

Researchers show empirically that the systematic risk of stocks varies substantially over time (see, for example, Ferson and Harvey (1999)). In such a dynamic world it is unlikely that exposure to risk and style factors remains constant over time. Kumar (2009) finds that individual investors exhibit time-varying style preferences. Hence, fluctuations in factor exposures should be taken into account when measuring performance (Ferson and Schadt (1996), Bauer, Cosemans and Eichholtz (2007)).

The intuition behind the new short-term alpha estimation method suggested in this paper - the differences method - is derived from the forward rate calculation: it estimates the alpha of period n by dividing n-period performance results by the coinciding (n-1)-period performance results. The differences method, as opposed to the widely used out-of-sample alpha method, does not need to assume that the betas are constant over a short period of time.

The differences method is analyzed and compared with the out-of-sample alpha method and with the one-year regression method based on aspects of expected value and variance. The analysis implies that all three methods' estimators have the same expected value, and it demonstrates that the differences method's estimator has the lowest variance. Thus, the differences method is the better short-term alpha estimation method of the three methods examined in this paper. In addition, a simulationalsosupports this result. The simulation suggests that the differences method better estimates the short-term alpha since its estimator yields, on average, the smallest difference (whether with or without absolute value) between itself and the simulated alpha.

The three short-term alpha estimators are compared and substantial score and ranking differences are found between the short-term alpha estimates, though the correlations between the estimates are high. In addition, as the regression model gets more complicated, the correlation between the short-term alpha estimates decreases and the classification and ranking differences increase.

Finally, the short-term alpha estimators are compared to the standard alpha as extracted from a regression run over four-year and three-year periods (long-term alphas). The comparison shows that the differences method yields performance scores and rankings that are the most consistent with their long-term counterparts. The conclusion is that the differences method, as suggested in this paper, should be adopted.

[5] At the same time, there is also contrary evidence of performance reversion: good past performance is not followed by good subsequent performance.

2. DERIVING ALPHA: THREE METHODS

This section specifies the three short-term alpha estimation methods examined in this paper.[6] Then, the short-term alpha estimation methods are analyzed and compared based on aspects of expected value and variance. The analysis implies that all three methods' estimators have the same expected value and the differences method's estimator has the lowest variance of all.

Given a four-year period (years 1 to 4), the estimation of the alpha of the fourth year (year 4) is of interest . Method 1, the one-year regression method, estimates the fourth-year alpha by running a regression over data from one-year (year 4) of security P's excess return on the relevant N benchmarks' excess return:

$$\widetilde{R}_{P,t,year=4} - \widetilde{R}_{f,t,year=4} = \sum_{i=1}^{N} \beta_{i,year=4} * (\widetilde{R}_{i,t,year=4} - \widetilde{R}_{f,t,year=4}) + \alpha_{year=4} + \widetilde{\varepsilon}_{t,year=4}. \quad (1)$$

The regression is run using monthly data such that there are twelve return observations. Then the alpha is extracted from that regression, it is called $\alpha^{year=4}_{(method=1)}$, and it is used as a measure for security P's excess return over year 4.

Method 2 estimates the fourth year alpha by applying the widely used out-of-sample alpha method. For simplicity, the methodology is demonstrated via a one-benchmark regression model. First, a regression of security P's excess return on the benchmark's excess return is run over the preceding three-year period (years 1 to 3):

$$\widetilde{R}_{P,t,year=1-3} - \widetilde{R}_{f,t,year=1-3} = \beta_{year=1-3} * (\widetilde{R}_{B,t,year=1-3} - \widetilde{R}_{f,t,year=1-3}) + \alpha_{year=1-3} + \widetilde{\varepsilon}_{t,year=1-3}. \quad (2)$$

Let beta as extracted from the regression above be $\beta_{year=1-3}$. Then, the alpha of year 4 is estimated via the equation:

$$\overline{R}_{P,year=4} - \overline{R}_{f,year=4} = \alpha_{year=4} + \beta_{year=1-3} * (\overline{R}_{year=4} - \overline{R}_{f,year=4}). \quad (3)$$

Let the out-of-sample alpha method's year 4 estimator be $\alpha^{year=4}_{(method=2)}$.

Third, a new methodology, the differences method (method 3), is suggested for evaluating the fourth-year alpha: calculate the four-year alpha ($\alpha_{year=1-4}$, estimated by a regression over years 1

[6]The data is not assumed to be stationary. Thus, performance is examined over short time periods such as three and four years. However, all methodologies could be implemented over longer as well as shorter time periods.

to 4) and the three-year alpha ($\alpha_{year=1-3}$, estimated by a regression over years 1 to 3), and then estimate the fourth year (year 4) alpha, $\alpha_{(method=3)}^{year=4}$, as:

$$(1+\alpha_{(method=3)}^{year=4})^{12} = \frac{(1+\alpha_{year=1-4})^{48}}{(1+\alpha_{year=1-3})^{36}}. \tag{4}$$

Thus,

$$\alpha_{(method=3)}^{year=4} = \frac{(1+\alpha_{year=1-4})^{4}}{(1+\alpha_{year=1-3})^{3}} - 1. \tag{5}$$

Note that the out-of-sample alpha method, as well as the differences method, allow one to estimate alpha over shorter periods of time. For example, consider a 37-month period (months 1 to 37) and assume that the estimation of alpha for month 37 is wanted.

The out-of-sample alpha method can be used for evaluating the month-37 alpha. First, a regression of security P's excess return on the benchmark's excess return is run over the previous three-year period (years 1 to 3 or months 1 to 36):

$$\widetilde{R}_{P,t,year=1-3} - \widetilde{R}_{f,t,year=1-3} = \beta_{year=1-3} * (\widetilde{R}_{B,t,year=1-3} - \widetilde{R}_{f,t,year=1-3}) + \alpha_{year=1-3} + \widetilde{\varepsilon}_{t,year=1-3}. \tag{6}$$

Let beta as extracted from the regression above be $\beta_{year=1-3}$. Then, the month-37 alpha is estimated via:

$$R_{P,month=37} - R_{f,month=37} = \alpha_{month=37} + \beta_{year=1-3} * (R_{month=37} - R_{f,month=37}). \tag{7}$$

The differences method can also be used for evaluating the month-37 alpha. The three-year (36-month) alpha ($\alpha_{year=1-3}$, estimated by a regression over years 1 to 3) and the 37-month alpha for months 1 to 37 ($\alpha_{month=1-37}$, estimated by a regression over months 1 to 37) are calculated, and then the month-37 alpha is estimated as:

$$\alpha_{(method=3)}^{month=37} = \frac{(1+\alpha_{month=1-37})^{37}}{(1+\alpha_{year=1-3})^{36}} - 1. \tag{8}$$

2.1 Expected Value and Variance of the Short-Term Excess-Return Estimators

In this subsection, the short-term excess return estimators described above are analyzed and compared using econometric tools. The analysis deviates from the standard regression framework and assumes that the Data Generating Process (DGP) is such that alpha and beta vary with time.

First, the new DGP's framework is analyzed. Then, the expected value and variance of the short-term alpha estimators are evaluated. The analysis results suggest that all estimators have the same expected value and the differences method estimator has the lowest variance.

Below are the framework's assumptions. For simplicity a one-benchmark framework is considerd. Let the security return at time t be y_t. Let the benchmark return at time t be x_t, where x_t is constant at time t. Let beta at time t be β_t, where beta at time t is distributed $\beta_t \sim (\beta, \sigma_\beta^2)$. Let alpha at time t be α_t, where alpha at time t is distributed $\alpha_t \sim (\alpha, \sigma_\alpha^2)$. The framework assumes that there might be some persistence in the security's performance such that $COV(\alpha_t, \alpha_{t-1}) \neq 0$. It is also assumed that beta might reflect an investment strategy and thus it cannot vary much from the current period to the following one, such that $COV(\beta_t, \beta_{t-1}) \neq 0$. In addition, it is assumed that the investment strategy is influenced by its benchmark performance such that $COV(x_{t-1}, \beta_t) \neq 0$.

Assuming alpha and beta vary each period, the DGP is $y_t = \alpha_t + \beta_t x_t + u_t$, with $E(u_t) = 0$. The regression equation, on the other hand, includes alpha and beta estimators that do not vary with time: $y_t = \hat{\alpha} + \hat{\beta} x_t + \varepsilon_t$. The expected value of the regression equation is $\bar{y} = \hat{\alpha} + \hat{\beta}\bar{x}$. The estimators for $\hat{\alpha}$ and $\hat{\beta}$ are $\hat{\alpha} = \bar{y} - \hat{\beta}\bar{x}$ and $\hat{\beta} = \frac{\sum (x_t - \bar{x})(y_t - \bar{y})}{\sum (x_t - \bar{x})^2}$, respectively, where $\bar{y} = \sum \frac{\alpha_t}{n} + \sum \frac{\beta_t x_t}{n} + \sum \frac{u_t}{n}$.

The following two results summarize the new DGP's framework.[7]

Result 1: The expected value of beta's estimator is $E(\hat{\beta}) = \beta$.

Result 2: The expected value of alpha's estimator is $E(\hat{\alpha}) = \alpha$.

Next, the expected value and variance of the three short-term alpha estimators are evaluated.[8]

First, consider the one-year regression method. Recall that the estimation of the alpha over the fourth year (year 4) is of interest. Let the alpha evaluated by the one-year regression method be $\alpha_{(1)}^4$, and $\alpha_{(1)}^4$ is extracted from the regression run over the 4th year data. Relating $\alpha_{(1)}^4$ to the

[7] All proofs are provided in the Appendix.

[8] All proofs are provided in the Appendix.

previous discussion, $\alpha^4_{(1)}$ is practically $\hat{\alpha}$ of the fourth year, $\hat{\alpha}^4$.[9] Thus, $E(\alpha^4_{(1)}) = E(\hat{\alpha}^4) = \alpha$. Let the variance of $\alpha^4_{(1)}$ be $VAR(\alpha^4_{(1)}) = VAR(\hat{\alpha}^4)$.

Second, consider the out-of-sample alpha method. Let the alpha evaluated by the out-of-sample alpha method be $\alpha^4_{(2)}$, and $\alpha^4_{(2)}$ is evaluated as follows: $\alpha^4_{(2)} = \bar{y}^4 - \hat{\beta}^{1-3}\bar{x}^4$, where $\bar{y}^4$ is the fourth-year average security return, $\hat{\beta}^{1-3}$ is the beta extracted from a regression of the security excess return over the benchmark excess return, run over years 1 to 3, and $\bar{x}^4$ is the fourth-year average benchmark return.

Result 3: The expected value of $\alpha^4_{(2)}$ is $E(\alpha^4_{(2)}) = \alpha$ and its variance is $VAR(\alpha^4_{(2)}) = VAR(\hat{\alpha}^4) + (\bar{x}^4)^2 (VAR(\hat{\beta}^4 - \hat{\beta}^{1-3}))$.

Third, consider the differences method. Let the alpha evaluated by the differences method be $\alpha^4_{(3)}$, and evaluate $\alpha^4_{(3)}$ as: $\alpha^4_{(3)} = \frac{(1+\hat{\alpha}^{1-4})^4}{(1+\hat{\alpha}^{1-3})^3} - 1$, where $\hat{\alpha}^{1-3}$ is the alpha extracted from a regression of the security excess return over the benchmark excess return run over years 1 to 3, and $\hat{\alpha}^{1-4}$ is the alpha extracted from a regression of the security excess return over the benchmark excess return run over years 1 to 4.

Result 4: The expected value of $\alpha^4_{(3)}$ is $E(\alpha^4_{(3)}) \approx \alpha$ and its variance is $VAR(\alpha^4_{(3)}) \approx VAR(\hat{\alpha}^{1-4})$ or $\approx VAR(\hat{\alpha}^{1-3})$.

The discussion of the expected value and variance of the three short-term alpha estimators is summarized in table 1.

[9] In the same manner, in the upcoming discussion, alpha estimated over year t to year t' is denoted as $\hat{\alpha}^{t-t'}$, beta estimated over year t to year t' is denoted as $\hat{\beta}^{t-t'}$, the average security return between year t and year t' is denoted as $\bar{y}^{t-t'}$ and the average benchmark return between year t and year t' is denoted as $\bar{x}^{t-t'}$.

