CORPORATE OWNERSHIP & CONTROL

КОРПОРАТИВНАЯ СОБСТВЕННОСТЬ И КОНТРОЛЬ

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Journal Corporate Ownership & Control is published four times a year, in September-November, December-February, March-May and June-August, by Publishing House "Virtus Interpress", Kirova Str. 146/1, office 20, Sumy, 40021, Ukraine.

Information for subscribers: New orders requests should be addressed to the Editor by e-mail. See the section "Subscription details".

Back issues: Single issues are available from the Editor. Details, including prices, are available upon request.

Advertising: For details, please, contact the Editor of the journal.

Corporate Ownership & Control

ISSN 1727-9232 (printed version)
1810-0368 (CD version)
1810-3057 (online version)

Certificate № 7881

Почтовый адрес редакции:

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г. Сумы, 40014
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Журнал "Корпоративная собственность и контроль" издается четыре раза в год в сентябре, декабре, марте, июне издательским домом Виртус Интерпресс, ул. Кирова 146/1, г. Сумы, 40021, Украина.

Информация для подписчиков: заказ на подписку следует адресовать Редактору журнала по электронной почте.

Отдельные номера: заказ на приобретение отдельных номеров следует направлять Редактору журнала.

Размещение рекламы: за информацией обращайтесь к Редактору.

Корпоративная собственность и контроль

ISSN 1727-9232 (печатная версия)
1810-0368 (версия на компакт-диске)
1810-3057 (электронная версия)

Свидетельство КВ 7881 от 11.09.2003 г.

CORPORATE OWNERSHIP & CONTROL

Volume 11, Issue 2, 2014, Continued - 7

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CORPORATE GOVERNANCE AND PERFORMANCE OF LISTED COMMERCIAL BANKS IN SOUTH AFRICA

Sam Ngwenya*

Abstract

The global financial crisis of 2008 that resulted in the collapse of many financial institutions in the United States (US) and Europe have resulted in debates over the failures of corporate governance structures to properly protect investors. The main objective of the study was to determine the relationship between corporate governance and performance of listed commercial banks in South Africa. The results of the study indicated a statistically positive significant relationship between board size, proportion of non-independent and non-executive directors and bank performance. The results of the rest of the corporate governance indicators are mixed when using different performance measurement variables.

Keywords: Corporate Governance, Performance, Listed Commercial Banks

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1. Introduction

The last decade has seen considerable research on corporate governance and company performance. Companies have long recognised that good corporate governance generates positive returns and boosts the confidence of stakeholders. Poorly governed companies are expected to be less profitable, have the most bankruptcy risks, lower valuations and pay out less to their shareholders, while well-governed companies are expected to have higher profits, less bankruptcy risks, higher valuations and pay out more cash to their shareholders (Kyereboah-Coleman and Biekpe, 2006).

It is generally accepted that boards of directors play a fundamental role in corporate governance and the structure of the board plays a significant role in the functioning of a company (Jensen, 1993). Without proper governance control, managers are more likely to deviate from the interest of shareholders. The board, however, with its legal authority to hire, fire, and compensate top management teams, can set the premises of managerial decision-making, monitor managerial behaviour, and safeguard invested capital (Liang and Li, 1999; Fama and Jensen, 1983).

Many empirical studies on corporate governance have indicated mixed results regarding corporate governance and various performance measures among listed firms (Kyereboah-Coleman and Biekpe, 2006). Liang and Li (1999) concur with Kyereboah-Coleman and Biekpe (2006) and state that the available evidence of studies on the impact of board composition on company performance remain ambiguous, and the reason for the ambiguity is that most of the board composition studies were conducted using a sample of large public companies where the linkage between board composition and company performance is long and the observations are "noisy". To minimise the noise they propose that the board composition and company performance relationship is best observed in small privately owned companies.

Most studies on the relationship between corporate governance and performance were conducted internationally and focused on both non-financial institutions (see Liang and Li, 1999; Guest, 2009; El-Masry 2010; Gill and Mathur, 2011; Nicholson and Kiel, 2007; Kyereboah-Coleman and Biekpe, 2006; Jensen, 1993; Fama and Jensen, 1983), and financial institutions (see Hoque, Islam and Ahmed, 2013; Muttakin and Ullah, 2012; Avouri, Hossain and Muttakin, 2011). Studies conducted in South Africa on corporate governance focus mainly on non- financial institutions (see Rossouw, van der Watt and Malan, 2002; Vaughn and Ryan, 2006; Wameru, 2012), and studies on corporate governance that focus on financial institution are scanty, the only study that the researcher could find is that of Young (2010), which focuses on corporate governance and risk management. The main objective of this paper is therefore to narrow the gap and to contribute to the

existing body of literature by investigating the relationship between corporate governance and bank performance of the top four listed commercial banks in South Africa.

John and Qian (2003) argue that it is important to understand corporate governance and the degree of managerial alignment in banks because banks differ from manufacturing firms in that they are regulated to a higher degree than manufacturing firms. Hoque, Islam and Ahmed (2013) concur with John and Qian (2003) by stating that unlike non-financial institutions, banks are subject to dual monitoring, by the regulatory bodies and also by the bank board. The monitoring and oversight of the regulators and the compliance of banks with regulatory requirements provide an alternative governance mechanism which is absent in a non-financial industry. The remainder of this paper is structured as follows: Firstly, a literature study presents the theoretical foundation of the study related to corporate governance and company performance. Secondly, the sample, variables and methodology employed are outlined. Thirdly, the analysis is carried out, and lastly the results of the analysis and the recommendations are outlined.

2. Literature review

The global financial crisis of 2008 that resulted in the collapse of many financial institutions in the United States (US) and Europe have resulted in debates over the failures of corporate governance structures to properly protect investors. It is said that eighty American banks failed between 2007 and 2009 due to the onslaught of the global financial crisis and a number of banks have become insolvent throughout the globe (Hoque, Islam, and Ahmed, 2013). Much debate has since been raging on about whether the cause of the financial crises was the result of the failure of internal or external governance structures. The recent global financial crises is said to be the worst since the Great Depression in terms of both the economic costs and geographical spread (Claessens, Dell'Ariccia, Igan and Laeven, 2010).

2.1 Banking sector in South Africa

South Africa has developed a well-regulated banking system over the years that compares favourably with many developed countries. Legislation governing the banking sector in South Africa includes among others the Banks Act No. 94 of 1990 as amended in 2008 to align it with principles of Basel II, the Mutual Banks Act No. 124 of 1993, the Financial Intelligence Centre Act No. 39 of 2001, the Financial Advisory and Intermediary Services Act No. 37 of 2002, the National Credit Act No. 34 of 2005, the Consumer Protection Act No. 68 of 2008, and the new Company Act No. 71 of 2008 which replaced the Companies Act No. 61 of 1973. Apart from the legislative framework governing the banking sector in South Africa, the South African Reserve Bank, as mandated by the South African Reserve Bank Act 90 of 1989 is responsible for bank supervision. The successful adoption of Basel compliance and the banking supervision has positively contributed to the stability of the banking sector (South African Reserve Bank, 2011).

Although the banking system in South Africa was relatively insulated from the effects of the global financial crises of 2008 through appropriate monitoring and supervision (South African Reserve Bank, 2011), issues of corporate governance and financial performance remain of great concern to both the shareholders and regulatory authorities. Given that corporate governance is essentially a mechanism for addressing agency problems and controlling risk within the firm, it is not surprising that the recent initiatives and statements by banking supervisors, central banks, and other authorities have emphasised the importance of effective corporate governance practices in the banking sector.

2.2 Corporate governance in South Africa

The King Report on Corporate Governance is considered to be a ground-breaking code of corporate governance in South Africa. The reports were issued in 1994 (King 1), 2002 (King 11), and 2009 (King 111). The King III Codes of Corporate Governance and the Company Act, No.71 of 2008 (replacing the Companies Act, No.61 of 1973) empowers the board of directors to monitor the activities and performance of companies. One of the main duties of the board of directors, as stipulated in the King III report is to appoint the Chief Executive Officer (CEO), and define its own level of materiality and approve a delegation of authority framework. The board should also ensure that the role and function of the CEO is formalised and the performance of the CEO is evaluated against the criteria specified by the board (King Report on Governance for South Africa, 2009). The recommendations further state that the board should comprise a majority of non-executive directors and a minimum of two executive directors of which one should be the CEO and the other the director responsible for finance.

3. Research objectives

The main objective of the study was to investigate the relationship between corporate governance and performance of the top four listed commercial banks in South Africa using data for the period 2009 to 2011. The reason for using the sample of the top four listed commercial banks in South Africa is because they together control over 90% of the retail market for personal transaction accounts (Competition Commission, 2008).

4. Research methodology

4.1 Data collection

The population of the study consisted of the top four commercial banks listed on the Johannesburg Stock Exchange (JSE) in South Africa. Secondary data used in the empirical study was obtained from two sources. First, the annual reports of the top four listed commercial banks were downloaded from their websites to obtain information relating to board structures and board composition. The second set of data was downloaded from the McGregor BFA website to obtain standardised financial statements of the top four commercial banks. The secondary data downloaded was for the year 2009 to 2011, thus allowing three years of uninterrupted observation. This period was deliberately chosen as it reflects the period immediately after the global crisis that started in the middle of 2007.

The study tested the relationship between corporate governance and a company's performance using premises and variables that have been used in prior studies. The study aimed to build on previous studies conducted on the relationship between corporate governance and company performance, with particular reference to Hoque, Islam and Ahmed (2013), El-Masry (2010), Muttakin and Ullah (2012), and Gill and Mathur (2011).

4.2 Definition of variables and hypotheses

Prior studies on the relationship between corporate governance and company performance have used various internal and external variables, among which is board size, board composition, board committees, CEO's position-duality, CEO incentives and ownership interest, ownership concentration of insiders and outsiders, multiple directorships, debt financing, market for corporate control and so forth (Hoque, Islam and Ahmed, 2013).

4.2.1 Variables used to measure corporate governance

The following variables were used to measure the effectiveness of corporate governance:

Board size (BSIZE): Board size refers to the total number of directors on the board which includes both executive and non-executive directors. There are various views based on the size of the board and company performance. One view is that larger boards enhance company performance because they have a range of expertise to help make better decisions, and are harder for a powerful CEO to dominate (Muttakin and Ullah, 2012; Kyereboah-Coleman and Biekpe, 2006). The other view is that large boards are less effective and more susceptible to the influence of the CEO (Avouri, Hossain and Muttakin, 2011; Core, Holthausen and Larcker, 1998; Jensen, 1993). This view is supported by studies conducted by Gill and Mathur (2011) and Liang and Li (1999) which indicates that larger board size negatively impact on the profitability of companies. Jensen (1993) suggests that keeping boards small can help improve their performance. In this study the natural logarithm of total assets was used to determine board size (BSize). The first hypothesis of the study is thus stated as follows:

H1: There is no significant relationship between board size and bank performance.

Board diversity. Proportion of female board directors (PFBD): Board diversity has to do with the gender composition of the board, that is, the percentage number of females versus the number of males in the board. It is argued that diversity of a corporate board enhances better monitoring and increase board independence. The study conducted by Erhardt, Werber and Shrader (2003) indicated that board diversity is positively associated with firm performance. However, the study conducted by Mutttakin and Ullah (2012), Dang, Nguyen and Vo (2009) indicated that the inclusion of female directors have no impact on company performance. Torchia, Calabò and Huse (2011) suggest that a women director's contribution to the level of firm organisational innovation depends on the number of women directors in the board. The second hypothesis is stated as follows:

H2: There is no significant relationship between the proportion of female directors and bank performance.