Table 1: Analysisof The Short-Term Alpha Estimation Methods

	METHOD		
	ONE-YEAR REGRESSION	OUT-OF-SAMPLE ALPHA	DIFFERENCES
EXPECTED VALUE	α	α	α
VARIANCE	$VAR(\hat{\alpha}^4)$	$VAR(\hat{\alpha}^4)+(\bar{x}^4)^2 VAR(\hat{\beta}^4-\hat{\beta}^{1-3})$	$VAR(\hat{\alpha}^{1-4})$ or $VAR(\hat{\alpha}^{1-3})$

Note that as the regression is run over a longer period (three or four years as opposed to one year), the alpha estimator's volatility decreases. So, it can be assumed that $VAR(\hat{\alpha}^{1-4}) \approx VAR(\hat{\alpha}^{1-3}) < VAR(\hat{\alpha}^4)$. Given that the expected value of all estimators equals α and the differences method estimator has the lowest variance of all, the differences method's estimator, $\alpha^4_{(3)}$, is the best estimator for short-term excess return.

3. METHODOLOGY AND DATA

This section compares the short-term alpha estimators and it also compares the short-term alpha estimators to the standard alphas as extracted from a regression run over four-year and three-year periods (long-term alphas).

3.1 Data

Data is collected on several groups of funds using the Lipper classification of funds, as provided in CRSP (The Center for Research in Security Prices). The Lipper classification divides the world of non-specialized open-end equity funds into 12 groups based on the funds' style: LCCE (Large-Cap Core Funds), LCGE (Large-Cap Growth Funds), LCVE (Large-Cap Value Funds), MCCE (Mid-Cap Core Funds), MCGE (Mid-Cap Growth Funds), MCVE (Mid-Cap Value Funds), SCCE (Small-Cap Core Funds), SCGE (Small-Cap Growth Funds), SCVE (Small-Cap Value Funds), MLCE (Multi-Cap Core Funds), MLGE (Multi-Cap Growth Funds), and MLVE (Multi-Cap Value Funds). Funds' Lipper classifications are given and can change from one year to another. While analyzing the funds, only funds whose classification does not change over the entire period are included and analyzed.

Mutual fund data are collected from the CRSP database. The Fama-French factors and the additional momentum factor returns are taken from French's web site.[10] The three Fama-French factors are: 1) the performance of small stocks relative to big stocks (SMB, Small Minus Big), 2) the performance of value stocks relative to growth stocks (HML, High Minus Low), based upon the Fama-French Portfolios, and 3) the excess market returns, based on the value-weight return on all NYSE, AMEX, and NASDAQ stocks (from CRSP), and the one-month Treasury bill rate (from Ibbotson Associates). The momentum factor of Carhart (1997) is the average return on the two high prior return portfolios minus the average return on the two low prior return portfolios.

[10] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

3.1.1 Data Characteristics

The data contains ten years (2001-2010) of funds' returns. Table 2 reports the 2001-2010 average data characteristics.

Table 2: Data Summary - 2001-2010 Data Characteristics

		AVERAGE			WEIGHTED (BY TNA)	
LIPPER CLASSIFICATION	OBSERVATIONS	TOTAL NET ASSETS	EXPENSE RATIO	MANAGEMENT FEE	EXPENSE RATIO	MANAGEMENT FEE
LCCE	288.7	897.3	1.2%	0.6%	1.1%	0.6%
LCGE	206.0	860.2	1.3%	0.7%	1.2%	0.7%
LCVE	119.5	1,183.2	1.2%	0.6%	1.1%	0.6%
MCCE	118.1	647.0	1.4%	0.8%	1.3%	0.8%
MCGE	149.2	383.5	1.5%	0.8%	1.4%	0.8%
MCVE	75.2	791.9	1.3%	0.8%	1.2%	0.8%
MLCE	229.9	718.1	1.2%	0.6%	1.2%	0.6%
MLGE	146.1	1,132.8	1.5%	0.8%	1.4%	0.8%
MLVE	147.1	750.5	1.2%	0.7%	1.1%	0.7%
SCCE	208.3	399.9	1.3%	0.8%	1.2%	0.8%
SCGE	164.4	275.5	1.5%	0.9%	1.4%	0.9%
SCVE	87.5	343.5	1.4%	0.8%	1.3%	0.9%
SUM:	1940					
AVERAGE:		698.6	1.3%	0.7%	1.2%	0.7%

The average number of funds per year is 1940, of which 289 are classified as LCCE, 206 are classified as LCGE, 120 are classified as LCVE, 118 are classified as MCCE, 149 are classified as MCGE, 75 are classified as MCVE, 230 are classified as MLCE, 146 are classified as MLGE, 147 are classified as MLVE, 208 are classified as SCCE, 164 are classified as SCGE, and 88 are classified as SCVE. The 2001-2010 average Total Net Assets (TNA) of all funds is $698.6 million. The average expense ratio (management fee) charged by fund managers is 1.3% (0.7%) and the weighted (by TNA) average expense ratio (management fee) is 1.2% (0.7%). The yearly data characteristics show no significant deviations from the average data characteristics presented at Table 2.[11]

3.2 Methodology

This subsection describes the methodology for comparing the short-term alpha estimators as well as the methodology for comparing the short-term alpha estimators to the standard alphas as extracted from a regression run over three-year and four-year periods (long-term alphas).

First, the three short-term alpha estimation methods described above are applied to seven one-year periods (2004-2010) in order to evaluate alpha throughout each of the seven years. Thus, for fund

[11]This data is not included in the body of the work, but it is available by request.

P and for method i=1,2,3, $\alpha^{2004}_{(method=i)}$, $\alpha^{2005}_{(method=i)}$, $\alpha^{2006}_{(method=i)}$, $\alpha^{2007}_{(method=i)}$, $\alpha^{2008}_{(method=i)}$, $\alpha^{2009}_{(method=i)}$, $\alpha^{2010}_{(method=i)}$ are obtained. Then, the three different short-term alpha estimators are compared. The comparison is based on the alphas' magnitude as well as on the classification and ranking of funds implied by each alpha throughout each of the seven years.

Next, the implied 2004-2007 alpha is calculated:

$$\alpha^{2004-2007}_{(method=i)} = (1+\alpha^{2004}_{(method=i)})^{12} * (1+\alpha^{2005}_{(method=i)})^{12} * (1+\alpha^{2006}_{(method=i)})^{12} * (1+\alpha^{2007}_{(method=i)})^{12}) - 1, \tag{9}$$

and the implied 2008-2010 alpha is also calculated:

$$\alpha^{2008-2010}_{(method=i)} = (1+\alpha^{2008}_{(method=i)})^{12} * (1+\alpha^{2009}_{(method=i)})^{12} * (1+\alpha^{2010}_{(method=i)})^{12} - 1. \tag{10}$$

Then, the 2004-2007 and the 2008-2010 calculated alphas are compared with the alphas as extracted from a regression run over 2004-2007 and over 2008-2010, respectively. The comparison is based on the alphas' magnitude as well as on the classification and ranking of funds implied by each alpha, and it examines whether the three short-term alpha estimation methods yield performance scores and rankings that are consistent with their long-term counterparts.

3.2.1 The Regression Models

Three different regression models are applied for evaluating a fund's alpha:

1. The CAPM regression is:

$$R_{P,t} - R_{f,t} = \alpha + \beta(R_{M,t} - R_{f,t}) + \varepsilon_t. \tag{11}$$

The excess market return is based on the value-weight return on all NYSE, AMEX, and NASDAQ stocks (from CRSP) and on the one-month Treasury bill rate (from Ibbotson Associates).

2. The Fama and French three-factor model is:

$$R_{P,t} - R_{f,t} = \alpha + \beta_1(R_{M,t} - R_{f,t}) + \beta_2 HML_t + \beta_3 SMB_t + \varepsilon_t. \tag{12}$$

The factors are: 1) the excess market return is based on the value-weighted return on all NYSE, AMEX, and NASDAQ stocks (from CRSP) and on the one-month Treasury bill rate (from Ibbotson Associates), 2) the performance of value stocks relative to growth stocks (HML, High Minus Low), and 3) the performance of small stocks relative to big stocks (SMB, Small Minus Big), based upon the Fama-French Portfolios.

3. Carhart's (1997) four-factor model is:

$$R_{P,t} - R_{f,t} = \alpha + \beta_1(R_{M,t} - R_{f,t}) + \beta_2 HML_t + \beta_3 SMB_t + \beta_4 MOM_t + \varepsilon_t. \tag{13}$$

The model is based on the Fama and French three-factor model and on an additional momentum factor (MOM) of Carhart (1997) which is the average return of the two highest portfolios for the prior period, minus the average return of the two lowest portfolios for the prior period.

3.3 Results

This subsection examines the following methods for calculating a fund's alpha over a short horizon: 1) the differences method as suggested in this paper, 2) the out-of-sample alpha method, and 3) the one-year regression method. These methods are explained in detail in section 2. The results section examines and reports the degree of similarity between these short-term alpha estimators as well as their congruence with the long-term alpha.

3.3.1 Short-Term Performance Evaluation

For 200X, X=4 . . . 10, each of the three methods above yields a yearly-alpha. Let the 200X alpha extracted from the one-year regression method be $\alpha^{200X}_{(method=1)}$. Let the 200X alpha extracted from the out-of-sample alpha method be $\alpha^{200X}_{(method=2)}$. Let the 200X alpha extracted from the differences method be $\alpha^{200X}_{(method=3)}$.

Alpha is calculated for each year (2004 to 2010) for each of the three short-term alpha estimators and for each of the three regression frameworks - 63 alphas for each fund. The funds are ranked and classified based on each alpha. Then, for each year and for each regression model, the degree of similarity between the three short-term estimates is compared. Table 3 reports the average comparison results of 2004-2010. The average data sample comprises 1112.6 funds.

Table 3: Short-Term Alpha Estimators Comparison

Panel A: Correlations Between Short-Term Alpha Estimators

CAPM

	REGRESSION	DIFFERENCES
OUT-OF-SAMPLE	86.2%	97.8%
REGRESSION		89.4%

Three-Factor Model

	REGRESSION	DIFFERENCES
OUT-OF-SAMPLE	66.8%	93.0%
REGRESSION		79.4%

Four-Factor Model

	REGRESSION	DIFFERENCES
OUT-OF-SAMPLE	54.8%	90.1%
REGRESSION		69.3%

Panel B: Signs Differences Among The Methods

		REGRESSION	DIFFERENCES
OUT-OF-SAMPLE	CAPM	15%	5%
	Three-Factor Model	26%	11%
	Four-Factor Model	33%	13%
REGRESSION	CAPM		12%
	Three-Factor Model		21%
	Four-Factor Model		26%

Panel C: Ranks Differences (More Than A Decile) Among The Methods

		REGRESSION	DIFFERENCES
OUT-OF-SAMPLE	CAPM	36%	10%
	Three-Factor Model	58%	26%
	Four-Factor Model	65%	32%
REGRESSION	CAPM		29%
	Three-Factor Model		48%
	Four-Factor Model		57%

Panel D: Comparing Best 20 Performing Funds Among The Methods

		REGRESSION	DIFFERENCES
OUT-OF-SAMPLE	CAPM	11.3	15.7
	Three-Factor Model	7.9	14.3
	Four-Factor Model	4.4	12.3
REGRESSION	CAPM		12.6
	Three-Factor Model		10.4
	Four-Factor Model		7.1

Panel E: Comparing Worst 20 Performing Funds Among The Methods

		REGRESSION	DIFFERENCES
OUT-OF-SAMPLE	CAPM	11.4	17.3
	Three-Factor Model	6.7	14.7
	Four-Factor Model	5.6	13.6
REGRESSION	CAPM		12.7
	Three-Factor Model		9.4
	Four-Factor Model		8.4

As reported in panel A, the average correlation between the one-year regression estimator and the out-of-sample alpha estimator is 86.2% for the CAPM, 66.8% for the three-factor model and 54.8% for the four-factor model. The average correlation between the one-year regression estimator and the differences estimator is 89.4% for the CAPM, 79.4% for the three-factor model and 69.3% for the four-factor model. The average correlation between the out-of-sample alpha estimator and the differences estimator is 97.8% for the CAPM, 93% for the three-factor model and 90.1% for the four-factor model.

Next, based on the different alphas implied by the different short-term alpha estimation methods, the funds are classified and ranked. Then, funds classification and ranking are compared and the comparison results are reported in Panels B-E of table 3. Recall that for each fund and using each of the regression models, the short-term alpha is estimated via three different methods each year. Based on its alpha, a fund is classified as either a good fund (where alpha is greater than zero) or a bad fund (where alpha is lower than zero). Thus, each year and for each of the three regression models, a fund is classified three times according to its three different short-term alphas. Then, for each pair of short-term alphas (i.e α_i and α_j), the funds' classifications are compared. If a fund is classified as a good (bad) fund according to both short-term alpha estimation method i and short-term alpha estimation method j, then there is no classification difference between methods i and j. On the other hand, if a fund is classified as a good (bad) fund according to short-term alpha estimation method i, but as a bad (good) fund according to short-term alpha estimation method j, then there is a classification difference between methods i and j. The comparison result, per each fund, is a three (regression models) by three (short-term alpha estimation methods) table filled with either a 1 (a classification difference) or a 0 (a classification agreement). Next, the average of all of the funds' classification difference/agreement tables is taken. Panel B reports the 2004-2010 average frequency of classification differences between the short-term alpha estimation methods, for each of the three regression models.

On average, the classification difference between the one-year regression estimator and the out-of-sample alpha estimator is 15% for the CAPM, 26% for the three-factor model and 33% for the four-factor model. The classification difference between the one-year regression estimator and the differences estimator is 12% for the CAPM, 21% for the three-factor model and 26% for the four-factor model. The classification difference between the out-of-sample alpha estimator and the differences estimator is 5% for the CAPM, 11% for the three-factor model and 13% for the four-factor model.

Panel C reports the ranking differences between the short-term alpha estimation methods. Assume N funds are available. Each year, for each regression model and for each short-term alpha estimation method, the best performing fund with the highest alpha is ranked in the 1st place, the second best performing fund with the second highest alpha is ranked in 2nd place, and so on. Since each year a fund has 9 different yearly-alphas (three regression models multiplied by three short-term alpha estimation methods), all funds are ranked 9 times each year. Consider regression model *a*. Assume fund P is ranked in the kth place according to regression model *a* and short-term alpha estimation method i (denoted as $\alpha_{a,i,P}$), and assume that the fund is ranked in the lth place according to the same regression model *a* and to the short-term alpha estimation method j (denoted as $\alpha_{a,j,P}$). If $|k-l|<0.1N$ (the ranking difference is less than 10% of the N existing funds) then it says that there is no ranking difference between the short-term alpha estimation methods i

and j. On the other hand, if $|k-l| \geq 0.1N$, then there is a ranking difference between methods i and j. The ranking comparison result, per each fund, is a three (regression models) on three (short-term alpha estimation methods) table. If there is a ranking difference, the cell is filled in with a 1 and if there is a ranking agreement, the cell is filled in with a 0. Next, the average of all funds' ranking differences/agreement tables is taken. Panel C reports the 2004-2010 average frequency of ranking differences between the short-term alpha estimation methods, for each of the three regression models.

On average, the ranking difference between the one-year regression estimator and the out-of-sample alpha estimator is 36% for the CAPM, 58% for the three-factor model and 65% for the four-factor model. The ranking difference between the one-year regression estimator and the differences estimator is 29% for the CAPM, 48% for the three-factor model and 57% for the four-factor model. The ranking difference between the out-of-sample alpha estimator and the differences estimator is 10% for the CAPM, 26% for the three-factor model and 32% for the four-factor model.

For the analysis of Panels D and E, the data sample is narrowed and only funds ranked as the 20 best performing funds or as the 20 worst performing funds are kept. Each year, each regression model and short-term alpha estimation method have their own list of funds included in the 20 best and in the 20 worst performing funds. Then, for each regression model, the funds that appear on both the list of short-term alpha estimation method i and the list of short-term alpha estimation method j of best (worst) performing funds are counted, and the 2004-2010 average numbers are reported in Panel D (E).

For the best (worst) performing funds, the average overlap in classification between the one-year regression estimator and the out-of-sample alpha estimator is, with 20 being the highest possible score, 11.3 (11.4) for the CAPM, 7.9 (6.7) for the three-factor model, and 4.4 (5.6) for the four-factor model. For the best (worst) performing funds, the average overlap in classification between the one-year regression estimator and the differences estimator is 12.6 (12.7) out of 20 for the CAPM, 10.4 (9.4) for the three-factor model, and 7.1 (8.4) for the four-factor model. For the best (worst) performing funds, the average overlap in classification between the out-of-sample alpha estimator and the differences estimator is 15.7 (17.3) out of 20 for the CAPM, 14.3 (14.7) for the three-factor model, and 12.3 (13.6) for the four-factor model.

Comparing the three short-term alpha estimators, there are substantial scores and ranking differences between them, though the correlations between the alpha estimates are high. In addition, as the model gets more complicated, the correlation between the short-term estimators decreases and the classification and ranking differences increase.

3.3.2 The Congruence of Short-Term and Long Term Alphas

Next, the short-term alphas' congruence with the long-term alpha is examined.

The yearly alphas, for each method i, are used for calculating the 2004-2007 alpha as:

$$\alpha_{(method=i)}^{2004-2007} = (1+\alpha_{(method=i)}^{2004})^{12} * (1+\alpha_{(method=i)}^{2005})^{12} * (1+\alpha_{(method=i)}^{2006})^{12} * (1+\alpha_{(method=i)}^{2007})^{12} - 1, \quad (14)$$

and the 2008-2010 alpha as:

$$\alpha_{(method=i)}^{2008-2010} = (1+\alpha_{(method=i)}^{2008})^{12} * (1+\alpha_{(method=i)}^{2009})^{12} * (1+\alpha_{(method=i)}^{2010})^{12} - 1. \quad (15)$$

Then, a regression is run over 2004-2007 and over 2008-2010. Let the monthly alpha as extracted from those regression be $\alpha_{M,2004-2007}$ and $\alpha_{M,2008-2010}$, respectively. Based on the monthly alpha as extracted from the 2004-2007 regression, the 2004-2007 alpha is calculated as:

$$\alpha_{2004-2007} = (1+\alpha_{M,2004-2007})^{48} - 1, \quad (16)$$

and it is compared with each of the three calculated four-year alphas ($\alpha_{(method=i)}^{2004-2007}, i = 1,2,3$). Based on the monthly alpha as extracted from the 2008-2010 regression, the 2008-2010 alpha is calculated as:

$$\alpha_{2008-2010} = (1+\alpha_{M,2008-2010})^{36} - 1, \quad (17)$$

and it is compared with each of the three calculated three-year alphas ($\alpha_{(method=i)}^{2008-2010}, i = 1,2,3$). The comparisons are conducted for each of the three regression models. Table 4 reports the 2004-2007 and 2008-2010 average comparison results. The average data sample comprises 692 funds.

Table 4: Short-Term And Long-Term Alpha Estimators Comparison

Panel A: Short-Term And Long-Term Alpha Estimators Correlations

	DIFFERENCES	REGRESSION	OUT-OF-SAMPLE
CAPM	95.9%	90.0%	92.2%
Three-Factor Model	95.3%	70.4%	87.7%
Four-Factor Model	92.9%	73.2%	84.2%

Panel B: Signs Differences - Short-Term Vs. Long-Term Alpha

	DIFFERENCES	REGRESSION	OUT-OF-SAMPLE
CAPM	8.5%	11.8%	11.1%
Three-Factor Model	9.3%	25.7%	15.9%
Four-Factor Model	12.6%	26.8%	18.6%

Panel C: Ranks Differences (More Than A Decile) - Short-Term Vs. Long-Term

	DIFFERENCES	REGRESSION	OUT-OF-SAMPLE
CAPM	22.2%	35.3%	32.8%
Three-Factor Model	23.4%	58.0%	43.0%
Four-Factor Model	31.9%	56.4%	45.8%

Panel D: Comparing Best 20 Performing Funds - Short-Term Vs. Long-Term Alpha

	DIFFERENCES	REGRESSION	OUT-OF-SAMPLE
CAPM	15.0	13.0	13.0
Three-Factor Model	13.0	7.0	11.0
Four-Factor Model	13.5	9.0	10.0

Panel E: Comparing Worst 20 Performing Funds - Short-Term Vs. Long-Term Alpha

	DIFFERENCES	REGRESSION	OUT-OF-SAMPLE
CAPM	14.0	10.5	12.5
Three-Factor Model	15.5	9.5	13.0
Four-Factor Model	16.0	8.0	14.5

Panel A reports the average correlations between the three calculated 2004-2007 alphas and the alpha extracted from the 2004-2007 regression, and between the three calculated 2008-2010 alphas and the alpha extracted from the 2008-2010 regression. For the CAPM (the three-/four-factor model), the average correlation between the differences estimator and the standard (long-term) alpha is 95.9% (95.3%/ 92.9%). The average correlation between the one-year regression estimator and the standard alpha is 90% (70.4%/ 73.2%). The average correlation between the out-of-sample alpha estimator and the standard alpha is 92.2% (87.7%/ 84.2%). Thus, for all regression models, the standard alpha has a higher correlation with the alpha implied by the differences method, relative to the correlations between the standard alpha and the alpha implied by both the one-year regression method as well as by the out-of-sample alpha method.

Panel B reports the average classification differences between the three calculated 2004-2007 alphas and the alpha extracted from the 2004-2007 regression, and between the three calculated 2008-2010 alphas and the alpha extracted from the 2008-2010 regression, for each of the three regression models. The reported classification differences are constructed based on the methodology described in subsection 3.3.1. In general, the differences method generates the smallest differences between the short-term and long-term measures.

Panel C reports the average ranking differences between the three calculated 2004-2007 alphas and the alpha extracted from the 2004-2007 regression, and between the three calculated 2008-2010 alphas and the alpha extracted from the 2008-2010 regression, for each of the three regression models. The reported ranking differences are constructed based on the methodology described in subsection 3.3.1. Again, the differences method minimizes the disparity between long-term and short-term measures.

Panels D and E report the average comparisons of the 20 best and worst performing funds between the three calculated 2004-2007 alphas and the alpha extracted from the 2004-2007 regression, and between the three calculated 2008-2010 alphas and the alpha extracted from the 2008-2010 regression, for each of the three regression models. The reported differences are constructed based on the methodology described in subsection 3.3.1. The differences method again yields the lowest differences.

Comparing the short-term alphas to the standard alpha extracted from a regression run over a three-year or a four-year period, the empirical results show that the differences method yields performance scores and rankings that are the most consistent with their long-term counterparts.

4. ANOTHER APPROACH: SIMULATION

This section creates a simulated database of fund returns with known statistical properties. Then,it estimates the short-term alpha using the out-of-sample alpha method estimator and the differences method estimator, and compares the estimates derived by the two methods. Based on the previous analysis of the methods, it is expected that the differences method would give the best estimate of the short-term alpha.

The framework assumes a DGP such that the fund alpha, the fund beta, and the fund idiosyncratic noise vary periodically. Consider a four-year period. For each simulated fund ($P=1,...,1000$) and month ($t=1,...,48$) the fund alpha (α_t), the fund beta (β_t), the fund idiosyncratic noise (ε_t) and the benchmark's monthly return ($R_{M,t}$) are simulated. Then, the fund return is calculated as:

$$R_{P,t} = \alpha_t + \beta_t R_{M,t} + \varepsilon_t. \tag{18}$$

The benchmark monthly return is simulated as $R_{M,t} \sim N(1\%, 2\%^2)$. This specification is based on the average value and variance of the 1994-2007 following benchmarks returns: S&P500, Russell 1000, Russell 1000 Growth, Russell 1000 Value, Russell Midcap, Russell Midcap Growth, Russell Midcap Value, Russell 2000, Russell 2000 Growth, and Russell 2000 Value.

The fund monthly idiosyncratic noise is simulated as $\varepsilon_t \sim N(-0.17\%, 0.5\%^2)$, the fund monthly alpha as $\alpha_t \sim N(-0.01\%, 0.1\%^2)$ with a serial correlation of 0.034 and the fund monthly beta as $\beta_t \sim N(1.05, 20.51\%^2)$ with a serial correlation of 0.573, following Knuth's methodology for simulating serial correlation (see Knuth (1981)). These specifications are based on the 2001-2007 analysis of 6620 non-specialized open-end equity funds. The funds' monthly betas and alphas are extracted from monthly regressions of the funds' returns on the market return (the CAPM), run over daily data. The monthly epsilons are calculated as the fund monthly return minus the monthly alpha, minus the monthly beta multiplied by the monthly benchmark return ($\varepsilon_t = R_{P,t} - \alpha_t - \beta_t R_{M,t}$). Then, the average value, variance, and serial correlation for alpha, beta, and epsilon are calculated.