Board composition: Board composition has to do with the number of executive directors (inside directors) versus the number of non-executive directors (outside directors).

Proportion of executive/inside directors (PNED): Kyereboah-Coleman and Biekpe (2006) argue that the issue of whether directors should be employees of or affiliated with the company (executive/inside directors) or non-executive/outside directors has been thoroughly researched, yet no clear conclusion has been reached. According to Fama and Jensen (1983), executive directors represent an important source of company-specific knowledge and their presence can lead to more effective decision-making. Kyereboah-Coleman and Biekpe (2006) state that executive directors also act as monitors to top management. This view is supported by Shakir (2008) and suggests that if executive directors play an effective monitoring role and provide first-hand information on the company's operations to other board members; this may increase the corporate governance structure of the company which will eventually lead to a better company performance. In contrast Core, Holthausen and Larcker (1998) argue

that executive directors are more loyal to management, and thus the CEO can exert relatively more influence over them as opposed to non-executive directors. However, the study conducted by Nicholson and Kiel (2007) found a positive relationship between the proportion of executive directors and company performance. The third hypothesis is thus stated as follows:

H3: There is no significant relationship between the proportion of executive directors (PNED) and bank performance.

Proportion of non-independent and non-executive directors (PNINE): While executive directors represent an important source of company-specific knowledge and their presence can lead to more effective decision-making (Fama and Jensen, 1983), the presence of non-executive directors may bring an independent judgment to bear on issues of strategy, performance and resources including key appointments and standards of conduct, and their independence from management can bring a degree of objectivity to the board's deliberations and play a valuable role in monitoring management decisions (Cadbury, 1992). Non-executive directors may act as "professional referees" to ensure that competition among executive directors stimulates actions consistent with shareholder value maximisation (Kyereboah-Coleman and Biekpe, 2006). In contrast, Hoque, Islam and Ahmed (2013) argue that non-executive directors may become less effective as they grow older or serve on "too many" boards. However, the study conducted by Liang and Li (1999) indicates that the presence of non-executive directors is positively associated with higher return on investment. The fourth hypothesis is thus stated as follows:

H4: There is no significant relationship between the proportion of non-independent and non-executive directors and bank performance.

Board independence. Proportion of independent directors (PINDD): Agency theory suggests that a higher proportion of independent directors should lead to a better firm performance since it reduces the conflict of interest between the shareholders and management and makes management more effective through better monitoring (Fama and Jensen, 1983; Muttakin and Ullah, 2012). King 111 requires boards in South Africa to be comprised of a majority of non-executive directors, of whom the majority should be independent (KPMG, 2009). Empirical evidence indicates that board independence have a significant positive impact on company performance (Hoque, Islam and Ahmed, 2013; Muttakin and Ullah, 2012; El-Mastry, 2010; Liang and Li, 1999). The fifth hypothesis is therefore stated as follows:

H5: There is no significant relationship between the proportion of independent directors and bank performance.

4.2.2 Dependent variables

Variables used to measure bank performance. Traditional bank performance measures are similar to those applied in other industries, with return on assets (ROA), return on equity (ROE) or cost-to-income ratio being the most widely used. In addition, given the importance of the intermediation function for banks, net interest margins are typically monitored (NIM) (European Central Bank, 2010). For the purpose of this study, only the accounting indicators return on assets (ROA) and return on equity (ROE) were used as proxies to measure bank performance. The return on assets (ROA) was calculated by dividing earnings before interest and tax by total assets. Total assets in this case include only tangible assets.

Return on assets = Net income/Total assets

ROE was calculated by dividing earnings before interest and tax by total equity.

Return on equity = Net income/Total equity

4.2.3 Control variables

Since the performance of the bank may be influenced by several factors, the following control variables were considered in the study:

Bank/company size (LNTA): According to Crumley (2008), one of the most important influences of compensation in literature is the size of the company. The size of the company is measured by book value of assets, level of sales and number of employees being managed. The size of the banks in this study was measured as the value of its assets base, total assets excluding intangible assets were used as measure of the size of the bank. For the regression analysis, we use the log of the assets because the values are widely spread. The sixth hypothesis is thus:

H6: There is no significant relationship between bank size and bank performance.

Debt-to-equity ratio (D/E): D/E = ratio of debt to equity

Banks have a unique capital structure as distinguished by its equity and liabilities. Macey and O'Hara (2003) states that banks receive 90 per cent or more of their funding from debt, which are largely in the form of deposits available to their creditors/depositors on demand, while their assets often take the form of loans that have longer maturities. Thus the bank is creating the liquidity for the economy through the holding of illiquid assets (loans) and issuing liquid liabilities (deposits) (Zulkafli and Samad, 2007). This mismatch between

deposits and liabilities becomes a problem in the unusual situation of a bank run (Macey and O'Hara, 2003). Debt-to-equity ratio (D/E) was therefore used as the second control variable in this study. Debt-to-equity ratio (D/E) was calculated by dividing the banks total liabilities (debt) by total equity.

Debt-to equity (D/E) = Total liabilities (debt)/total equity.

The seventh and last hypothesis is therefore stated as follows:

H7: There is no significant relationship between debt-to-equity ratio and bank performance.

5. Results

Descriptive statistics

Table 1 depicts the descriptive statistics of the dependent and independent variables.

Table 1. Descriptive statistics, n = 12

Variables	Minimum	Maximum	Mean	Std. deviation
Total liabilities	500 000 000 000	1 000 000 000 000	807 000 000 000	297 100 000 000
Fixed assets	5 178 000 000	38 390 000 000	15 569 583 333	12 225 920 493
Total assets	600 000 000 000	1 000 000 000 000	872 000 000 000	317 300 000 000
Net income	5 135 000 000	14 859 000 000	9 824 166 667	3 324 887 171
Total equity	44 984 000 000	100 000 000 000	70 468 000 000	23 435 028 460
BSIZE	18	23	19.92	1.730
ROE	10.740	20.829	14.03289	3.027100
ROA	0.854	1.921	1.15788	0.336491
D/E	99.655	99.749	99.71424	0.036643
PNINE	15.789	35.000	24.85442	7.424438
PINDD	42.105	72.727	57.31967	11.595587
PFBD	9.091	27.778	18.00272	6.646617
PNED	73.680	90.910	82.17417	5.214585
LNTA	27.060	28.020	27.44250	0.326528

Explanation of variables: BSIZE - the number of members on the board; ROE - return on equity; ROA - return on assets; D/E -debt equity ratio; PNINE - percentage number of independent and non-executive directors; PINDD -percentage number of independent directors; PFBD - percentage number of female board directors; PNED - percentage number of executive directors, LNTA- size of the bank.

According to Table 1, the average valid observations is n = 12. The banks included in the sample have an average of R15 569 583 333 fixed assets (FA), R872 000 000 000 total assets (TA), R807 000 000 000 total liabilities (TL) R9 824 166 667 net income (NI), and R70 468 000 000 total equity (TE). The average return on equity (ROE) is 14.03%, average return on assets (ROA) is 1.16%, and the banks have an average debt-to-equity ratio (D/E) of 99.71424%. The banks also have an average board size (BSIZE) of 20 members, and an average percentage of independent directors (PINDD) of 57.32%. Table 2 depicts the first regression model.

Table 2. Regression analysis between the dependent variables (ROE; ROA) and independent variables (predictors: BSIZE, D/E, LNTA)

Coefficients[a]

	Unstandardised coefficient		Standardised coefficient		
Predictor	**Beta**	**Std. Error**	**Beta**	**T**	**Sign.**
ROE					
(Constant)	5576.156	1313.817		4.244	0.003
BSIZE	1.001	0.361	0.572	2.776	0.024
D/E	-55.096	13.405	-0.667	-4.110	0.003
LNTA	-3.214	1.994	-0.347	-1.612	0.146
ROA					
(Constant)	694.225	102.671		6.762	0.000
BSIZE	0.097	0.028	0.499	3.446	0.009
D/E	-6.875	1.048	-0.749	-6.563	0.000
LNTA	-0.345	0.156	-0.335	-2.212	0.058

ANOVA[a]

Model	Sum of squares	Df	Mean square	F	Sig.
ROE					
Regression	84.676	3	28.225	14.007	0.002[b]
Residual	16.121	8	2.015		
Total	100.797	11			
ROA					
Regression	1.147	3	0.382	31.070	0.000[b]
Residual	0.098	8	0.012		
Total	1.245	11			

a.Dependent variable: ROE; ROA
b.Predictors: (Constant), BSIZE, D/E, LNTA
**Significant at the 0.05 level*

The results of the first regression analysis are reported in two phases. In the first phase ROE is used as a dependent variable. The results of the regression indicate a statistically positive significant relationship between BSIZE (0.024), D/E (0.003) and ROE, but indicate no statistically significant relationship between LNTA (0.146) and ROE. The F test for ROE equals 14.007 and is statistically positive significant at 0.002. In the second phase ROA is used as dependent variable. The results indicate a statistically positive significant relationship between BSIZE (0.009), D/E (0.000) and ROA, but indicate a weaker statistically positive relationship between LNTA (0.058) and ROA. The F test for ROA equals 31.070 and is highly statistically positive significant at 0.000. The results are consistent with the view that larger boards are better for company performance because they have a range of expertise to help make decisions and are harder for a powerful CEO to dominate (Muttakin and Ullah, 2012; Kyereboah-Coleman and Biekpe, 2006). The second regression has the same predictors as the first regression, except that BSIZE is replaced by percentage number of independent directors (PFBD). ROE and ROA still remains the independent variables. Table 3 report the results of the second regression analysis.

Table 3. Regression analysis between the dependent variables (ROE; ROA) and independent variables (predictors: PFBD, D/E, LNTA)

Coefficients[a]

	Unstandardised coefficient		Standardised coefficient		
Predictor	**Beta**	**Std. Error**	**Beta**	**T**	**Sign.**
ROE					
(Constant)	7060.077	1371.370		5.148	0.001
PFBD	-0.287	0.139	-0.630	-2.059	0.073
D/E	-69.452	13.877	-0.841	-5.005	0.001
LNTA	-4.209	2.887	-0.454	-1.458	0.183
ROA					
(Constant)	837.601	120.290		6.963	0.000
PFBD	-0.025	0.012	-0.501	-2.072	0.072
D/E	-8.274	1.217	-0.901	-6.798	0.000
LNTA	-0.387	0.253	-0.386	-1.570	0.155

ANOVA[a]

Model	Sum of squares	Df	Mean square	F	Sig.
ROE					
Regression	80.114	3	26.705	10.329	0.004
Residual	20.683	8	2.585		
Total	100.797	11			
ROA					
Regression	1.086	3	0.362	18.205	0.001[b]
Residual	0.159	8	0.020		
Total	1.245	11			

a.Dependent variable: ROE; ROA
b.Predictors: (Constant), PFBD, D/E, LNTA
**Significant at the 0.05 level*

The results of the second regression analysis are also reported in two phases. In the first phase ROE is used as dependent variable. The results of the regression indicate a statistically negative weaker relationship between PFBD (0.073) and ROE, a statistically negative significant relationship between D/E (0.001) and ROE, and no statistically significant relationship between LNTA (0.183) and ROE,. The F test for ROE equals 10.329 and is statistically positively significant at 0.004. In the second phase ROA is used as dependent variable. The result indicates a statistically negative weaker relationship between PFBD (0.072), and a statistically negative significant relationship between D/E (0.000) and ROA, and no statistically significant relationship between LNTA (0.155) and ROA. The F test for ROA equals 18.205 and is statistically positive significant at 0.001. The weaker positive relationship between PFBD and the two bank measurements ROE and ROA, indicates that board diversity as indicated by the presence of female directors in a board have little impact on the performance of the banks, a view supported by Muttakin and Ullah (2012), and Dang, Nguyen and Vo (2009). The third regression has the same predictors as the second regression, except that PFBD is replaced by percentage number of executive directors (PNED), ROE and ROA still remains the independent variables. Table 4 report the results of the forth regression analysis

Table 4. Regression analysis between the dependent variables (ROE; ROA) and independent variables (predictors: PNED, D/E, LNTA)

Coefficients[a]

	Unstandardised coefficient		Standardised coefficient		
Predictor	**Beta**	**Std. Error**	**Beta**	**T**	**Sign.**
ROE					
(Constant)	7070.439	1749.104		4.042	0.004
PNED	-0.043	0.247	-0.073	-0.173	0.867
D/E	-71.122	17.902	-0.861	-3.973	0.004
LNTA	1.422	4.095	0.153	0.347	0.737
ROA					
(Constant)	840.579	153.551		5.474	0.001
PNED	-0.005	0.022	-0.076	-0.227	0.826
D/E	-8.446	1.572	-0.920	-5.374	0.001
LNTA	0.116	0.360	0.113	0.324	0.754

ANOVA[a]

Model	**Sum of squares**	**Df**	**Mean square**	**F**	**Sig.**
ROE					
Regression	69.267	3	23.089	5.858	0.020
Residual	31.529	8	3.941		
Total	100.797	11			
ROA					
Regression	1.003	3	0.334	11.002	0.003[b]
Residual	0.243	8	0.030		
Total	1.245	11			

c. Dependent variable: ROE; ROA
d. Predictors: (Constant), PNED, D/E, LNTA
**Significant at the 0.05 level*

The results of the third regression analysis are also presented in two phases. In the first phase ROE is used as a dependent variable. The results of the third regression indicate no statistically significant relationship between PNED (0.867), LNTA (0.737) and ROE, but indicate a statistically negative significant relationship between D/E (0.004) and ROE. The F test for ROE equals 5.858 and is statistically positive significant at 0.020. In the second phase ROA is used as dependent variable. The results indicate no statistically significant relationship between PNED (0.826), LNTA (0.754) and ROA, but indicate statistically negative significant relationship between D/E (0.001) and ROA. The F test for ROA equals 11.002 and is statistically positive significant at 0.003. The results are in contrast with the study conducted by Nicholson and Kiel (2007) which found a positive relationship between the proportion of executive directors and company performance. The fourth regression has the same predictors as the third regression, except that PNED is replaced by a proportion of non-independent and non-executive directors (PNINE), ROE and ROA still remain the independent variables. Table 5 report the results of the sixth regression analysis.

Table 5. Regression analysis between the dependent variables (ROE; ROA) and independent variables (predictors: PNINE, D/E, LNTA)

Coefficients[a]

	Unstandardised coefficient		Standardised coefficient		
Predictor	**Beta**	**Std. Error**	**Beta**	**T**	**Sign.**
ROE					
(Constant)	8297.829	1271.863		6.524	0.000
PNINE	0.220	0..76	0.540	2.879	0.021
D/E	-84.307	12.983	-1.021	-6.494	0.000
LNTA	4.277	1.812	0.461	2.361	0.046
ROA					
(Constant)	958.176	98.478		9.730	0.000
PNINE	0.021	0.006	0.471	3.605	0.007
D/E	-9.708	1.005	-1.057	-9.657	0.000
LNTA	0.382	0.140	0.371	2.722	0.026

ANOVA[a]

Model	**Sum of squares**	**Df**	**Mean square**	**F**	**Sig.**
ROE					
Regression	85.253	3	28.418	14.626	0.001[b]
Residual	15.544	8	1.943		
Total	100.797	11			
ROA					
Regression	1.152	3	0.384	32.974	0.000[b]
Residual	0.093	8	0.012		
Total	1.245	11			

a. Dependent variable: ROE; ROA

b. Predictors: (Constant), PNINE, D/E, LNTA

**Significant at the 0.05 level;*

In the fourth regression return on equity (ROE) and return on assets (ROA) are used as dependent variables, while percentage number of non-independent and non-executive directors (PNINE), debt-to-equity ratio (D/E), and size of the bank as measured by the logarithm of total assets (LNTA) are used as predictors. The results of the analysis are reported in two phases. In the first phase ROE is used as dependent variable. The results indicate a statistically positive significant relationship between PNINE (0.021), LNTA (0.046) and ROE, and a statistically negative significant relationship between D/E (0.000) and ROE. The F test for ROE equals 14.626 and is statistically positive significant at 0.001. In the second phase ROA is used as dependent variable. The result indicates a statistically positive significant relationship between PNINE (0.007), LNTA (0.026) and ROA, and a statistically negative significant relationship between D/E (0.000) and ROA. The F test for ROA equals 32.974 and is statistically positive significant at 0.000. The results are consistent with the study conducted by Liang and Li (1999) which indicated that the presence of non-executive directors is positively associated with higher return on investment. The fifth regression has the same predictors as the fourth regression, except that PNINE is replaced by percentage number of independent directors (PINDD). ROE and ROA still remains the independent variables. Table 6 report the results of the second regression analysis.

Table 6. Regression analysis between the dependent variables (ROE; ROA) and independent variables (predictors: PINDD, D/E, LNTA)

Coefficients[a]

	Unstandardised coefficient		Standardised coefficient		
Predictor	**Beta**	**Std. Error**	**Beta**	**T**	**Sign.**
ROE					
(Constant)	8 195.272	1 450.257		5.651	0.000
PINDD	-0.156	0.071	-0.597	-2.185	0.060
D/E	-83.483	14.874	-1.011	-5.613	0.001
LNTA	5.544	2.654	0.598	2.089	0.070
ROA					
(Constant)	949.039	118.279		8.024	0.000
PINDD	-0.015	0.006	-0.524	-2.615	0.031
D/E	-9.637	1.213	-1.049	-7.944	0.000
LNTA	0.508	0.216	0.493	2.346	0.047

ANOVA[a]

Model	Sum of squares	Df	Mean square	F	Sig.
ROE					
Regression	80.977	3	26.992	10.895	0.003[b]
Residual	19.819	8	2.477		
Total	100.797	11			
ROA					
Regression	1.114	3	0.371	22.527	0.000[b]
Residual	0.132	8	0.016		
Total	1.245	11			

a. Dependent variable: ROE; ROA
b. Predictors: (Constant), PINDD, D/E, LNTA
**Significant at the 0.05 level*

The results of the fifth regression are also reported in two phases. In the first phase ROE is used as a dependent variable. The results of the regression indicate no statistical relationship between PINDD (0.060), LNTA (0.070) and ROE, but reveal a statistically negative significant relationship between D/E (0.001) and ROE. The F test for ROE equals 10.895 and is statistically positive significant at 0.003. In the second phase ROA is used as a dependent variable. The result indicates a statistically negative significant relationship between PINDD (0.031), D/E (0.000), and ROA, and a statistically positive significant relationship between LNTA (0.047) and ROA. The F test for ROA equals 22.527 and is statistically positive significant at 0.000. The results are inconclusive as they indicate a weaker positive relationship between PINDD and ROE, and a statistically positive significant relationship using the bank performance measure ROA, which is consistent with the results obtained by Hoque, Islam and Ahmed (2013), Muttakin and Ullah (2012), El-Mastry (2010), and Liang and Li (1999). Table 7 provides a summary of the list of variables, the stated hypotheses and the results thereof.

6. Limitations of the study

The first limitation is that the data of this study was limited to a period of three years, 2009 to 2011. The second limitation is that the sample was drawn from the top four listed commercial banks in South Africa; other small commercial banks were not included in the sample.

7. Conclusion

One of the major roles of the board of directors is to ensure that the interests of shareholders and managers are closely aligned in order to ensure optimal performance of the company. The main objective of this paper was to determine the relationship between corporate governance and bank performance of the four top listed commercial banks in South Africa using data for the period 2009 to 2011. Accounting-based measures, namely ROA and ROE were used to measure the financial performance against various corporate governance variables including board sixe (BSIZE), the proportion of female board directors (PFBD), proportion of non-executive directors (PNED), proportion of non-independent and non-executive directors (PNINE) and percentage number of independent directors (PINDD). Control variables such as debt equity ratio (D/E) and bank size as measured by logarithm of total assets (LNTA) were used during the study.

The results on the relationship between board size (BSIZE) and bank performance indicated a significantly positive relationship using both two measures of bank performance ROE and ROA. The results support the view that larger boards are better for company performance because they have a range of expertise to help make decisions and are harder for a powerful CEO to dominate (Muttakin and Ullah, 2012; Kyereboah-Coleman and Biekpe, 2006). Board diversity as represented by proportion of female directors in the board (PFBD) indicated a statistically weak negative relationship with bank performance (ROE and ROA), which is an indication that the presence of female directors in the board has little or no impact on the performance of banks in South Africa. This view is supported by Muttakin and Ullah (2012), and Dang, Nguyen and Vo (2009).

Board composition has to do with the number of executive directors (inside directors) versus the number of non-executive directors (outside directors). With regards to the proportionate number of executive directors (PNED), the results indicated no statistically significant relationship with bank performance for both ROE and ROA. The results are in contrast with the study conducted by Kiel and Nicholson (2003) which found a positive relationship between the proportion of executive directors and company performance. Executive directors (inside directors) form part of management and have specific skills, their presence in the board should lead to more effective decision-making (Kyereboah-Coleman and Biekpe, 2006), and their ability to provide first hand inside information on the company's operations to other board members may increase the corporate governance structure of the company and lead to better company performance (Core, Holthausen and Larcker, 1998). The reason why the relationship between executive directors and bank performance is insignificant in the banks in South Africa might be the

fact that the majority of the sampled banks had only two executive directors, the CEO and the chief financial officer (CFO) as recommended by the King III report.

On the other hand the results of the proportion of non-independent and non-executive directors (PNINE) indicated a statistically positive and significant relationship using both bank performance measures ROE and ROA which is consistent with the study conducted by Liang and Li (1999). Because non-executive directors are not part of management, their independence may bring a degree of objectivity to the board and they may act as "professional referees" to ensure that the interests of shareholders are protected (Cadbury, 1992; Kyereboah-Coleman and Biekpe, 2006). The presence of non-executive directors should therefore represent a means of monitoring the actions of the executive directors and of ensuring that the executive directors are pursuing policies consistent with shareholders interest.

Board independence is represented in this study by the proportion of independent directors (PINDD). The results of the study indicated a statistically negative weaker relationship when using the performance measurement ROE and a statistically negative significant relationship when using ROA as a performance measure, which is consistent with the results obtained by Hoque, Islam and Ahmed (2013), Muttakin and Ullah (2012), El-Mastry (2010), and Liang and Li (1999). The results of the relationship between bank size (BSIZE) and bank performance are inconclusive for both ROE and ROA, while the relationship between debt-equity-ratio (D/E) and bank performance indicates a statistically negative and significant relationship with bank performance, an indication that bank insolvency may affect the performance of the bank.