The out-of-sample alpha method and the differences method are applyed for estimating the fourth year alpha. Then, the average fourth year simulated alpha ($AVG(\alpha_t \mid t = 37..48)$) is calculated and compared with the alpha implied by the out-of-sample alpha method and with the alpha implied by the differences method. This methodology is repeated 1000 times.

Table 5: Simulation Resultsof The Short-Term Alpha Estimation Methods

	OUT-OF-SAMPLE ALPHA METHOD	DIFFERENCES METHOD
AVERAGE($\alpha_{estimator} - \alpha_{from-data}$)	-0.200%	-0.152%
AVERAGE($\lvert \alpha_{estimator} - \alpha_{from-data} \rvert$)	0.244%	0.203%
% Better Estimator	38%	62%

Table 5 summarizes the simulation results. The results suggest that the differences method estimates the fourth-year simulated alpha better than the out-of-sample alpha method as follows: 1) on average, the difference between the differences method's estimator and the simulated fourth-year alpha is lower than the difference between the out-of-sample alpha method's estimator and the simulated fourth-year alpha, 2) the average absolute value difference between the differences method's estimator and the simulated fourth-year alpha is lower than the average absolute value difference between the out-of-sample alpha method's estimator and the simulated fourth-year alpha, and 3) the number of the simulations in which the differences estimator is the better estimator for the simulated fourth-year alpha is almost twice the number of simulations in which the out-of-sample alpha estimator is the better estimator for the simulated fourth-year alpha, where the better estimator is the one that yields that smallest difference between itself and the simulated fourth-year alpha. Thus, the simulation results support the superiority of the differences method.

5. CONCLUSION

In this paper, a new methodology is suggested for evaluating short-term alpha: the differences method. The intuition behind the differences method is derived from the forward rate calculation. The differences method, as opposed to the widely used out-of-sample alpha method, does not need to assume that the betas are constant over a short period of time.

Three different methods are applied and compared for evaluating short-term excess-returns: the differences method, the out-of-sample alpha method and the one-year regression method. Substantial score and ranking differences are found between the short-term estimators, although the correlations between the alpha estimates are high. In addition, as the model gets more complicated, the correlation between the short-term alpha estimators decreases and the classification and ranking differences increase.

The short-term alpha estimation methods are analyzed and compared based on aspects of expected value and variance. The analysis implies that all three methods' estimators have the same expected value, and that the differences method's estimator has the lowest variance. Thus, the conclusion is that the differences method is the better short-term alpha evaluation method of the three methods examined in this paper. In addition, a simulation supports this result. The simulation suggests that the differences method better estimates the short-term alpha since its estimator yields, on average, the smallest difference (whether the absolute value or not) between itself and the simulated alpha. Finally, the new methodology also yields performance scores and rankings that are the most consistent with their long-term counterparts. The conclusion is that the differences method, as suggested in this paper, should be adopted.

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Appendix

Proof of Results

Proof of result 1:. The expected value of beta's estimator is

$$E(\hat{\beta}) = E(\frac{\sum(x_t - \bar{x})(y_t - \bar{y})}{\sum(x_t - \bar{x})^2}) = \tag{19}$$

$$= E(\frac{\sum x_t y_t - n\overline{xy}}{\sum x_t^2 - n\bar{x}^2}) =$$

$$= E(\frac{\sum x_t(\alpha_t + \beta_t x_t + u_t) - n\bar{x}(\sum \frac{\alpha_t}{n} + \sum \frac{\beta_t x_t}{n} + \sum \frac{u_t}{n})}{\sum x_t^2 - n\bar{x}^2}) =$$

$$= E(\frac{\sum(x_t\alpha_t + x_t\beta_t x_t + x_t u_t) - \bar{x}\sum\alpha_t - \bar{x}\sum\beta_t x_t - \bar{x}\sum u_t}{\sum x_t^2 - n\bar{x}^2}).$$

Recall that x_t is constant at time t and that $E(u_t) = 0$. Thus,

$$E(\hat{\beta}) = \frac{1}{(\sum x_t^2 - n\bar{x}^2)}[\sum x_t E(\alpha_t) + \sum x_t^2 E(\beta_t) - \bar{x}\sum E(\alpha_t) - \bar{x}\sum E(\beta_t)x_t] = \tag{20}$$

$$= \frac{\alpha(\sum x_t - n\bar{x})}{(\sum x_t^2 - n\bar{x}^2)} + \frac{\beta(\sum x_t^2 - \bar{x}\sum x_t)}{(\sum x_t^2 - n\bar{x}^2)}.$$

Note that $\sum x_t - n\bar{x} = 0$ and $\sum x_t^2 - \bar{x}\sum x_t = \sum x_t^2 - n\bar{x}^2$. Thus, $E(\hat{\beta}) = \beta$.

Proof of result 2:. The expected value of alpha's estimator is

$$E(\hat{\alpha}) = E(\bar{y} - \hat{\beta}\bar{x}) = \tag{21}$$

$$= E(\sum \frac{\alpha_t}{n} + \sum \frac{\beta_t x_t}{n} + \sum \frac{u_t}{n} - \frac{\sum(x_t - \bar{x})(y_t - \bar{y})}{\sum(x_t - \bar{x})^2}\bar{x}) =$$

$$= E(\sum \frac{\alpha_t}{n} + \sum \frac{\beta_t x_t}{n} + \sum \frac{u_t}{n} - \frac{\sum x_t y_t - n\overline{xy}}{\sum(x_t - \bar{x})^2}\bar{x}) =$$

$$= E(\sum \frac{\alpha_t}{n} + \sum \frac{\beta_t x_t}{n} + \sum \frac{u_t}{n} - \frac{\sum x_t(\alpha_t + \beta_t x_t + u_t) - n\bar{x}(\sum \frac{\alpha_t}{n} + \sum \frac{\beta_t x_t}{n} + \sum \frac{u_t}{n})}{\sum (x_t - \bar{x})^2} \bar{x}).$$

Recall that x_t is constant at time t and that $E(u_t) = 0$. Thus

$$E(\hat{\alpha}) = \sum \frac{E(\alpha_t)}{n} + \sum \frac{E(\beta_t)x_t}{n} - \frac{\bar{x}}{\sum (x_t - \bar{x})^2}[\sum x_t E(\alpha_t) + \sum x_t^2 E(\beta_t)$$

$$-n\bar{x}\sum \frac{E(\alpha_t)}{n} - n\bar{x}\sum \frac{E(\beta_t)x_t}{n}] = \tag{22}$$

$$= \alpha + \beta\bar{x} - \frac{\bar{x}}{\sum (x_t - \bar{x})^2}[\alpha \sum x_t + \beta \sum x_t^2 - n\bar{x}\alpha - n\bar{x}\beta \sum \frac{x_t}{n}].$$

Note that $\alpha \sum x_t = n\bar{x}\alpha$, so

$$E(\hat{\alpha}) = \alpha + \beta\bar{x} - \frac{\bar{x}}{\sum (x_t - \bar{x})^2}[\beta(\sum x_t^2 - \bar{x}\sum x_t)]. \tag{23}$$

In addition, note that $(\sum x_t^2 - \bar{x}\sum x_t) = \sum (x_t - \bar{x})^2$, so

$$E(\hat{\alpha}) = \alpha + \beta\bar{x} - \bar{x}\beta \tag{24}$$

$$= \alpha.$$

Proof of result 3:. Consider the out-of-sample alpha method. Let the alpha evaluated by the out-of-sample alpha method be $\alpha_{(2)}^4$. Then $\alpha_{(2)}^4$ is evaluated as follows:

$$\alpha_{(2)}^4 = \bar{y}^4 - \hat{\beta}^{1-3}\bar{x}^4, \tag{25}$$

where $\bar{y}^4$ is the fourth-year average security return, $\hat{\beta}^{1-3}$ is the beta extracted from a regression of the security excess return over the benchmark excess return run over years 1 to 3, and $\bar{x}^4$ is the fourth-year average benchmark return. Adding and subtracting $\hat{\beta}^4\bar{x}^4$ to and from that equation gives

$$\alpha_{(2)}^4 = \bar{y}^4 - \hat{\beta}^{1-3}\bar{x}^4 = \tag{26}$$

$$= \bar{y}^4 - \hat{\beta}^{1-3}\bar{x}^4 - \hat{\beta}^4\bar{x}^4 + \hat{\beta}^4\bar{x}^4.$$

Note that $\bar{y}^4 - \hat{\beta}^4\bar{x}^4$ is, by definition, $\hat{\alpha}^4$. Therefore

$$\alpha_{(2)}^4 = \bar{y}^4 - \hat{\beta}^4\bar{x}^4 + \bar{x}^4(\hat{\beta}^4 - \hat{\beta}^{1-3}) = \tag{27}$$

$$= \hat{\alpha}^4 + \bar{x}^4(\hat{\beta}^4 - \hat{\beta}^{1-3}).$$

The expected value of $\alpha_{(2)}^4$ is:

$$E(\alpha_{(2)}^4) = E(\hat{\alpha}^4 + \bar{x}^4(\hat{\beta}^4 - \hat{\beta}^{1-3})) = \tag{28}$$

$$= E(\hat{\alpha}^4) + E(\bar{x}^4(\hat{\beta}^4 - \hat{\beta}^{1-3})) =$$

$$= E(\hat{\alpha}^4) + \bar{x}^4 E(\hat{\beta}^4 - \hat{\beta}^{1-3}) =$$

$$= E(\hat{\alpha}^4) + \bar{x}^4(E(\hat{\beta}^4) - E(\hat{\beta}^{1-3})) =$$

$$= E(\hat{\alpha}^4) + \bar{x}^4 E(\beta - \beta) =$$

$$= E(\hat{\alpha}^4) =$$

$$= \alpha.$$

The variance of $\alpha_{(2)}^4$ is:

$$VAR(\alpha_{(2)}^4) = E[(\alpha_{(2)}^4 - E(\alpha_{(2)}^4))^2] = \tag{29}$$

$$= E((\hat{\alpha}^4 + \bar{x}^4(\hat{\beta}^4 - \hat{\beta}^{1-3}) - \alpha)^2) =$$

$$= E((\hat{\alpha}^4)^2 + (\bar{x}^4)^2(\hat{\beta}^4 - \hat{\beta}^{1-3})^2 + \alpha^2$$

$$+ 2\hat{\alpha}^4\bar{x}^4(\hat{\beta}^4 - \hat{\beta}^{1-3}) - 2\alpha\hat{\alpha}^4 - 2\alpha\bar{x}^4(\hat{\beta}^4 - \hat{\beta}^{1-3})) =$$

$$= E((\hat{\alpha}^4)^2) + E((\bar{x}^4)^2(\hat{\beta}^4 - \hat{\beta}^{1-3})^2) + E(\alpha^2)$$

$$+ E(2\hat{\alpha}^4\bar{x}^4(\hat{\beta}^4 - \hat{\beta}^{1-3})) - E(2\alpha\hat{\alpha}^4) - E(2\alpha\bar{x}^4(\hat{\beta}^4 - \hat{\beta}^{1-3})).$$

Recall that x_t is known at time t. Thus

$$VAR(\alpha_{(2)}^4) = E((\hat{\alpha}^4)^2) + (\bar{x}^4)^2 E((\hat{\beta}^4 - \hat{\beta}^{1-3})^2) + \alpha^2 \tag{30}$$

$$+2\bar{x}^4 E(\hat{\alpha}^4)E(\hat{\beta}^4-\hat{\beta}^{1-3})-2\alpha E(\hat{\alpha}^4)-2\alpha\bar{x}^4 E(\hat{\beta}^4-\hat{\beta}^{1-3}).$$