8. Managerial implication and recommendations

Based on the results obtained, it is evident that corporate governance is reasonable implemented by commercial banks in South Africa, this might be the results of the regulatory environment and the recommendations of King 1, King 11 and King 111 reports. The legislative framework that govern banks in South Africa has also played a major role in strengthening the governing structures of the banks hence the global financial crisis had little impact on the South African banking system. However, banks in South Africa should not become complacent, but must seek to improve their corporate governance structures to ensure that the agency and stewardship forces in the banks are well managed.

It is further recommended that banks in South Africa should maintain a reasonable board size which consists of a mixture of skills or expects since larger boards are better for company performance, but the size of the board must not be too large to manage to ensure timely resolution in decision making. With regard to board diversity, the proportion of female directors in the board (PFBD) should not be used as a token but should be used to enhance the governance of the banks. The proportion of independent directors should be increased as recommended by the King reports, but banks should ensure that independent directors are skilled and effective, and that they are evaluated annually to ensure that they remain committed and do not serve in too many companies as that might hamper their effectiveness.

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A CAUSAL RELATIONSHIP BETWEEN DERIVATIVES TRADING, CAPITAL MARKET DEVELOPMENT AND ECONOMIC GROWTH: EVIDENCE FROM SOUTH AFRICA

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Abstract

This article is based on empirical research on the relationship between derivatives and capital market development and also between derivatives and economic growth on the Johannesburg Stock Exchange (JSE) for the period between 1994 and 2012. The study employed the Autoregressive Distributed Lag (ARDL)-bound testing approach and the Granger causality tests to examine the linkage between capital market development and derivatives, and the nexus between derivatives and economic growth to capture the short-run and long-run dynamics. The results show that there is a significant relationship between derivatives and capital markets development. Further tests indicated that there is a unidirectional Granger causality running from capital market development to derivatives both in the short run and long run, implying that derivatives do not Granger cause capital market development. Results also revealed that there is no direct linkage between derivatives and economic growth. Based on the research it is recommended that further research should be conducted to investigate how derivatives enhance capital market development through augmentation of liquidity and efficiency, leverage, and reduction of transaction costs through the role of derivatives as risk management tools in capital markets.

Keywords: Derivatives, Capital Markets Development, Economic Growth, ARDL-Bounds Testing Approac, Granger Causality

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1. Introduction

After the Mexican financial crisis in 1994, the East Asian financial crisis in 1997, the Euro crisis that started in 2010 and especially the global financial crises of 2008/9 the word 'derivative' seems to have caused a shock wave within the ranks of many financial commentators. It is, though, perhaps not wise to throw out the baby with the bath water, but to look at the positive role derivatives can play, especially in Africa, where there is a need for modern tools of risk management. This situation compelled the author to investigate the nature of the relationship between derivative trading and capital market development, and also the nature of the relationship between derivative trading and economic growth in South Africa.

Despite the drawbacks and complexities of derivatives, they are widely used as a tool in managing financial risk and have enhanced capital market development and economic growth in many countries. These instruments are thought of as potential development enhancers for developing countries as it is believed that derivatives could potentially reduce economic volatility (Tiberiu, 2007). Tsetsekos and Varangis (1998) argue that derivatives markets create an atmosphere for risk transfer, enhanced public information, and lower transaction costs, thereby allowing a climate of effective price discovery and market transparency to develop.

Goromonzi (2010) points out that the institutionalisation of derivatives trading in Africa will serve towards the deepening of financial markets through the introduction of new products that will enhance risk management operations. Finance professionals feel that derivatives are expected to improve financial market performance by allowing for adequate price discovery, providing for opportunities for hedging risk, permitting investments to become more productive, and thereby leading to a higher rate of economic growth (Şendeniz-Yüncü, Akdeniz and Aydoğan, 2007).

The approach used for the research on which this article reports differs from other approaches in three main respects. Firstly, the focus is mainly on the nature of the relationship between derivative trading

and capital market development, and also between derivatives and economic growth with the analysis including the cointegration and causality relationships. Secondly, the author considers JSE stock market capitalisation over a more recent period, thus providing more appropriate and contemporary empirical evidence from emerging markets. Lastly, the empirical analysis does not only focus on the nature of relationship of variables in question but also looks at the implications of this interconnectedness in the context of the financial risk management framework, financial deepening and economic growth.

The aim of the research was to investigate the nature of the relationship between derivative trading and capital market development, and also the nature of the relationship between derivative trading and economic growth. The evidence was based on the Johannesburg Stock Exchange (JSE) market capitalisation and the South Africa Gross domestic Product (GDP) per capita from 1994 to the end of 2012. The Autoregressive Distributed Lag (ARDL)-bound test approach and Granger causality testing were utilised in an attempt to find the nexus between derivatives trading and capital markets development, and also derivative trading and economic growth.

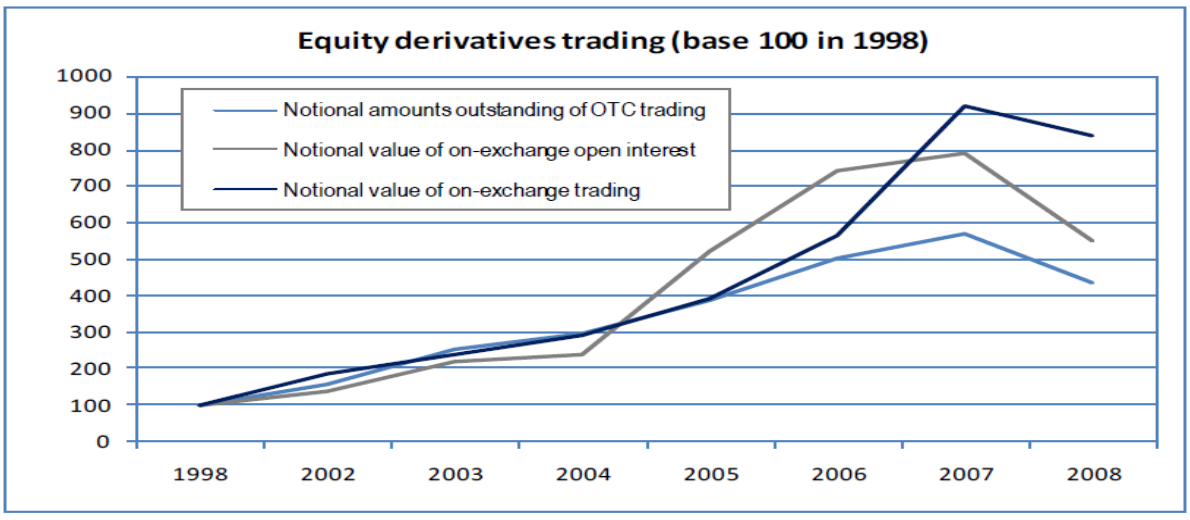
The article is organised in the following manner: the first part discusses facts on JSE derivative trading, financial market developments in South Africa and South Africa's economic growth. The second part constitutes a brief discussion of the literature and the empirical framework as applied in this article. The third part presents the estimation method and empirical results. Finally, conclusions and recommendations are presented and policy implications are drawn.

2. Development of derivatives in the world

The global derivatives market has witnessed substantial growth in the past years as its scope has expanded beyond the boundaries of the industrialised world (De Rato 2007; Mihaljek and Packer, 2010). Before the financial crisis, between 1998 and 2008, the overall exchanges' activity showed increases for trading volumes in terms of all groups of derivatives products.

Figure 1 captures the pre-crisis developments globally over the counter (OTC) and exchange trades of equity-linked derivatives as evidence of the growing expansion of global derivatives markets. In the OTC markets, an annual average growth rate of 22% in the outstanding amounts of OTC derivatives was registered, with a particular boost from the segment for collateralised debt securities (CDS) which levelled at an outstanding value close to US$ 60 billion at end of June 2008.

Figure 1. The Pre-crisis OTC and Exchange-traded Equity Derivatives Trading



Source: Davydoff and Naacke (2009:6)

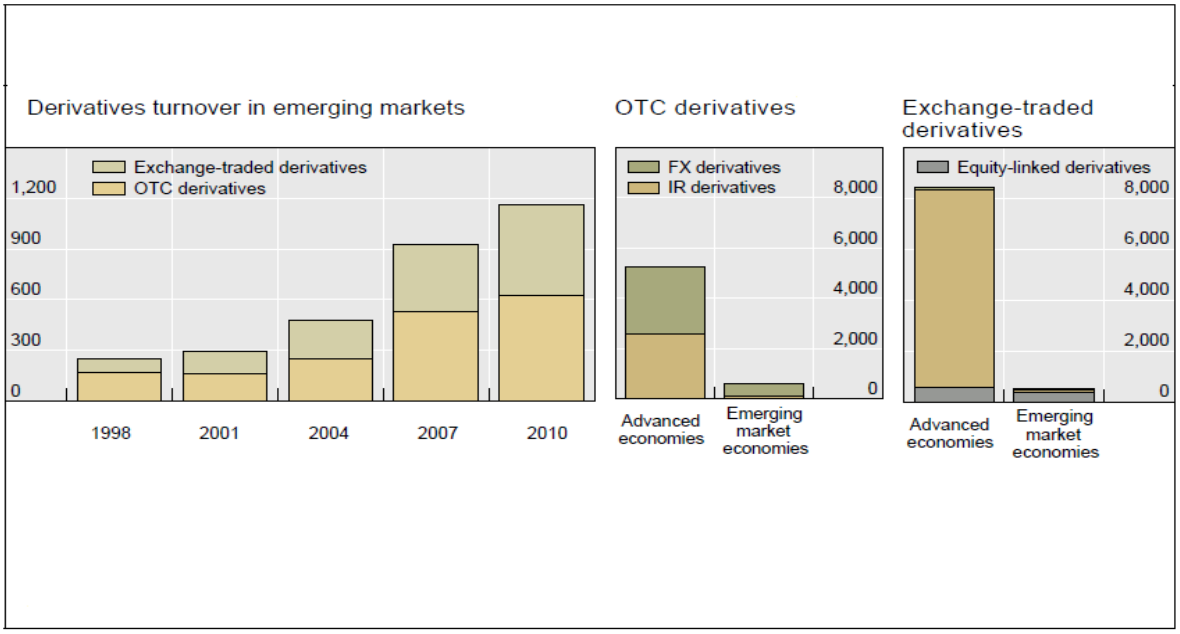
From a global perspective, the use of derivatives as instruments has continued to be significant in both exchange-traded and OTC markets (Van Wyk , 2012).

3. Development of derivatives in emerging markets

The number of local derivatives markets in developing countries has been rapidly growing since the 1990s. Starting in the late 1980s, larger emerging economies became established and increasingly used futures markets as a possible solution to the financial volatility. Thus, markets for financial derivatives were initiated in Hong Kong, Japan, Brazil, and South Africa in the 1980s. The exchange in South Africa lists among the deepest and most liquid fixed

income derivatives markets. The JSE also figures among the most active traders of equity index derivatives; and a local credit derivatives activity is even currently developing there (Lien and Zhang, 2008). Figure 2 below shows that developing countries trade derivatives almost in equal proportions OTC and on exchanges.