By definition, $E(x^2)=VAR(x)+E(x)^2$. In addition, recall that $E(\hat{\beta}^4-\hat{\beta}^{1-3})=0$. Thus

$$VAR(\alpha^4_{(2)})=VAR(\hat{\alpha}^4)+E(\hat{\alpha}^4)^2+(\bar{x}^4)^2(VAR(\hat{\beta}^4-\hat{\beta}^{1-3})+E(\hat{\beta}^4-\hat{\beta}^{1-3})^2)+\alpha^2-2\alpha^2= \tag{31}$$

$$=VAR(\hat{\alpha}^4)+\alpha^2+(\bar{x}^4)^2(VAR(\hat{\beta}^4-\hat{\beta}^{1-3}))+\alpha^2-2\alpha^2=$$

$$=VAR(\hat{\alpha}^4)+(\bar{x}^4)^2(VAR(\hat{\beta}^4-\hat{\beta}^{1-3})).$$

Proof of result 4:. Consider the differences method. Let the alpha evaluated by the differences method be $\alpha^4_{(3)}$. Then $\alpha^4_{(3)}$ is evaluated as:

$$\alpha^4_{(3)}=\frac{(1+\hat{\alpha}^{1-4})^4}{(1+\hat{\alpha}^{1-3})^3}-1, \tag{32}$$

where $\hat{\alpha}^{1-3}$ is the alpha extracted from a regression of the security excess returns over the benchmark excess returns run over years 1 to 3 and $\hat{\alpha}^{1-4}$ is the alpha extracted from a regression of the security excess returns over the benchmark excess returns run over years 1 to 4. The Taylor series expansion is used for calculating the expected value and variance of $\alpha^4_{(3)}$. The Taylor series expansion of $f(x,y)$ about the values (x_0,y_0) is given by:

$$f(x,y)\approx f(x_0,y_0)+\frac{\partial f(x,y)}{\partial x}|_{(x_0,y_0)}(x-x_0)+\frac{\partial f(x,y)}{\partial y}|_{(x_0,y_0)}(y-y_0)+....$$

Letting $x_0=E(x)=\bar{x}$, the mean of x, and letting $y_0=E(y)=\bar{y}$, the mean of y, a Taylor expansion series of $f(x,y)$ about $(\bar{x},\bar{y})$ gives the approximation

$$f(x,y)\approx f(\bar{x},\bar{y})+\frac{\partial f(\bar{x},\bar{y})}{\partial x}(x-\bar{x})+\frac{\partial f(\bar{x},\bar{y})}{\partial y}(y-\bar{y}).$$

The expected value of $f(x,y)$, approximated by the Taylor series expansion, is

$$E(f(x,y))\approx E(f(\bar{x},\bar{y})+\frac{\partial f(\bar{x},\bar{y})}{\partial x}(x-\bar{x})+\frac{\partial f(\bar{x},\bar{y})}{\partial y}(y-\bar{y}))=$$

$$=f(\bar{x},\bar{y})+\frac{\partial f(\bar{x},\bar{y})}{\partial x}E(x-\bar{x})+\frac{\partial f(\bar{x},\bar{y})}{\partial y}E(y-\bar{y}).$$

Since $E(x-\bar{x})=0$ and $E(y-\bar{y})=0$, then

$E(f(x,y)) \approx f(\bar{x},\bar{y}).$

The variance of $f(x,y)$, approximated by the Taylor series expansion, is

$$VAR(f(x,y)) \approx VAR[f(\bar{x},\bar{y}) + \frac{\partial f(\bar{x},\bar{y})}{\partial x}(x-\bar{x}) + \frac{\partial f(\bar{x},\bar{y})}{\partial y}(y-\bar{y})] =$$

$$= (\frac{\partial f(\bar{x},\bar{y})}{\partial x})^2 VAR(x) + (\frac{\partial f(\bar{x},\bar{y})}{\partial y})^2 VAR(y) + 2\frac{\partial f(\bar{x},\bar{y})}{\partial x}\frac{\partial f(\bar{x},\bar{y})}{\partial y} COV(x,y).$$

Next, the expected value and the variance of the two variable function approximated by the Taylor series expansion are applied to evaluate the expected value and the variance of $\alpha_{(3)}^4$. Recall that:

$$\alpha_{(3)}^4 = \frac{(1+\hat{\alpha}^{1-4})^4}{(1+\hat{\alpha}^{1-3})^3} - 1, \tag{33}$$

and that:

$$E(\hat{\alpha}^{1-4}) = E(\hat{\alpha}^{1-3}) = \alpha. \tag{34}$$

The expected value of $\alpha_{(3)}^4$ is:

$$E(\alpha_{(3)}^4) \approx \frac{(1+\hat{\alpha}^{1-4})^4}{(1+\hat{\alpha}^{1-3})^3}|_{(\alpha,\alpha)} - 1 = \tag{35}$$

$$= \frac{(1+\alpha)^4}{(1+\alpha)^3} - 1 =$$

$$= \alpha.$$

The variance of $\alpha_{(3)}^4$ is:

$$VAR(\alpha_{(3)}^4) \approx (\frac{\partial \alpha_{(3)}^4(\hat{\alpha}^{1-4},\hat{\alpha}^{1-3})}{\partial \hat{\alpha}^{1-4}})^2 |_{(\alpha,\alpha)} VAR(\hat{\alpha}^{1-4}) + (\frac{\partial \alpha_{(3)}^4(\hat{\alpha}^{1-4},\hat{\alpha}^{1-3})}{\partial \hat{\alpha}^{1-3}})^2 |_{(\alpha,\alpha)} VAR(\hat{\alpha}^{1-3}) \tag{36}$$

$$+ 2\frac{\partial \alpha_{(3)}^4(\hat{\alpha}^{1-4},\hat{\alpha}^{1-3})}{\partial \hat{\alpha}^{1-4}}|_{(\alpha,\alpha)} \frac{\partial \alpha_{(3)}^4(\hat{\alpha}^{1-4},\hat{\alpha}^{1-3})}{\partial \hat{\alpha}^{1-3}}|_{(\alpha,\alpha)} COV(\hat{\alpha}^{1-4},\hat{\alpha}^{1-3}) =$$

$$= (4)^2 (\frac{(1+\alpha)^3}{(1+\alpha)^3})^2 VAR(\hat{\alpha}^{1-4}) + (-3)^2 (\frac{(1+\alpha)^4}{(1+\alpha)^4})^2 VAR(\hat{\alpha}^{1-3})$$

$$+ 2 * 4 \frac{(1+\alpha)^3}{(1+\alpha)^3} * (-3) \frac{(1+\alpha)^4}{(1+\alpha)^4} COV(\hat{\alpha}^{1-4}, \hat{\alpha}^{1-3}) =$$

$$= 16VAR(\hat{\alpha}^{1-4}) + 9VAR(\hat{\alpha}^{1-3}) - 24COV(\hat{\alpha}^{1-4}, \hat{\alpha}^{1-3}).$$

$\hat{\alpha}^{1-3}$ and $\hat{\alpha}^{1-4}$ are estimated over coinciding periods. In addition, since the alphas are estimated over long enough periods (a three-year period (years 1 to 3) and a coinciding four-year period (years 1 to 4)) it is safe to assume that $VAR(\hat{\alpha}^{1-4}) \approx VAR(\hat{\alpha}^{1-3})$ and that $VAR(\hat{\alpha}^{1-4}) \approx VAR(\hat{\alpha}^{1-3}) \approx COV(\hat{\alpha}^{1-4}, \hat{\alpha}^{1-3})$.

Thus,

$$VAR(\alpha^4_{(3)}) \approx 16VAR(\hat{\alpha}^{1-4}) + 9VAR(\hat{\alpha}^{1-3}) - 24COV(\hat{\alpha}^{1-4}, \hat{\alpha}^{1-3}) \approx VAR(\hat{\alpha}^{1-4})$$

or

$$\approx VAR(\hat{\alpha}^{1-3}).$$

Journal of Business, Economics & Finance ISSN: 2146-7943

Journal of Business, Economics & Finance
Year: 2013 Volume: 2 Issue: 4

Macroeconomic Impacts of Privatization: The Case of Turkey

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KEYWORDS

Privatization, economic growth, Turkey, cointegration.

ABSTRACT

State owned enterprises and privatization have long been a major economic concern for Turkey. The main philosophy of privatization is to confine the role of the state in the economy in the areas like health, basic education, social security, national defense, large scale infrastructure investments; provide legal and structural environment for free enterprise to operate and thus to increase the productivity and the value added to the economy. Originally the privatization ideology was based on economic efficiency of the private sector whereas inherently corrupt structure of the public sector. Over the course of time, main objective of privatization had shifted towards mainly revenue generation and financing of the public debt. The literature on privatization has emphasized the microeconomic aspects of privatization and especially concentrates on the efficiency gains. However, there is less empirical work about fiscal and macroeconomic impact of privatization. In this paper, we tried to investigate the relationship between the privatization revenue, capital stock, foreign direct investment, human capital, external debt, and economic growth. Although Turkey is a developing country with high growth rates in recent years, in the empirical analysis, no evidence of long run relationship between privatization revenue and economic growth has been detected.

1. INTRODUCTION

Privatization is defined as an economic process of transferring property from public ownership to private ownership. The key theoretical element under the argument of change in ownership was the lack of economic welfare maximization in the public ownership. Also inefficient use of resources in the public sector was another reason for an increased demand for a change in ownership structure. In theory, privatization helps to establish a free market as well as foster competition. Privatization gained momentum in the late 1980s and spread to a wide range of developing economies. It has been a crucial ingredient in structural reforms in developing countries during the 1980s. In determining a developing country's growth, privatization is one of the important variables that should be included to the model.

Governments undertaking privatization have pursued a variety of objectives: achieving gains in economic efficiency, increasing the growth rate, reducing the budget deficit, attracting investment, improving the fiscal position are some of them. This is more common where the governments have been unwilling or unable to continue to finance deficits in the public enterprise sector with poor economic performance. Commonly accepted reason for privatizing the public enterprises is a more efficient use of assets, which is believed to be achieved in private property. However if the privatization revenue is used to finance the current expenditures of the government, then the

efficiency gains can lose its place as a prior objective. Then privatization will become necessary to finance the operations of the government. Moreover if the privatization revenue is used for closing the gap in operating balance, not only that an opportunity is forgone for capital investment to be made but a more important problem arises. The problem is that the government will not be able to sustain the increased level of expenditures without further privatization. In that case privatizations will not be made for efficiency gains but used as a tool for deficit financing.

Privatization may affect several macroeconomic variables both in the short run and long run, particularly output, employment, investment, costs, prices and total factor productivity. In this paper we focus on the effect of privatization on output growth measured by real GNI growth. The plan of the rest of the paper will be as follows: The next section provides an overview of privatization in Turkey. The second section summarizes the literature about the macroeconomic effects of privatization in developed and developing countries and focus on the studies about the effect of privatization on economic growth. The third section discusses the methods adapted to explore the relation between privatization and economic growth and introduces the model used in the empirical analysis. In the next section the data and their sources, empirical results of unit root tests, cointegration tests and the error correction model are explained. The last section provides a summary and draws some broad conclusions.

2. LITERATURE REVIEW

While there are many studies that test microeconomic effects of privatization, there are not many of them that are focused on macroeconomic effects. Barnett (2000) has checked for evidence on the fiscal and macroeconomic impact of privatization by using data for a collection of 18 countries. His major finding is that the privatization process is strongly correlated with an improvement in macroeconomic performance as manifested in higher real GDP growth and lower unemployment rates. The point estimates suggest that a one percent of GDP privatization corresponds to a 0.5 percentage point increase in contemporaneous real GDP growth and a further 0.4 percentage point increase in the following year.

Lavoro (2004) developed a model to perform a simple test of the long run impact of privatization on output in the UK. The test focuses on real GDP and its determinants as control for the role of privatization. The main objective was to see whether privatization has positive effects on the macroeconomic improvement in Britain. Following the cointegration techniques they have found a weak relationship privatization proceeds and the GDP. The hypothesis that there exists a positive correlation between privatization and GDP growth seem to hold for some countries. But privatization alone is not suggested to be the only source of increase in growth rates. It is more likely that privatization serves as a proxy for a couple of structural measures being part of a larger change in economic regime.

Mackanzie (1998) shows that privatization has short term and long term effects on boosting the level and growth rate of output on one condition: if proceeds of privatized companies are not used for additional government spending.

Dolenc (2009) tests macroeconomic effect of privatization in Slovenia in the period from 1992 until 2005. They found that privatization in Slovenia had no significant macroeconomic effect. However in Slovenia privatization influenced only on lowering public debt, while other influences could not be proven. Sala-i-Martin (1997) finds that growth tends to be more rapid in economies with higher share of private sector in GDP. According to the empirical findings of Davis et al. (2000) there is a strong positive relationship between privatization and growth rates, which seems to be more pronounced in non-transition countries.