Figure 2. Derivatives turnover in advanced and emerging markets



Source: Mihaljek and Packer (2010:45)

4. Literature review

Derivatives are financial instruments whose value is derived from the future price of underlying products such as equities and equity indices, bonds, loans, interest rates, exchange rates, commodities, mortgages, and even catastrophes like earthquakes and droughts (Vander Stichele, Kerckhoffs, and Van Os, 2010). In effect, the term 'derivative' comes from the fact that the value of these financial instruments or contracts derives from that of an underlying asset. These instruments consist of contracts that strive to derive payoffs from changes in the value/price of their underlying asset/product. As such, they come in many shapes and forms including forwards, futures, options, swaps, and various combinations thereof.

4.1 Derivatives, capital market development and economic growth

Derivatives contracts have been in use for quite some time and in the past they were known as 'grain loan'. The first of such instruments emerged as devices for evading fluctuations in the price of grains: for a price (in grain or silver) paid at the time the contract was entered into (before planting), a seller agreed to deliver a large amount of grain in the future (after harvest) (Swan, 2000). These kinds of commodity-linked instruments remained the solely existing form of derivatives for many subsequent centuries, until the emergence of the now renowned financial derivatives in the 1970s as a result of growing global financial instability.

After the publication of the option pricing formula (the Black-Scholes-Merton model) and the creation of options markets in 1973, as well as the almost concurrent abolition of the Bretton Wood system that promoted fixed exchange rates among major currencies, the world of financial derivatives has seen an impressive growth of products derived from new underlying assets, including interest rates, foreign exchange rates, stocks, stock indices, bonds, swaps and even credits (Dubil, 2007; Chance, 1998). Nowadays, financial derivatives have become well accepted as the driving force of the global financial market as these have kept growing in terms of the variety of instruments and complexity (Chance, 2003).

The development of the derivatives market can be the result of the willingness by some economic agents, like large institutional investors, to protect themselves against the uncertainties of fluctuating financial asset prices. The very high degree of volatility characterising the modern financial markets provide good a ground for using these instruments. In the case of derivatives, it becomes possible to transfer price risks, and thus to minimise the impact of fluctuating asset prices with regard to the profitability and cash flow situation of the risk-averse investors.

Given underdeveloped capital markets in developing countries, implementing financial initiatives has essentially been aimed at opening up these markets to greater private capital flows and a wider range of capital vehicles such as stocks and bonds. So, some new sets of parallel financial transactions – for instance those involving derivatives need to come along with the transformation of capital markets so as to become integral to financial markets, contribute to financial sectors development, and help countries to grow overall (Dodd, 2002).

Bush (2012) argues that derivatives can help developing countries address their vulnerabilities without government intervening in the underlying markets and spending unnecessary public money. For this reason, derivatives advocacy in the development of such countries has been gaining serious momentum. These instruments are used as a potential medium to respond to the ever-increasing global markets' volatility, more precarious livelihoods, the rising prominence and sophistication of global financial markets and actors, and among poor countries, a growing discontent with the global economic system.

The derivatives markets in the developing countries have remained relatively small compared to those in advanced economies; nonetheless derivatives have shown sustained growth despite the 2009 slowdown (Mihaljek and Packer, 2010).

Developing countries' growing international trade relations, coupled with the rapid spread of financial globalisation, as well as the individual progressive regulatory reforms in countries, constitute some fairly good reasons for encouraging booming derivatives markets in the developing world (Mihaljek and Packer, 2010). The fastest growing derivatives exchanges in the world are located in China and India (Bush, 2012).

Derivative instruments are now recognised as some cost-efficient tools of risk management in the developing world, and countries that do not provide such globally accepted risk management facilities are disadvantaged in the prevailing rapidly integrating global economy (Lien and Zhang, 2008). Although not every country has a derivatives market or even a stock exchange, the number of derivatives exchanges in developing countries is rising. Most of the larger and more prosperous emerging market economies now have them and more will follow soon (Dodd, 2006). These developing countries already have long-term plans underway to introduce local derivatives exchanges (Lien and Zhang, 2008).

Kirkpatrick (2000) emphasised the fact that the size and depth of the financial system is an important contributor to economic growth, as it is the key determinant of a country's savings and investment capabilities. A larger and deeper financial system enhances a country's ability to benefit from economies of scale while at the same time pushing towards the relief of credit constraints.

Kumari (2011) argues that the growth of derivatives markets in the developing parts of the globe may become a remarkable factor for the development of capital markets in developing countries. However, in the absence of efficient bond and stock markets, funds for business expansion may shrink, resulting in a reduction of business activity, high unemployment, and slow growth (Mishkin and Eakins, 2012).

Banks commonly buy and sell derivatives as a natural extension of their activities in the financial markets (Chance, 2003). To illustrate: accepting interest rate risk is a normal part of the activity of banks. Changing interest rates affect banks' earnings because it has an effect on their net interest income and the level of other interest – sensitive income and operating expenses. Hedging, using derivative securities is an effective way for maintaining banks' risks within some prudential levels, thus guaranteeing the safety and soundness of banks (Srivastava and Srivastava, 2010).

The participation of banks in derivatives markets results in the modernisation of banking systems, which involves increasing globalisation of banks' financial activities (National Stock Exchange of India, 2009) as well as an increase of the efficiency of banks in developing countries (Rivas, Ozuna and Policastro, 2006).

Despite some evidence of the negative impact an unstable banking system may have on the economy, banks play a vital role in supporting economic growth: the larger the banking system, the more capital is able flow from savers to investors in a way capable of enhancing financial development, thus leading to greater economic growth (Kirkpatrick, 2000).

The need for bigger financial markets makes it necessary for new financial instruments to emerge in developing financial markets as more complete market structures require the presence of equity, debt and derivatives markets (Raghu and Zeineddine, 2007).

Accordingly, the trend in the majority of developing countries' financial development initiatives is toward the increasing use of derivatives in order to develop some efficient local markets for stocks and bonds. Such a structural modernisation of domestic financial markets is vital for enhancing financial intermediation and stability as well as for sustaining economic growth (Sreenu, 2012).

The development of these markets is indeed seen by financial professionals as a vehicle for improved efficiency and stability in financial intermediation, enhanced cross-border lending and new opportunities for mitigating exchange rates and other financial risks (Mathieson and Roldos, 2004).

The use of derivatives is more inclined to unpredictability in the markets of stock and stock indices they underlie, thereby leading to a certain extent of greater liquidity and stability in these markets (Siopis and Lyroudi, 2007; Kapadia, 2006). Furthermore, Wells (2004) established that active equity derivatives markets do not harm the equity cash markets at all. According to Wells (2004), there is generally a strong link between the development of an equity cash market and a derivatives market, because higher levels of derivatives trading tend to be associated with a high level of cash stock trading.

Likewise, the use of derivatives in developing debt markets can be conducive to significant transformation within these markets. Hence, the increasing availability of derivatives instruments tends to facilitate the broadening of debts markets in emerging market countries (OECD, World Bank and IMF, 2007).

Kirkpatrick (2000) established that efficient stock and bond markets on their own can significantly contribute to a country's growth. The liquidity of a stock market can have a positive influence on capital accumulation, productivity growth, and thus the current and future rates of economic growth. Indeed, stock markets encourage long-term growth by promoting specialisation, the acquisition and dissemination of information, and the mobilisation of efficient savings in order to promote investment. Similarly, bond markets play an important role in financial development and the effective allocation of capital. With derivatives, investors are allowed to generate more profits on shares and bonds (Schwegler, 2010; Kirkpatrick, 2000). Consequently, the markets for derivatives instruments are some confidence enhancers capable of encouraging international investors to participate in local bond and stock markets, and hence of increasing the flow of international capital into a particular country.

Rodrigues, Schwarzand, and Seeger (2012) unveiled three major channels through which derivatives markets can influence a country's economic growth: (1) as an integral part of financial markets and through the influence they exert on the development these markets; (2) through the role they hold in expanding business activities within a given country; and (3) via their effects on economic growth volatility.

As an integral part of modern financial markets, derivatives can have an impact on the investment behaviour of the users of these markets, thus helping to channel the resources available therein into growth (Rodrigues et al., 2012). Haiss and Sammer (2010) argue that derivatives may influence a particular country's economic development, as they are valuable financial instruments that have an important bearing on financial markets.

The literature reviewed in this section shows that derivatives may be useful tools in the financial sector and that they can probably improve capital markets and ultimately enhance economic growth. All the findings of the literature referred to in this article and confirming the usefulness of derivatives arose from case studies. There is a need to test these findings empirically, hence the focus of this article. The following section tests the linkages between derivatives and capital markets development and also between derivatives and economic growth empirically.

5. Data, empirical model specification and estimation techniques

Having examined as part of the study's literature component the potential impact of derivatives markets on capital markets' development and economic growth, the attention is now focused on the empirical aspects of the investigation of the nature of the relationship between the South African derivative trading and capital markets.

5.1Data sources and the definition of variables

The study used annual time series data for the period between 1994 and 2012 and all data used in the research were obtained from the McGregor data base and the central bank of South Africa. The analysis pertaining to the causal relationship between the three main parameters under consideration was restricted to 1994–2012 due to the apparent lack of derivatives exchange activity data before 1994. The trading volume of derivatives was computed as a total volume of all derivative instruments traded on the JSE in the month under consideration. JSE all share market capitalisation was used as a proxy for capital market development while the GDP per capita was used as a proxy for economic growth. Initially, in an attempt to establish a long-run cointegration relationship between derivative trading and the growth variables under consideration, the Autoregressive Distributed Lag (ARDL)-bound testing approach by Pesaran, Shin and Smith (2001) model was adapted. Finally, the Granger causality test was performed to determine the nexus between derivative trading and the two growth variables.

5.2 Unit root tests

The data sets of three variables (Derivative trading volumes (DTV), JSE all share capitalisation (JSEA) and GDP per capita (GDPc)) were tested for stationarity using Phillip-Perron and Augmented Dickey Fuller tests before they were tested for cointegration – using the ARDL-bounds approach. The results of the stationarity tests on differenced variables are presented in Table 1.

Table 1. Stationarity tests of variables on first difference – Augmented Dickey Fuller (ADF) test and Phillips-Perron (PP) test

Variable	No trend	Trend	Intercept
Stationary tests of variables on fist difference – **Augmented Dickey Fuller (ADF) test**			
DTV	-3.5821***	-3.2180	-3.3631**
JSEA	-6.6660***	-6.1506***	-6.5440***
GDPc	-3.5821***	-3.2180	-3.3631**
Stationary tests of variables on fist difference – **Phillips-Perron (PP) test**			
DTV	-5.7823***	-6.2642***	-5.8236***
JSEA	-6.9226***	-6.1506***	-6.5440***
GDPc	-5.7823***	-6.2642***	-5.8236***

*** *Denotes 1% level of significance*
** *Denotes 5% level of significance*

Using the Phillips-Perron (PP) criterion the results in the table above show that the hypothesis that first difference of derivative trading volumes, JSE all share capitalisation and GDP per capita have unit roots that can be rejected.

5.3 Cointegration test – ARDL-bounds testing procedure

To establish a long-run cointegration relationship between derivative trading and growth variables the ARDL-bounds testing approach as per the model by Pesaran et al. (2001) was adopted. The ARDL approach is unique and superior in that it does not require all the variables under investigation to be integrated in the same order. The ARDL approach can therefore be used in a situation even if the regressors are integrated in any order that is order one (I(1)), order zero (I(0)) or partially integrated (Pesaran and Pesaran, 1997). Laurenceson (2003) argues that using the ARDL approach avoids problems resulting from non-stationary time series data.