Katsoulakos and Likoyanni (2002) made an econometric analysis using country level panel data of 23 OECD countries for the period 1990 – 2000. Their results show that privatization receipts are not significantly correlated with budget deficit for the whole OECD sample. They also find that there exists a statistically significant and negative relation between privatization receipts and public debt.

In a study conducted by Cook and Uchida (2003) on 63 developing countries between 1988 and 1997, they found a negative relation between privatization and economic growth. They showed that a strong negative relation between privatization and economic growth would be achieved if Malaysia and Singapore were set aside.

Filipovice (2005) reported a negative but insignificant relation between privatization and economic growth. Plane (1997) used 35 developing countries covering the period 1984-1992 to measure the impact of privatization on economic growth. He found that privatization positively affected GDP growth and that the effect on growth was more significant for activities of a public goods type than for other sectors.

3. PRIVATIZATION IN TURKEY

The striking economic shifts of the 80's ushered a new era for the world economy, where privatization became one of the most essential and indispensable financial reforms on the economic agendas of many nations. Privatization gained momentum in the late 1980s and spread to a wide range of developing economies. As being one of the fundamental tools of the free market economy, privatization has been on Turkey's agenda since 1984. It was an attempt to loosen the state's grip on the economy and move towards more free market principles.

Privatization in Turkey, not only aims to minimize state involvement in economic activities and to relieve the financial burden of State Economic Enterprises (SEE) on the national budget, but also contemplates the development of capital markets and the re-channeling of resources towards new investments.

The fundamental transformation in Turkish economy has moved the country from an inward-focused import substitution model towards an export led growth and industrial one. All these changes have started with the structural adjustment program in 1980. The program was designed to accomplish the transition to export oriented growth and to overcome the limits on growth imposed by the import substitution strategy. Also the investment opportunities in Turkey are particularly attractive in the framework of country's ongoing ambitious privatization agenda. The involvement and participation of international investors is highly encouraged in the massive privatization program.

The objectives for the privatization program were identified as follows:

- To transfer the decision making process of large corporations and national assets from the public to the private sector to ensure a more effective play of free market forces. (This objective is in line with Turkey's encounter with the logic of Washington Consensus and neo-liberal reforms date back to January 1980.)
- To promote competition, improve efficiency and increase the productivity of public enterprises. (This objective is coming from the belief that the public enterprises are inefficient and can perform better with private ownership under good management and pursuit of maximum profit).

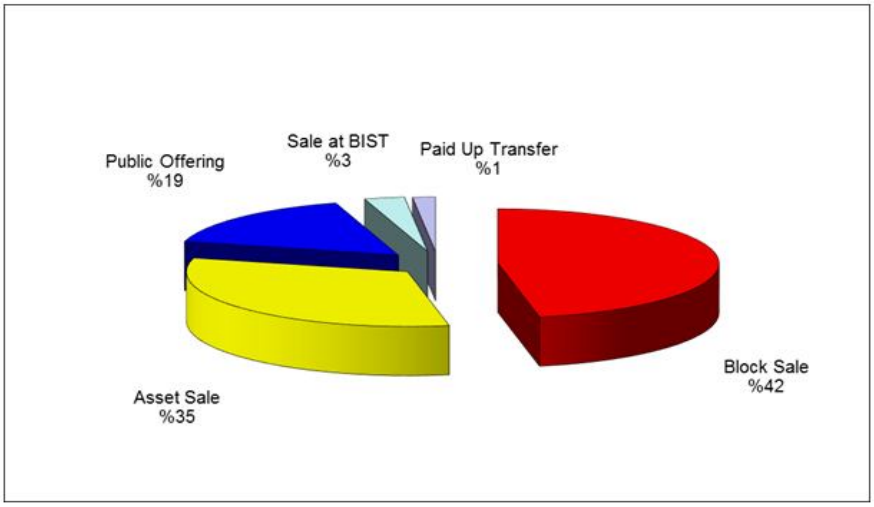
- To enable a wider distribution of share ownership. (This is for the development of Capital Markets)
- To reduce the financial burden of the state economic enterprises on the general operating budget. (Because some SEE's were making huge losses and were subsidized from the treasury to continue their operations).
- To raise revenue for the Treasury. (Privatization was seen as a remedy to decrease the domestic and foreign debt).

So the government was interested in privatization not only as a means of improving enterprise efficiency but also as an effective instrument for promoting the development of the capital market and for financing the budget deficits.

Companies within the privatization portfolio are privatized through the use of one or more of the methods mentioned below;

- Sale: Transfer of the ownership of companies in full or partially, or transfer of shares of these companies through domestic or international public offerings, block sales to real and/or legal entities, block sales including deferred public offerings, sales to employees, sales on the stock exchanges by standard or special orders, sales to investment funds and/or securities investment partnerships by taking into consideration the prevailing conditions of the companies.
- Lease:Grant of the right of use of all or some of the assets of the companies for a defined period of time.
- Grant of Operational Rights
- Establishment of Property Rights other than Ownership
- Profit Sharing Model and other Legal Dispositions Depending on the Nature of the Business.

Figure 1: Privatization Methods



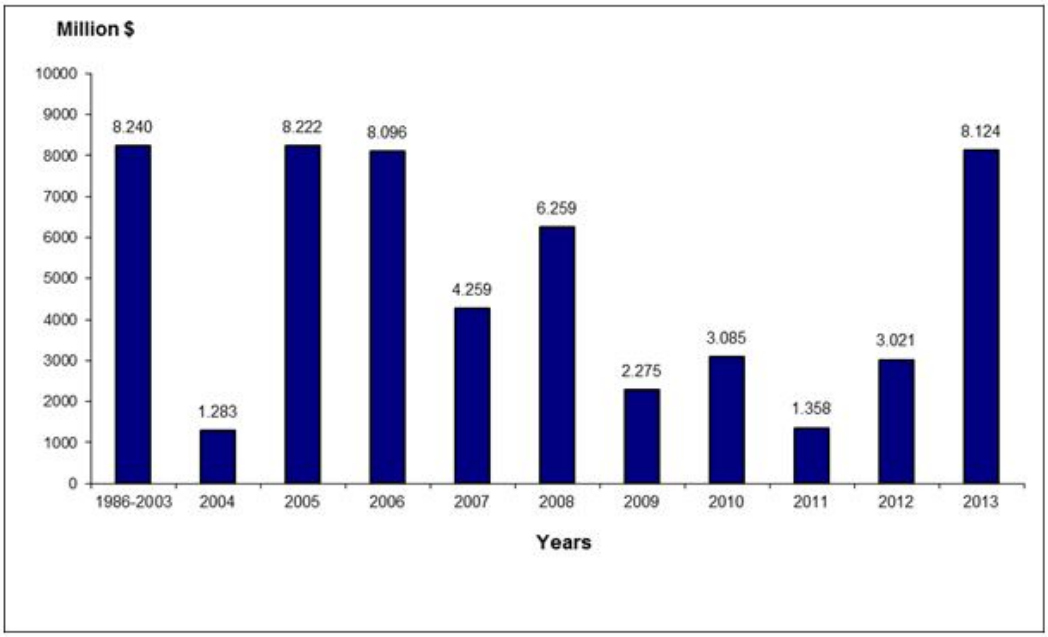
Source: Privatization Administration

As it can be observed from figure 1, privatizing SOE's using "Block Sale" method has been predominant method. The main reasons are much practical, faster and logical method for low profit and loss making companies. But from the point of view of economic competition and efficiency it is the least desirable method as it may lead to creation of private monopolies. Moreover using this method dominantly led to widespread allegations of fraud and corruption as well as undervaluation of privatized assets (Palmer 2010).

However for blue chip companies operating in telecommunications, petroleum refining, petrochemical, airlines, banking sectors, successful public offerings have been observed constituting of 22 percent (public offering and sale through Borsa Istanbul). Privatization implementations have started in 1984 with the transfer of incomplete plants of the SEE's to the private sector for completion. In this juncture, six plants were sold to different investors and nine plants were transferred to municipalities or to state enterprises on book value. In 1986, privatization implementations have gained momentum and since then, 200 companies have been privatized where no more government shares exist in 189 of these.

As mentioned by the Privatization Administration since 1985 until today, total proceed from the privatization implementations is recorded as USD 43.1 billion. Total revenue generated from entities within the privatization program between 1985-December 2011, together with USD 4.4 billion dividend income and USD 10.6 billion other income, has amounted to USD 47.4 billion. In the same period, total privatization expenses were USD 46.2 billion. The largest item in privatization expenditures (with about 99 percent) is the transfer to Treasury and financing of the companies in the privatization portfolio in the form of capital increases and loans.

Figure 2: Privatization Revenues



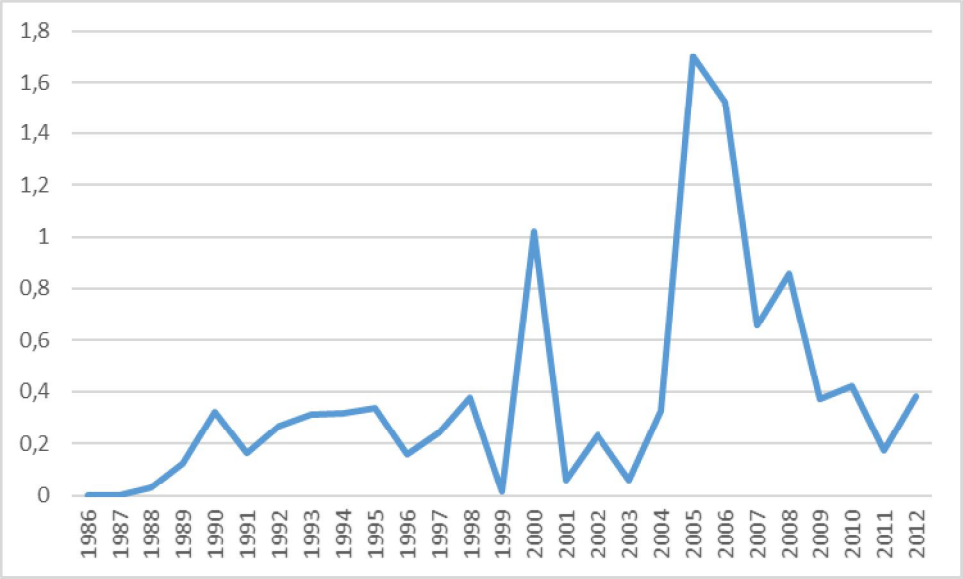
Source: Privatization Administration

Considering the privatization implementations for the last 27 years, one will observe that; State completely withdrew from cement, animal feed production, milk-dairy products, forest products, civil handling and catering services and petroleum distribution sectors. More than 50 percent of the state shares were privatized in tourism, iron and steel, textile, sea freight and meat processing sectors. State has withdrawn from most of the ports and petroleum refinery sector.

Some part of the privatization revenue can be used for restructuring of some key state enterprises before or even instead of privatization. Among the uses of privatization revenue, the most dangerous one is the use of revenue for financing the current expenditures of the government because of the one-time nature of the proceeds. If the governments increase the expenditures relying on the privatization proceeds, it will not be sustainable when no public enterprise is available for privatization or the global economic condition is not suitable for making further privatizations.

Privatization revenues in Turkey have only short term effects on the public finance as the revenue transferred to the treasury is only used to finance the related year's deficit. Therefore this temporary extraordinary income provided by the treasury shows the budget deficit lower than it really is and cause budget performance look better than the real case.

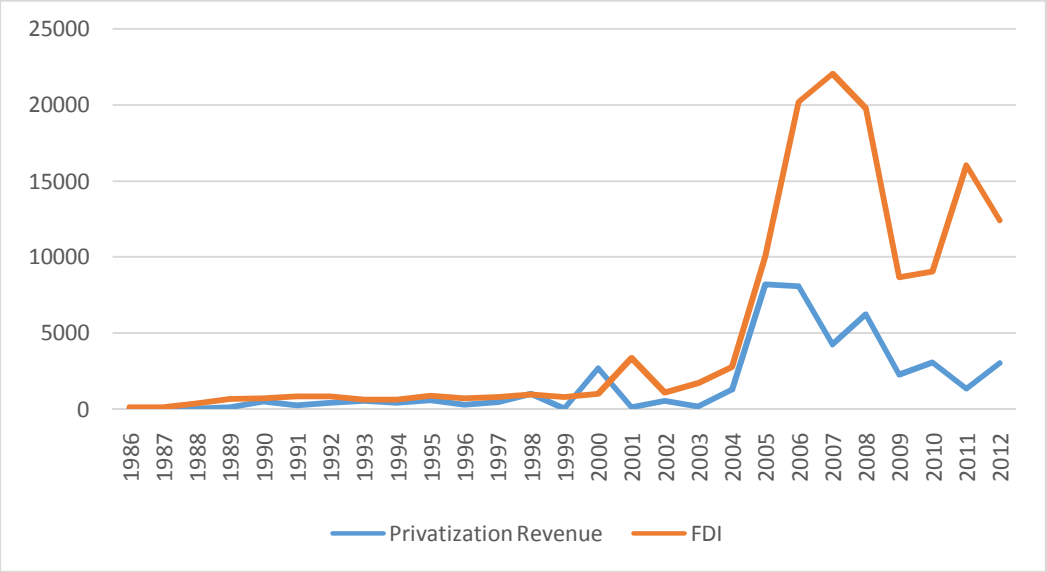
Figure 3: Privatization Revenue as a percentage of GDP



Source: Central Bank of the Republic of Turkey

Turkey was not successful in attracting foreign direct investment during the 1980s and the 1990s. But this situation has clearly changed after 2001. With the increase in the direct investment by foreign entities in Turkey, privatization revenue has also increased. Figure 4 shows the direct relationship between FDI and privatization revenue. From the figure we can also see that privatization revenue has not increased at the same rate as FDI. The reason can be the competition or rivalry between FDI and privatization. This might me due to the fact that FDI offers a simpler and more direct vehicle for investors as opposed to the highly regulated procedures associated with privatization. Also it is easier for a foreign investor to sell out an asset in the capital markets than selling a formerly privatized public enterprise. So if the high liquidity phase ends up in the financial markets, flowing out of foreign capital from Turkey like the other emerging markets will be a danger for financing the budget. Without the help of FDI and privatization revenue it is really difficult to overcome the problems of current account, internal and external debt.

Figure 4: Privatization Revenues and FDI Inflows (Million $)



Source: Central Bank of the Republic of Turkey

4. METHODOLOGY AND DATA

It is assumed that the countries with low levels of physical and human capital will follow the neoclassical growth model. Because at the beginning growth is provided by only physical capital and when the foreign direct investments are considered as the accumulation of physical capital they will affect the short-term economic growth. But for sustained growth besides physical capital, human capital which is provided with education is also necessary. The shift from neoclassical growth model to sustained growth model is related with the saving behavior of the economy. There are two different approaches that we can follow to investigate the effects of foreign direct investment on economic growth.in the countries with low levels of human capital neoclassical growth models is used whereas in countries with high levels of human capital endogenous growth model is used. In many empirical studies different proxies for measuring human capital is used (Barro 2000, Borensztein, De Gregorio and Lee 1998; Li and Liu 2005). One of the most popular ones is the secondary school attainment of the population above 25 years old. In this study, secondary school enrollment rate, which is reported as percentage of total will be used as a proxy for human capital. Total is the total enrollment in secondary education, regardless of age, expressed as a percentage of the population of official secondary education age. As the privatization applications in Turkey started in 1984, data about privatization revenue is available only after 1986. As Turkey is a developing country with low levels of human capital and the data which can be used for the analysis has considerably short span the neoclassical growth model will be used to investigate the effects of privatization on economic growth.

There are two different methodologies in the literature for modeling economic growth. In the first one which is called growth accounting, foreign direct investments and privatization revenues are added to the augmented neoclassical production function. Other than this, different factors such as

openness of the economy, export structure and external debt may affect the economic growth. The neoclassical growth model which takes all those factors into consideration will be as follows:

$$Y = Af(K,L,HC,FDI,EXP,Priv)$$

Here Y is the output level measured by GDP, A is a constant that represents technology, K is Capital, L is labor, HC is Human Capital, FDI is foreign direct investment, EXP is export, Priv is the privatization revenue. Shortly growth accounting methodology is considering the supply side of the economy.

The second method used for modeling economic growth is intertemporal utility maximization framework which considers the demand side of the economy.

The aim of this study is to investigate the effect of privatization on economic growth which is measured by growth in per capita income. In the empirical studies that follow neoclassical growth model, growth accounting methodology is preferred. Therefore growth accounting methodology will be used and supply side of the economy will be considered in our analysis.

Data for privatization revenue are collected from the Republic of Turkey Prime Ministry Privatization Administration and calculated in US dollars.

Capital Stock data is obtained from the report prepared by Turkish Industry and Business Association and Central Bank of The Republic of Turkey. (Saygılı Ş. and Cihan C. (2008). It is in 1998 prices reported as 1000 Turkish Lira. The data is updated with the method they recommended in the report by using gross fixed capital formation.

GNI per capita, PPP is calculated in current international USD and it is derived from World Bank world development indicators 2013.

FDI stock is measured in US Dollars at current prices and current exchange rates per capita. The data is obtained from United Nations Conference on Trade and Development (UNCTAD) database.

Export data is obtained from the Central Bank of the Republic of Turkey. It is measured in current USD and per capita export for each year is calculated manually by dividing the value to the population of the corresponding year.

Secondary school enrolment rate is a gross enrolment ratio and is reported as percentage of total. Total is the total enrollment in secondary education, regardless of age, expressed as a percentage of the population of official secondary education age. This data is obtained from World Bank World Development Indicators 2013.

External debt ratio is also obtained from the World Bank World Development Indicators 2013. It is the ratio of total external debt stocks to gross national income. Total external debt is debt owed to nonresidents repayable in foreign currency, goods, or services. Total external debt is the sum of public, publicly guaranteed, and private nonguaranteed long-term debt, use of IMF credit, and short-term debt. Short-term debt includes all debt having an original maturity of one year or less and interest in arrears on long-term debt. GNI (formerly GNP) is the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad.

5. EMPIRICAL RESULTS

The assumptions of the classical regression model necessitate that the time series that are used in the model must be stationary and the errors have a zero mean and a finite variance. In the presence of non-stationary variables, there might be what Granger and Newbold (1974) call a spurious regression. A spurious regression has a high R^2 and t statistics that appear to be significant, but the results are without any economic meaning (Enders, 2010). A stochastic process is said to be stationary if its mean and variance are constant over time and the value of the covariance between the two periods depends only on the distance or gap or lag between the two time periods and not the actual time at which the covariance is computed (Gujarati, 2003). Such a time series will tend to return to its mean and fluctuations around this mean will have broadly constant amplitude. But most of the macroeconomic time series have positive trends and they do not have a tendency to return to their mean values. In such cases the time series is called non-stationary and any sudden shock will not fade over time. So before starting any analysis we have to test for unit root to decide if the series are stationary or not. If the series are not stationary at their levels we have to calculate the appropriate differences to make the series stationary. In general, if a non-stationary time series has to be differenced d times to make it stationary, that time series is said to be integrated of order d. Most macroeconomic time series are $I(1)$ which means they become stationary after taking the first differences.

To test for unit root we apply Augmented Dickey Fuller (ADF) and Phillips Perron (PP) tests on each variable. The ADF test consists of estimating the following regression:

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \alpha_i \sum_{i=1}^{m} \Delta Y_{t-i} + \varepsilon_t \tag{1}$$

Where ε_t is a pure white noise error term. Phillips and Perron (1988) developed a generalization of the ADF test procedure that allows for mild assumptions concerning the distribution of errors. The PP test estimates the following AR(1) model:

$$\Delta y_{t-1} = \alpha_0 + \delta y_{t-1} + \varepsilon_t \tag{2}$$

The null hypothesis of the ADF and PP tests is $\delta = 0$ which means that the series has a unit root and is non-stationary. The alternative hypothesis is $\delta < 0$ which means that the series is stationary. One of the limitations of unit root tests is their weakness in small samples. Another limitation is the dependency of the test on the number of lags used. The lag length is either determined by the Akaike Information Criterion (AIC) or Schwartz Bayesian Criterion (SBC) or more usefully by the lag length necessary to whiten the residuals. Like the ADF test the PP test can be performed with the inclusion of a constant, a constant and linear trend or neither in the test regression. For the final decision, without an intercept or trend, we should use τ statistic; with only the intercept, we should use τ_μ statistic; and with both intercept and trend we should use the τ_τ statistic. We reject the null hypothesis of a unit root against the one sided alternative if the ADF statistic is greater than the critical value and we conclude that the series is stationary. The

table in Appendix 1 reports the results of the ADF and PP tests with only intercept (τ_μ), and with both intercept and trend (τ_τ). The appropriate lag length is chosen by the Akaike Information Criterion (AIC) for the ADF test and reported in brackets. Similarly the bandwidth for the PP test is chosen by the Newey-West using Barlett kernel and reported in brackets.

The results of the unit root tests reported in Appendix 1 indicate that all variables are non-stationary in levels but they all become stationary when we take the first differences. Shortly all variables are integrated of order one $I(1)$.

5.1 COINTEGRATION

The concept of cointegration was first introduced by Granger (1981) and elaborated further by Phillips (1986, 1987), Engle and Granger (1987) and many others. Engle and Granger (1987) make a formal definition of cointegration between two variables as follows: Time series Y_t and X_t are said to be cointegrated of order d,b where $d \geq b \geq 0$, written as $Y_t, X_t \sim CI(d,b)$ if a) both series are integrated of order d and b) there exists a linear combination of these variables say $\beta_1 Y_t + \beta_2 X_t$ which is integrated of order $d-b$. The vector $\{\beta_1, \beta_2\}$ is called the cointegrating vector. A generalization of this definition to cover n variables is also possible. So a set of variables is defined as cointegrated if a linear combination of them is stationary. Or if we put it in economic terms, two variables will be cointegrated if they have a long-term or equilibrium relationship between them

The unit root tests show that all the variables in the model are integrated of order one $I(1)$. So to avoid spurious regression, we have to check if the variables are cointegrated or not. As Granger (1986) notes, "A test for cointegration can be thought of as a pre-test to avoid spurious regression situations." A number of methods for testing cointegration have been proposed in the literature. In this analysis we will apply Johansen's test for cointegration. The purpose of this research is to determine the effects of privatization on economic growth. So the cointegration test is applied on the variables of the neo-classical growth model such as gross national income per capita, capital stock per labor, secondary school enrollment rate, FDI stock per capita and privatization revenue per capita. Table 1 reports the results of Johansen's Test. For applying the Johansen Test of cointegration the variables must be non-stationary or has a unit root at level and they should be integrated of the same order. As both of these requirements are met we can use this test without any restriction.

Table 1: Johansen's Cointegration Test for GNIPC, CAPSTOCKPL, SSENROL, FDISTOCKPC, REVPC

Trace Test

Null	Alternative	Eigenvalue	Trace Statistic	5 Percent Critical Value	1 Percent Critical Value
$r = 0$	$r \geq 1$	0.980367	167.9570*	68.52	76.07
$r \leq 1$	$r \geq 2$	0.778084	73.62449*	47.21	54.46
$r \leq 2$	$r \geq 3$	0.698030	37.49349*	29.68	35.65
$r \leq 3$	$r \geq 4$	0.303059	8.755243	15.41	20.04
$r \leq 4$	$r = 5$	0.003741	0.089945	3.76	6.65

(*) indicates statistical significance at %1.

Max-Eigenvalue Test

Null	Alternative	Eigenvalue	Max-Eigen Statistic	5 Percent Critical Value	1 Percent Critical Value
$r = 0$	$r = 1$	0.980367	94.33255*	33.46	38.77
$r \leq 1$	$r = 2$	0.778084	36.13100*	27.07	32.24
$r \leq 2$	$r = 3$	0.698030	28.73825*	20.97	25.52
$r \leq 3$	$r = 4$	0.303059	8.665299	14.07	18.63
$r \leq 4$	$r = 5$	0.003741	0.089945	3.76	6.65

(*) indicates statistical significance at %1.

The results of both trace and maximum eigenvalue tests indicates that there are 3 cointegrating equations at both %5 and %1 significance level. There is a long run relationship among growth in gross national income per capita (GNIPC), Capital Stock per Labor (CAPSTOCKPL), Secondary School Enrollment Rate (SSENROL), Foreign Direct Investment Stock Per Capita (FDISTOCKPC) and Privatization Revenue Per Capita (REVPC). Table 2 reports the normalized coefficients of the first cointegrating vector which is normalized on GNIPC. The standard errors are represented in parenthesis.