The ARDL framework for equation 1, 2, 3 and 4 is as follows:

$$\Delta DTV_t = \mu_0 + \sum_{i=1}^{n} \gamma_{1i} \Delta DTV_{t-i} + \sum_{i=1}^{n} \gamma_{2i} \Delta JSEA_{t-i} + \gamma_3 DTV_{t-1} + \gamma_4 JSEA_{t-1} + \varepsilon_t \quad (1)$$

$$\Delta JSEA_t = \kappa_0 + \sum_{i=1}^{n} \phi_{1i} \Delta JSEA_{t-i} + \sum_{i=1}^{n} \phi_{2i} \Delta DTV_{t-i} + \phi_3 JSEA_{t-1} + \phi_4 DTV_{t-1} + \varepsilon_t \quad (2)$$

$$\Delta DTV_t = \alpha_0 + \sum_{i=1}^{n} \beta_{1i} \Delta DTV_{t-i} + \sum_{i=1}^{n} \beta_{2i} \Delta GDPc_{t-i} + \beta_3 DTV_{t-1} + \beta_4 GDPc_{t-1} + \varepsilon_t \quad (3)$$

$$\Delta GDPc_t = \varphi_0 + \sum_{i=1}^{n} \rho_{1i} \Delta GDPc_{t-i} + \sum_{i=1}^{n} \rho_{2i} \Delta DTV_{t-i} + \rho_3 GDPc_{t-1} + \rho_4 DTV_{t-1} + \varepsilon_t \quad (4)$$

Where Δ – first difference operator, DTV – derivatives trading volume, JSEA – JSE all share capitalisation, GDPc – GDP per capita. In the above equations, the terms with the summation signs represent the error correction dynamics while the second part (terms with γ in equation (1), ϕ in equation (2), β in equation (3), and ρ in equation (4)) corresponds to the long-run relationship. The null hypotheses in 1, 2, 3 and 4 are: $\gamma_3 = \gamma_4 = 0,\ \phi_3 = \phi_4 = 0,\ \beta_3 = \beta_4 = 0, and\ \ \rho_3 = \rho_4 = 0$, respectively, which indicate the non-existence of the long-run relationship. The first step of the ARDL-bounds testing requires examining the order of lags on the first differenced variables in equations 1, 2, 3, and 4 using the Akaike information criterion (AIC) and the Schwartz-Bayesian criterion (SBC). The results of the AIC and the SBC suggest that optimal lag for DTV and JSEA is 4, while the optimal lag for DTV and GDPc is 5. The second step requires one to apply the bounds F-test to equations 1, 2, 3, and 4 in order to determine whether any long-run relationship between derivative trading and growth variables exists.

Table 2. Bounds F-test

Dependent variable		Function	F-test statistic
DTV		DTV (JSEA)	6.6980**
JSEA		JSEA (DTV)	60.6056
DTV		DTV (GDPc)	31.4400
GDPc		GDPc (DTV)	0.1747

** *Denotes 5% level of significance*

The results show that there is no evidence of a long-run relationship between derivatives and GDPc. All other things being equal derivatives are not influenced by economic growth in the long run. To determine whether derivative trading is driven by capital market development in the long run we used Table CI (III) as per Pesaran et al. (2001:300) to determine the asymptotic critical value bounds for the F-statistic since the models had unconstrained intercept and no trend. The lower and upper bounds for the F-test statistic at the 10%, 5%, and 1% significance levels are [4.04 4.78], [4.94 5.73] and [6.84 7.84] respectively. As the value of the F-statistic is above the upper bound at the 5% significance level, in this case it can be concluded that there is evidence of a long-run relationship between the two time-series at this level of significance or greater.

5.4 Granger causality test

Having confirmed the existence of the long-run relationship between derivative trading and capital market development from the bounds F-test integration, the next step was to investigate the Granger causality between the two variables. The Narayan and Smyth (2008) model specification was adapted to test the direction of causality.

$$\Delta DTV_t = \mu_0 + \sum_{i=1}^{n} \gamma_{1i} \Delta DTV_{t-i} + \sum_{i=1}^{n} \gamma_{2i} \Delta JSEA_{t-i} + ECM_{t-1} + \varepsilon_t \quad (5)$$

$$\Delta JSEA_t = \kappa_0 + \sum_{i=1}^{n} \phi_{1i} \Delta JSEA_{t-i} + \sum_{i=1}^{n} \phi_{2i} \Delta DTV_{t-i} + ECM_{t-1} + \varepsilon_t \quad (6)$$

Where ECM_{t-1} is the lagged error-correction term obtained from the long-run equilibrium relationship. The results of these causality tests are reported in Table 3.

Table 3. Granger no-causality test

Dependent variable	Causal flow	F-statistic	t-test on ECM	R^2
Derivative Trading (DDTV)	Capital market growth (DJSEA) $\longrightarrow$ Derivative trading (DDTV)	7.06391	-2.984118	0.4157
Capital Market growth (DJSEA)	Derivative trading (DDTV) $\longrightarrow$ Capital market growth (DJSEA)	0.47585	-	-

According to the empirical results reflected in Table 3 there is a unidirectional Granger causality running from capital market development to derivatives trading both in the short and the long run. The F-statistic and the coefficient of the error-correction term in the derivative trading function are statistically significant. Results also revealed that derivative trading does not Granger cause capital market development.

6. Conclusion

Focusing on the role played by derivatives in development of capital markets and economic growth, viewed within the context of 2009/10 financial crisis, the research attempted to empirically determine the relationship between derivatives and capital markets development and also between derivatives and economic growth. This was done with the aim of establishing whether there is any causal relationship between derivatives and the two economic variables under consideration.

The evidence used was based on the Johannesburg Stock Exchange (JSE) market capitalisation and South Africa Gross domestic Product (GDP) per capita from 1994 to the end of 2012. The Autoregressive Distributed Lag (ARDL)-bound test approach and Granger causality testing were utilised in an attempt to find the nexus between derivatives trading and capital markets development, and also between derivative trading and economic growth.

The results that are reported in this article are consistent with the view that there is a significant long-run relationship between derivatives and capital market development. Further tests indicated that there is a unidirectional Granger causality running from capital market development to derivatives both in the short run and the long run, implying that derivatives do not Granger-cause capital market development. Results also revealed that there is no direct linkage between derivatives and economic growth. The findings are consistent with the findings of Baluch and Ariff (2007) who found that derivatives do not correlate with economic growth significantly.

The results are contrary to the general belief

(Dodd, 2002; Kapadia, 2006; Tiberiu, 2007; Kumari, 2011; Bush, 2012) that derivatives have an indirect relationship with economic growth. To be more precise, derivatives are generally deemed to positively influence economic growth through capital market development. This cannot be the case as it has been shown in this article that derivatives do not influence capital market development; rather it is capital market development that influences derivatives. It is financial deepening that creates a platform for the creation of new derivative products and calls for more risk management techniques.

Based on the overall observation of the interaction of derivatives, growth in capital markets and economic growth, it is recommended that emerging markets such as the South African one should follow the capital market model. Though results indicate that derivatives are not correlated to economic growth there could be a transmission mechanism between these variables. The outcome of this research also revealed that capital market development influences derivate market growth, a conclusion which calls for further investigation.

An analysis of derivatives as presumably having a direct linkage with economic growth and capital market developments could have been the major drawback of this study. It is suggested that future studies focus on the analysis of derivatives through different mechanisms that can possibly influence capital market growth and ultimately economic growth. This could mean investigating how derivatives enhance capital market development through mechanisms such as liquidity and efficiency, leverage, reduction of transaction costs and their role as risk management tools. An understanding of the interconnections between these elements will help finance professionals appreciate the role of derivatives in financial markets.

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INVESTORS' TRADING AND RELATIVE PERFORMANCE OF ANALYSTS DURING THE CRISIS PERIOD

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Abstract

This paper documents the relationship between foreign and local analysts' recommendations and subsequent trades done by different investor groups – foreign investors, local institutional investors, and local individual investors. Using analysts' recommendations and investors' trading data from South Korea, we show that foreign analysts' buy recommendations and local analysts' sell recommendations generate significantly more subsequent trade than their respective counterpart recommendations (i.e. local analysts' buy and foreign analysts' sell recommendations) during the Asian financial crisis of 1997-98. We argue that the ability of foreign analysts' buy recommendations and local analysts' sell recommendations to generate trade is responsible for superior performance foreign analysts' buy recommendations and local analysts' sell recommendations in emerging stock markets. We also show that earlier explanations proposed to explain the asymmetric performance of foreign and local analysts' recommendations do not hold in our sample period.

Keywords: Analyst Recommendations; Asian Financial Crisis; Foreign and Local Analysts; Investor Trading; Optimism; Relative Performance

JEL classification*:* G15, G24

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1. Introduction

Recent strand of literature documents asymmetry in the performance of foreign and local analysts' stock recommendations in emerging markets. Lai and Teo (2008) and Farooq (2013) document that foreign analysts' buy recommendations outperform local analysts' buy recommendations, while local analysts' sell recommendations perform better than foreign analysts' sell recommendations. These results are in contrast with the findings of earlier studies that report complete information advantage of one group over another. For instance, Malloy (2005) maintains that "the ability of local analysts to make house calls rather than conference calls, during which time they can meet CEOs face-to-face and survey the firm's operations directly, provides them with an opportunity to obtain valuable private information". Geographic proximity of local analysts with the firms, therefore, translates into better performance of these analysts relative to geographically distant foreign analysts (Chang, 2010; Bae et al., 2008). Higgins (2002) and Bacmann and Bolliger (2001), however, report the opposite results by arguing that due to access to better resources, broader expertise, and greater talent, foreign analysts outperform local analysts. Better resources and greater talent, therefore, convert available information into more valuable forecasts and recommendations.

This paper argues that usual information centric arguments that hold analysts' ability to acquire better quality information (i.e. main argument in favor of local analyst advantage) or their ability to process given information more efficiently (i.e. main argument in favor of foreign analyst advantage) cannot explain the findings of Lai and Teo (2008) and Farooq (2013). For information centric arguments to hold, one group should completely outperform the other in buy as well as in sell recommendations. In this paper, we depart from the information centric arguments by proposing that certain type of recommendations influence investors' trading behavior more than the others during the periods of extreme uncertainties. We argue that that the way investors react to analysts' recommendations can explain the findings of Lai and Teo (2008) and Farooq (2013) better than the information centric arguments. Using analysts' recommendations and investors' trading data from South Korea, we show that foreign analysts' buy recommendations and local analysts' sell recommendations generate significantly more subsequent trade than their respective counterpart recommendations (i.e. local analysts' buy and foreign analysts' sell recommendations) during the Asian

financial crisis of 1997-98. Our results show that foreign analysts' buy recommendations generate significant buying from foreign investors – most of which are institutional investors. The buying trend of foreign investors is persistent and increasing over time. We argue that foreign investors, being risk averse, are more inclined to buy those stocks where they have outside analysts to blame if their investment turns out to be a failure. On the contrary, local analysts' buy recommendations, apart from generating significant buying from local institutional investors, generate significant selling from local individual investors – the biggest group of investors in the Korea Stock Exchange. No significant selling is observed in response to foreign analysts' buy recommendations. Consistent with the prior literature, we argue that significant buying by foreign investors – in response to foreign analysts' buy recommendations – should have a positive impact on stock prices (Clark and Berko, 1997; Froot, et al., 2001). Therefore, we observe significant positive returns following foreign analysts' buy recommendations. In contrast to foreign analysts' buy recommendations, local analysts' buy recommendations are not followed by significant positive returns due to the fact that their recommendations not only generate significant buying from local institutional investors but also generate significant selling from local individual investors. We argue that this significant buying and selling should result in no price appreciation, thereby resulting in lower performance of buy recommendations issued by local analysts. Consequently, foreign analysts' buy recommendations outperform local analysts' buy recommendations during the Asian financial crisis. Our results show that returns following foreign analysts' buy recommendations are significantly higher than returns following local analysts' buy recommendations during the Asian financial crisis.

Our results also show that foreign analysts' sell recommendations generate no significant selling from any group of investor except from local institutional investors who engage in significant selling during the first two days of trading during the post-recommendation period. However, local individual investors buy in response to these recommendations, thereby minimizing any impact that local institutional investors may have on subsequent returns. In contrast to foreign analysts' sell recommendations, local analysts' sell recommendations generate significant post-recommendation selling over a period of approximately four weeks from local institutional investors during our sample period. The selling pattern of local institutional investors appears to be persistent and increasing over time indicating that local institutional investors gradually increase their selling in response to local analysts' sell recommendations. We argue that significant and persistent selling from local institutional investors following local analysts' sell recommendations should have a negative impact on prices during the crisis period, thereby decreasing their prices more than the prices of stock that are recommended as sell by foreign analysts. As a result of this, local analysts' sell recommendations outperform foreign analysts' sell recommendations. We show that returns following local analysts' sell recommendations are significantly lower than returns following foreign analysts' sell recommendations during the Asian financial crisis.

Our explanation differs from the arguments cited by Lai and Teo (2008). They argue that the asymmetry in the performance of foreign and local analysts' recommendations is due to the fact that local analysts are overly optimistic in their recommendations. Because local analysts are more eager to issue buy recommendations, a buy recommendation issued by a local analyst carries less information than a more carefully issued recommendation by a foreign analyst. For sell recommendations, they suggest that local analysts' optimism would produce the opposite results. Since local analysts are more reluctant to issue sell recommendations as compared to foreign analysts, their sell recommendations tend to be better justified than foreign analysts' sell recommendations. In contrast to Lai and Teo (2008), we show that optimism cannot be the reason for asymmetry in the performance of foreign and local analysts' recommendations during the crisis period. Our results show no significant difference in the optimism between foreign and local analysts during our sample period.

The remainder of the paper will proceed as follows: Section 2 presents the motivation and background for this paper. Section 3 documents the data and presents summary statistics. Section 4 reports the assessment of our hypothesis. Section 5 tests whether the alternate arguments that explain the asymmetry in relative performance of foreign and local analysts holds or not. The paper ends with Section 6 where we present conclusions.

2. Motivation and background

2.1 Impact of foreign and local analysts' recommendations on the trading behavior of different investor groups

Traditional literature on the "prudent-man rule" and institutional investment suggests that institutional investors base their investment decisions on the fiduciary responsibilities that accompany while handling clients' funds.[1] Since the performance and investment choices of institutional investors are continually monitored and evaluated, they tend to make sure that their investment decisions are not only

[1] The prudent-man rule suggests that, in the absence of law regarding the types of investments undertaken by the fiduciary, the fiduciary must perform his duties with care, skill, prudence, and diligence.

practically sound, but also regarded by others as decisions which are reasonable, well-informed, and prudent (Badrinath et al., 1989). Furthermore, the law also lays down several constraints, including severe penalties in case of irresponsible investment behavior by the institutional investors. Managers have to explain their decisions if their investment decision turn out to be bad. Curzio (1987) mentions that "…if a fund manager invests $10 million in a B- stock and it collapse, he may very well risk his job. If the $10 million was invested in B+ or higher rated stock, and it collapsed, his investment was justified".

The need to be prudent becomes more important during the times of extreme economic uncertainty, i.e. the crisis period. However, during such times, a safety-net may be provided to the managers if they can demonstrate that their assessment regarding the soundness of a particular investment choice was shared by the others. Badrinath et al. (1989) document that level of institutional holdings is an increasing function of the safety-net potential of a particular stock. We argue that foreign institutional investors (henceforth foreign investors), being more prone to monitoring and subsequent legal penalties, are the ones who show more prudent investment behavior if the countries they are investing in experience crisis. As a result, they may base their investment decisions on the recommendations issued by financial analysts, who are considered to be more informed. By doing so, foreign investors can effectively justify their decisions ex-post, in case any of their decisions lead to much worse performance than the relevant benchmark. Furthermore, we expect them to base their buy or hold decisions more than their sell decisions on analysts' recommendations. Sell decisions are, usually, governed by the Principal's requirements, who can simply force investment managers to exit the stocks irrespective of analysts' recommendations during the periods of crisis. Prior literature documents that large depreciation of currency and decline in equity prices in crisis-hit countries caused foreign investors to incur large capital losses (Singh, 1998).[2] These losses induced foreign investors to sell their holdings for rebalancing their assets irrespective of analysts' recommendations. Therefore, it is reasonable to imply that foreign analysts, who are more accessible to foreign investors, are able to influence foreign investors' trade more with their buy recommendations than with their sell recommendations during a period of crisis.

On the other hand, given their personal relationships with firms, it is relatively hard for local institutional investors to exit the firms' stocks during the crisis period (i.e. the time when the firms need them the most) in comparison to foreign investors (Rajan and Zingales, 1998).[3] This reluctance to exit the firms' stocks may be compounded by the fact that local institutional investors in the Asian markets face lesser legal penalties as compared to their foreign counterparts in case of any imprudent investment decision. It implies that we may expect local institutional investors to sell out only when it is absolutely sure that the firm will perform badly and local analysts' sell recommendations provide good indication about the firms that are expected to perform badly. Therefore, there is a higher possibility that local institutional investors base their sell trade more than their buy trade on analysts' recommendations. Given that local analysts are more accessible to local institutional investors, we argue that local analysts' sell recommendations can generate more trade from local institutional investors than their buy recommendations during a period of crisis.

Furthermore, prior literature on the Asian financial crisis of 1997-98 suggests that foreign investors were net buyers and local investors were net sellers. For example, Stultz et al. (2008), while studying South Korea, document that foreign investors had positive net inflows, while local investors had negative net inflows during the crisis period. Kamesaka and Wang (2001) and Vimilsiri (2001) also document similar findings for Indonesia and Thailand respectively. These observations indicate that foreign analysts' buy recommendations and local analysts' sell recommendations were more influential in generating subsequent trade during the period of crisis.

2.2 Investors' trading behavior and the relative performance of foreign and local analysts' recommendations

The ability of foreign analysts' buy recommendations and local analysts' sell recommendations to generate significant trade is not of much interest, if it has no implications for returns. Consistent with the prior literature, we argue that there is a strong link between trading and subsequent stock returns. Froot et al. (2001) study foreign inflows in emerging stock markets and show that local stock prices are sensitive to foreign investors' inflows. They document that inflows have a positive impact on future stock returns. One of the explanations put forward to explain the relationship between foreign investors' inflows and subsequent stock returns is that foreign investors, most of which are big financial institutions, have huge sums of money to invest in stocks. By investing huge sums of money, they are able to affect the stock prices significantly. In a related study, Gompers and Metrick (2001) investigate equity holdings of large institutions

[2] The net foreign equity portfolio investment in South Korea during the period between July 1997 to December 1997 was negative (Source: The Bank of Korea).

[3] Rajan and Zingales (1998) argue that local institutional investors used to get above market rate of returns from the firms during the periods when the firms were performing well, and in turn they would help the firms by providing capital with below market rate during the periods when the firms were performing bad.

from 1980 to 1996 and document that demand shocks generated by the large institutional investors can explain nearly 50 percent of increase in the stock prices of large firms relative to the stock prices of small firms. The relationship between foreign investors' trading and the subsequent stock returns is not confined to tranquil periods alone. In fact, it has shown to persist even during the periods of economy wide crisis. Kamesaka and Wang (2005) analyze Thai stock market during the Asian financial crisis and document that foreign investors' buying resulted in significant positive returns as compared to local buying. In another related study, Clark and Berko (1996) examine Mexican stock market and document that unexpected inflows of 1 percent of the market's capitalization drive prices up by 13 percent during the 1993 Mexican crisis.

Similar arguments can be floated to argue that any significant outflows should have negative impact on stock prices and returns. Chan and Lakonishok (1995), for instance, analyze the trades of 37 large investment management firms in the USA and document average price change of negative 0.35 percent due to excessive sell trade. Consistent with arguments highlighted above, we claim that the supply shocks generated due to the withdrawal of significant sums of money from the equity market by institutional investors is the reason for this price decline.

Some researchers argue that this permanent effect on prices might be due to the fact that institutional investors trade on information that is not already incorporated in the market. This explanation does hold an intuitive appeal, but a number of empirical studies, especially those on the compositional changes in the S&P 500 index, argue that not all of the price impact is attributed to information (Garry and Goetzmann, 1986; Shleifer, 1986; Harris and Gurel, 1986; Dhillon and Johnson, 1991; Beneish and Whaley, 1996; Lynch and Mendenhall, 1997). This strand of literature illustrates that the price impact of institutional investors' trade is due to the supply and demand shocks that are created due to these trades. The inclusion of a stock in the S&P 500 index immediately creates a demand for that stock, which eventually translates into a permanent price increase. Since Standard & Poors adds a stock to the S&P 500 index solely based on the public information, no new information is conveyed to the market participants about the true value of stock when a stock is added in the index. For information related arguments to hold, we should expect no or a small and transitory price impact. However, we do see a price impact that is permanent rather than transitory. In a related study, Goetzmann and Massa (2003) examine how changing demand for a specific portfolio, i.e. the S&P 500, relates to its price dynamics on a daily and an intraday level. They find evidence of a strong same-day relationship between demand for index fund shares and the movement of the S&P 500. They test and reject the hypothesis that this contemporaneous effect results from trend following and find little evidence of trend following at the daily level. They find a significant positive correlation of inflows and contemporaneous returns and a significant negative correlation between outflows and contemporaneous returns. They also document that this effect is permanent rather than transitory. The reason for the permanent effect of supply and demand shocks is that if there are insufficient close substitutes for a particular firm's stock, a seller might be faced with a downward-sloping demand curve, which will necessitate discount in stock price for the transaction to take place. Likewise, a buyer might be faced with an upward-sloping supply curve, which will mean that for the large transaction to occur a premium will be necessary. This explanation predicts a permanent price effect or at least a slower price rebound.

Given the impact of investors' trading on stock prices, we argue that the relative performance of foreign and local analysts' recommendations can be partly explained by the impact that their recommendations have on the trading behavior of investors. We have already argued that foreign analysts' buy recommendations and local analysts' sell recommendations have greater ability to influence investors than their counterpart recommendations (i.e. local analysts' buy recommendations and foreign analysts' sell recommendations) during the periods of crisis. This ability of recommendations to generate trade, eventually, leads to their superior performance relative to their counterpart recommendations (i.e. local analysts' buy and foreign analysts' sell recommendations).