Table 2: Normalized Cointegrating Vector: Coefficients normalized on GNIPC

GNIPC	CAPSTOCKPL	SSENROL	FDISTOCKPC	REVPC
-1.000	0.007778 (0.11459)	169.9750* (10.4786)	2.834185* (0.19127)	-15.05621* (1.88571)

(*) denotes statistical significance at %1

The normalized cointegrating vector reveals that education, FDI stock and privatization have significant effects on growth rate in the long run. Although the effect of accumulation of capital is positive it is not significant. The coefficient of privatization revenue is significant but has a negative sign. This implies that privatization has a negative effect on growth in the long run.

5.2 ERROR CORRECTION MODEL

One drawback of the differencing is that it results in a loss of valuable long run information in the data. Therefore the concept of cointegrated series has been suggested as a solution to this problem. If variables are cointegrated then there is a long term or equilibrium relationship between them. The fact that the two variables are cointegrated implies that there is some adjustment process preventing the errors in the long run relationship from becoming larger and larger. Therefore one can treat the error term in the model as the "equilibrium error" (Gujarati, 2004, 824). We can use this error term to tie the short run behavior of the variable to its long run value. The error correction mechanism was first used by Sargan (1984) and later popularized by Engle and Granger. If the two variables like Y_t and X_t are cointegrated, then we can express the relationship between Y_t and X_t with an Error Correction Mechanism as follows:

$$\Delta Y_t = a_0 + b_1 \Delta X_t - \pi u_{t-1} + e_t$$

This model has both short run and long run information. b_1 is the short run or impact multiplier which measures the immediate impact on Y_t after a change in X_t. π is the feedback effect, or the adjustment effect and shows how much of the disequilibrium is being corrected (Asteriou & Hall, 2011,359). Of course an error correction model can be estimated for more than two variables. The error correction model with our seven variables becomes:[1]

$$\Delta LGNIPC_t = \alpha + \beta \Delta LCAPSTOCKPL_{t-i} + \delta \Delta LFDISTOCKPC_{t-i} + \lambda \Delta LEXPPC_{t-i} + \Delta\gamma \Delta LREVPC_{t-i} + \theta \Delta LSSENROL_{t-i} + \psi \Delta LEXTDEBTRAT_{t-i} + \mu EC_{t-1} + \varepsilon_t$$

EC_{t-1} is the lagged residual of the cointegrated relationship and is calculated with the normalized long run coefficients from the cointegrating vector. Its coefficient μ is called the error correction term and reflects the speed of adjustment from a deviation of economic growth from its long run relationship with the explanatory variables. As all the variables are represented in natural logarithms the parameters $\beta, \delta, \lambda, \gamma, \theta, \psi$ gives short run elasticities for growth in Gross National Income per capita with respect to changes in the explanatory variables. During estimation general to specific approach to econometric modeling is used. This is a very important advantage of Error Correction Model. By this way we can search for the most parsimonious model that best fits the given data set. After estimating the general model we apply F tests for jointly significance and drop the insignificant variables. The Error Correction Model, which is estimated with the Turkish annual data between 1986 and 2012 is reported in Appendix 2.

[1]A model with similar variables is used by Naguib (2012) in the study of the effects of privatization on economic growth in Argentina.

The results show that capital stock per labor, FDI stock per capita and export per capita do not have a significant effect on growth rate of gross national income per capita. On the other hand, privatization revenue has a negative significant effect on growth. Although this effect changes into positive in the long run, it is not significant. Excess cash in Privatization Fund is transferred to Treasury accounts for the purpose of payment of internal and external debts of the Treasury. No transfers may be made from the Privatization Fund to any other funds. So the privatization revenue is used to finance the debts but not used for infrastructure investments, which will bring high growth rates in the following years.

Secondary school enrollment, which is used as a proxy for human capital has a significant positive effect on growth. This is explaining the importance of the quality of human capital for growth. However in the long run the coefficient of secondary school enrollment is not significant. Empirical studies report conflicting results about the effects of human capital on economic growth. Engelbrecht (2003) observes countries in OECD and claims that human capital has a positive effect on economic growth. Pritchet (2001) observes a positive relation between schooling rate and economic growth rate. On the other hand, Benhabib and Spiegel (2000), Nunnenkamp and Spatz (2003), Zhang (2001) find insignificant effects of human capital on economic growth. These differences can be attributed to the different use of proxies for representing human capital in different studies.

Additionally the external debt ratio has a positive significant effect on growth. This can be explained by the dependency of the Turkish economy to foreign capital for achieving high growth rates. External debt as of the end of April 2013 neared $340 billion. This is almost 43 percent of the national income. During 2003-2012, which is a high growth period for the economy, $210 billion of new foreign loans have been taken and foreign debt has increased by 162 percent. With the help of indirect taxes and privatization revenues, Turkey's public debt burden is better than EU countries. Public debt stock, including domestic debts, is 40 percent of the national income. The main problem is in the external debt of private sector. As of the end of 2012, the private sector owed $226 billion, which is two-thirds of the total foreign debt. With the help of pressed exchange rate and abundance of resources in the financial markets, private sector has no doubt to borrow from foreign creditors. Even the privatized Public Economic Enterprises were bought with foreign credits.

Similar to external debt there are some problems with the foreign capital inflows to Turkey after the announcement of FED to end up the high liquidity period. High amounts of foreign capital are flowing out from emerging markets and Turkey is not an exception.

6.CONCLUSION

In this study we tried to investigate the influence of privatization on economic growth. The results of the previous studies were not consistent about the significant effects of privatization on economic growth. In our analysis of the Turkish economy between 1986-2012, we found that privatization revenue has a negative significant effect on growth. In Turkey Excess cash in Privatization Fund is transferred to Treasury accounts for the purpose of payment of internal and external debts of the Treasury. If the privatization funds could be used for infrastructure investments instead of financing the budget deficits privatization could have positive effect on growth. Secondary school enrollment, which is used as a proxy for human capital has a significant positive effect on growth. This is explaining the importance of the quality of human capital for growth. The external debt ratio has a positive significant effect on growth. This can be explained by the dependency of the Turkish economy to foreign capital for achieving high growth

rates. On the other hand, the results show that capital stock per labor, FDI stock per capita and export per capita do not have a significant effect on growth rate of gross national income per capita.

Privatization is not the only tool for achieving high growth rates. Privatization accompanied by appropriate structural reforms, creates incentives to improve economic efficiency and boost growth. If the government wants to increase output in the long run should not focus only on privatization but should promote other industrial policy such as competition or infrastructure investments and other regulations. The history of privatization in Turkey is not very long. The mass privatizations have started only after 2001. So this was only a preliminary study with short time series. Further analysis on longer time series would be necessary to confirm or reject our findings.

If we look at the Turkey's recent experience with privatization we saw that a favorable legal and institutional framework is essential to the implementation of a large scale privatization program. We also learnt that the development of a regulatory framework to prevent anti-competitive abuses is important. And lastly we saw that the primary objective of privatization has shifted from long term productivity increase to revenue generation, which is not favorable. So for successful applications, privatization should be informed by the lessons of previous privatization cases.

Excess cash in Privatization Fund is transferred to Treasury accounts for the purpose of payment of internal and external debts of the Treasury. No transfers may be made from the Privatization Fund to any other funds. 825 Million US Dollars were transferred from the Fund to the Treasury in 2012. On the use of privatization revenue, the conventional wisdom is that it is better using it for retiring debt. Debt reduction lowers interest rates, reduces further borrowing and inflation and boosts overall growth. Privatization can be a useful tool to strengthen and stabilize the economy. But there is also a dangerous case here. It is about the shift of priorities in privatization. As mentioned before, there are many objectives for privatization of public enterprises. If the primary objective is to finance the external and internal debt rather than the efficiency gains, public enterprises may be sold at prices which fail to reflect their true value. This can be regarded as a loss for the whole society.

There are not strict rules that are suitable for all counties in all cases. A method for one country may not be suitable for the other one. So privatization should be tailored to local conditions. But there is one rule that should be applied in all cases: Transparency in sales process should be enforced. Otherwise allegation of fraud and corruption cannot be stopped in the society.

The results of the time series models used in this analysis cover only the Turkish economy. As the time series models do not allow for cross - country differences, the results may not be robust for other developing countries. In order to overcome this shortness panel data models can be an alternative.

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Appendix 1: Unit Root Tests

Variable	τ_μ		τ_τ		
	ADF Test	PP Test	ADF Test	PP Test	
LGNIPC	0.448626 [4]	-0.199919 [1]	-2.971909 [4]	-3.128996 [1]	$I(1)$
DLGNIPC	-4.702718* [4]	-6.115248* [1]	-4.868317* [4]	-6.002354* [1]	
LCAPSTOCKPL	-2.880617 [6]	-0.556887 [1]	-0.949333 [6]	-2.983816 [1]	$I(1)$
DLCAPSTOCKPL	-2.850454 [4]	-7.509180* [8]	-3.520348*** [4]	-8.204627* [9]	
LFDISTOCKPC	1.148522 [8]	0.426261 [1]	-2.334345 [7]	-1.810578 [1]	$I(1)$
DLFDISTOCKPC	-2.085631 [8]	-6.562125* [1]	-3.546132*** [8]	-6.765273* [1]	
LEXPPC	-0.451831 [0]	-0.451831 [0]	-3.026484 [1]	-2.383106 [1]	$I(1)$
DLEXPPC	-4.258542* [0]	-4.267182* [1]	-4.177248** [0]	-4.183700** [1]	
LREVPC	-1.275698 [4]	-2.546505 [2]	-2.094836 [4]	-3.132846 [2]	$I(1)$
DLREVPC	-8.174803* [0]	-7.780015* [2]	-8.784763* [0]	-8.354135* [2]	
LSSENROL	-1.687861 [0]	-1.624962 [1]	-0.747708 [0]	-0.941049 [1]	$I(1)$
DLSSENROL	-3.754966* [0]	-3.759928* [1]	-3.978947** [0]	-3.987047** [1]	
LEXTDEBTRAT	-2.649128 [0]	-2.649128 [0]	-1.560856 [4]	-2.606063 [0]	$I(1)$
DLEXTDEBTRAT	-5.720416* [3]	-4.623738* [1]	-5.630583* [3]	-4.530536* [1]	

* denotes the significance of the test statistics at %1 level ** denotes the significance of the test statistics at %5 level *** denotes the significance of the test statistics at %10 level

Critical values for τ_μ are: -3.75 (at %1 significance level) and -3.00 (at %5 significance level)

Critical values for τ_τ are: --4.38 (at %1 significance level) and -3.60 (at %5 significance level)

Source: Gujarati Basic Econometrics, 2004, Table D.7, P. 975.

L denotes the natural log of the related variable and D denotes the first difference of the related variable.

Appendix 2: Vector Error Correction Model

Variable	*Coefficient*	*Standart Errors*	*statistics*
Constant	0.099954	(0.02818)	[3.54704]**
$\Delta LCAPSTOCKPL_{t-1}$	0.054656	(0.17798)	[0.30710]
$\Delta LCAPSTOCKPL_{t-2}$	-0.417540	(0.62950)	[-0.66329]
$\Delta LFDISTOCKPC_{t-1}$	-1.532699	(1.58917)	[-0.96446]
$\Delta LFDISTOCKPC_{t-2}$	0.071284	(0.08408)	[0.84785]
$\Delta LEXPPC_{t-1}$	0.438920	(0.51706)	[0.84887]
$\Delta LEXPPC_{t-2}$	-0.370995	(0.22776)	[-1.62888]
$\Delta LREVPC_{t-1}$	-9.294766	(3.80978)	[-2.43971]**
$\Delta LREVPC_{t-2}$	0.021911	(0.01740)	[1.25903]
$\Delta LSSENROL_{t-1}$	0.375049	(0.13961)	[2.68641]**
$\Delta LSSENROL_{t-2}$	0.569250	(0.59974)	[0.94916]
$\Delta LEXTDEBTRAT_{t-1}$	1.211513	(0.54349)	[2.22912]**
$\Delta LEXTDEBTRAT_{t-2}$	0.138967	(0.19124)	[0.72666]
EC_{t-1}	-0.940241	(0.40515)	[-2.32070]**
R^2	0.557387		
$\overline{R}^2$	0.241235		

(**) indicates statistical significance at % 5