3. Data

We conduct our analyses using the data from South Korea. South Korea was chosen due to the availability of trading data regarding different investor groups. The sample period for this study is from July 2, 1997 to August 31, 1998 (Mitton, 2002).[4] We will, briefly, discuss the data in the following sub-sections.

3.1 Classification of analysts

Analysts are classified as foreign or local based on the country of origin of the brokerage houses that employ them. Analysts working for local brokerage houses are classified as local analysts, while analysts working for foreign brokerage houses are classified as foreign

[4] The beginning of the crisis period corresponds to the devaluation of the Thai baht on July 2, 1997. Most of the literature on Southeast Asian financial crisis considers devaluation of the Thai baht as a starting point of the crisis. July 2, 1997 also corresponds to the date when stock markets of all four crisis hit countries, i.e. Indonesia, Malaysia, Thailand, and South Korea began their downward movement together. The ending point of the crisis period corresponds with the date on which all of the crisis hit stock markets began a sustained upward movement.

analysts.[5] For the purpose of this paper, we leave out those foreign analysts from our analyses that have local presence in South Korea. We obtain information about the location of head-offices of brokerage houses from brokerage houses' websites and www.Business.com.

It was hard to find out if a particular brokerage house had a local presence or not during the Asian financial crisis. Websites of security exchange commissions, brokerage houses, or stock exchanges do not provide much information on that. We, however, used the information provided in the IBES Detail International History-Recommendation file to separate out those brokerage houses that had local presence during the crisis period from those that did not have the local presence. The IBES file assigns a unique code to each of the contributing brokerage house. Brokerage houses having several subsidiaries have separate code for each subsidiary. For instance, J. P. Morgan operates across the globe having subsidiaries in all parts of the world. I/B/E/S assigns a unique code to each of its subsidiary. We exploit this property of I/B/E/S data to find out which brokerage house had local presence and which did not have local presence during the period understudy. The basic assumption that we make in this process is that if a brokerage house has a local presence, it should issue the largest number of its recommendations for firms located in that country. Therefore, if a brokerage house issues the largest number of its recommendations for stocks in country *x*, we classify it as having local presence in country *x*.

Table 1 presents descriptive statistics for foreign and local brokerage houses in our sample. It is noteworthy to mention that South Korea attracted substantial interest from foreign brokerage houses during the Asian financial crisis. The number of foreign brokerage houses, in fact, exceeded the number of local brokerage houses during our analysis period. Table 1 also shows that foreign analysts cover a smaller number of firms than local analysts.[6] An important observation in the table is that foreign analysts issue more recommendations per firm than local analysts. More frequent revisions indicate that foreign analysts scrutinize firms more closely than local analysts. Table 1 also shows that, on average, foreign analysts issued recommendations for firms with high market capitalization relative to local analysts.

3.2 Trading data

The data provided by the Korea Stock Exchange allows us to distinguish between trades made by different investor groups. The data classifies investors as: (1) Securities companies, (2) Insurance companies, (3) Investment trusts, (4) Banks, (5) Other finance companies, (6) Funds, (7) Local individual investors, (8) Foreign investors, and (9) Others. For the purpose of this paper, we aggregate the first six types of investors and refer to them as local institutional investors. This study, thus, use three groups of investors, i.e. local institutional investors, local individual investors, and foreign investors. We exclude group (9) from our analysis.

3.3 Analyst recommendations

We obtain analyst recommendations data from the IBES Detail International History-Recommendation file.[7] The IBES provides a data entry for each recommendation announcement by each analyst whose brokerage house contributes to the database. Each observation in the file represents the issuance of a recommendation by a particular brokerage house for a specific firm. For instance, one observation would be a recommendation by Brokerage House ABC regarding Firm XYZ. Therefore, there is no distinction between "analyst" recommendations and "brokerage house" recommendations in our sample. Table 2 shows that firms from ten different industries are represented in the sample. Our classification of industries is based on Industry Classification Benchmark (ICB). ICB classification has been created by FTSE. It shows that foreign and local analysts issued most of their recommendations for firms in the industrial sector in South Korea during the crisis period. This reflects the fact that the South Korean economy is a manufacturing based economy. Basic Materials is another sector that attracted significant analyst following.

[5] We recognize the importance of personal characteristics of analysts in determining their performance, but for this study we have deliberately ignored them. Prior literature also documents that personal characteristics of analysts are less important in Asian emerging markets than Western developed markets.

[6] An unreported result shows that foreign brokerage houses substantially decreased their coverage after the onset of crisis, and local brokerage houses considerably increased their coverage after the onset of crisis. In the period between January 1, 1996 and July 1, 1997 (period prior to crisis), foreign analysts' covered 238 firms in South Korea, while local analysts' coverage for South Korean firms was 499. Substantial decrease in coverage by foreign brokerage houses might be due to increased information asymmetry that resulted after the onset of financial crisis.

[7] The IBES converts the original text recommendations provided by analysts to its own 5-point rating system. Recommendations in the IBES database are subsequently coded as: 1 = Strong Buy, 2 = Buy, 3 = Hold, 4 = Sell, 5 = Strong Sell. As is pointed out in Lai and Teo (2008), analysts in Southeast Asian emerging markets prefer to use 3-point rating scheme. Most of them rate firms as Buy, Hold, or Sell. In such cases, I/B/E/S maps them to 1, 3, and 5, respectively, in their 5-point rating system. Due to wide use of 3-point rating scheme by analysts, there are considerably few buy and underperform recommendations in our sample. Following Lai and Teo (2008), we aggregate IBES ratings 1 and 2 as buy, and 4 and 5 as sell throughout the study.

Table 1. Descriptive statistics regarding brokerage houses

The table shows the basic descriptive for those brokerage houses that issued at least one recommendation in South Korea during the period between July 2, 1997 and August 31, 1998.

	Foreign Analysts	**Local Analysts**
Number of Brokerage Houses	13	4
Number of Firms Covered	159	567
Number of Recommendations	529	1486
Recommendations per Firm	3.32	2.62
Average Market Capitalization on the Recommendation Date (million Korean Won)	1114420	261600

Table 2. Industries followed by foreign and local analysts

This table presents the descriptive statistics for the type of industries covered by foreign and local analysts in South Korea. The sample includes all firms that have at least one recommendation issued by local or foreign analysts. The sample period is from July 2, 1997 to August 31, 1998.

Industries	**Foreign Analysts**	**Local Analysts**
Oil and Gas	3.40%	1.00%
Basic Materials	10.80%	16.20%
Industrial	18.50%	25.00%
Consumer Goods	9.80%	19.50%
Healthcare	0.40%	4.90%
Consumer Services	4.00%	1.80%
Telecommunications	1.10%	0.80%
Utilities	7.80%	2.40%
Financials	7.90%	5.50%
Technology	8.70%	5.70%

Table 3 shows the number and percentage of each type of recommendations issued by foreign and local analysts during the crisis period. In this table, we have characterized all strong buy and buy as buy recommendations, and all underperform and sell as sell recommendations. Contrary to our expectations, our result show that local analysts issue a higher percentage of their recommendations as sell and a smaller percentage of their recommendations as buy when compared to foreign analysts during our sample period.[8] This is a little surprising because of the dominance of local underwriters in these markets (Lai and Teo, 2008; Sullivan and Unite, 2001; Kim et al., 1995). Faced with higher investment banking pressures, it would have been natural if local analysts had issued a larger number of their recommendations as buy recommendations.

[8] An unreported result shows that foreign analysts issued substantially more percentage of their recommendations as buy recommendations in comparison to local analysts in South Korea during the pre-crisis and the post-crisis periods. To be precise, foreign analysts issued 43% and 50% of their recommendations as buys during the pre-crisis and the post-crisis periods respectively, while corresponding percentage of local analysts' buy recommendations was 28.5% and 29.8%. In case of sell recommendations, there was not enough difference between foreign and local analysts. To be precise, foreign analysts issued 29.3% and 24.1% of their recommendations as sell during the pre-crisis and the post-crisis periods respectively, while corresponding percentage of local analysts' sell recommendations was 25.8% and 28.5%.

Table 3. Type of recommendations issued by foreign and local analysts

This table presents descriptive statistics for the type of recommendations issued by foreign and local analysts in South Korea. The sample period is from July 2, 1997 to August 31, 1998.

Recommendations	Foreign Analysts	Local Analysts
Buy	170 (32.10%)	290 (19.50%)
Hold	167 (31.60%)	562 (37.80%)
Sell	192 (36.30%)	634 (42.70%)

4. Empirical tests

4.1 Influence of foreign and local analysts' recommendations on the trading behavior of different types of investors

In Section 2, we argued that the constraints faced by different groups of investor may lead them to follow certain types of recommendation more than the other. In this section, we will test that argument by analyzing the trade reaction of different investor group in the Korea Stock Exchange to the stock recommendations issued by foreign and local analysts. The Korea Stock Exchange provides daily net buying and selling data of each investor group for all stocks traded on the Exchange. In order to measure the trade reaction of each investor group, we construct a variable that captures the buying pressure for a firm (Malmendier and Shanthikumar, 2007). We call this variable as trade imbalance (TI). The T-day trade imbalance of investor 'x' after the issuance of analyst recommendation on date 't' for a firm 'S' ($TI_{S,x,T,t}$) is defines as follows.[9] In the following equation, investor 'x' can be foreign investors, local institutional investors, or local individual investors. While, $BVol_{S,x,T,t}$ is the number of shares of stock 'S' bought by investor 'x' during T-days of trading after the issuance of analyst recommendation on date 't' and $SVol_{S,x,T,t}$ is the number of shares of stock 'S' sold by investor 'x' during T-days of trading after the issuance of analyst recommendation on date 't'.

$$TI_{S,x,T,t} = \frac{BVol_{S,x,T,t} - SVol_{S,x,T,t}}{BVol_{S,x,T,t} + SVol_{S,x,T,t}} \quad (1)$$

In order to gauge how different groups of investors react to the recommendation issued by foreign or local analysts, we estimate a regression equation with trade imbalance ($TI_{S,x,T,t}$) as a dependent variable and four dummy variables representing foreign analysts' buy recommendations issued on date 't' for stock 'S' ($FBUY_{S,t}$), local analysts' buy recommendations issued on date 't' for stock 'S' ($LBUY_{S,t}$), foreign analysts' sell recommendations issued on date 't' for stock 'S' ($FSELL_{S,t}$), and local analysts' sell recommendations issued on date 't' for stock 'S' ($LSELL_{S,t}$) as independent variables. The following regression equation is run separately for local institutional investors, local individual investors, and foreign investors.

$$TI_{S,x,T,t} = \alpha + \beta_1(LBUY_{S,t}) + \beta_2(FBUY_{S,t}) + \beta_3(LSELL_{S,t}) + \beta_4(FSELL_{S,t}) + \varepsilon_{S,x,T,t} \quad (2)$$

The results of our analysis are reported in Table 4. Our results in Table 4, Panel A, show that the coefficient estimates for FBUY are always significant and positive for all trading periods when foreign investors trade. It shows that foreign investors consider foreign analysts' buy recommendations as an important determinant of their buying decision. We argue that higher amount of buying generated by foreign investors as a result of foreign analysts' buy recommendations has a positive impact on stock prices, It, therefore, causes prices to go up and results in higher value of foreign analysts' buy recommendations. Table 4, Panel A, also shows that local institutional investors and local individual investors disregard foreign analysts' buy recommendations. It may be because of the fact that these two investors group do not have timely access to foreign analysts' recommendations.

Our results in Table 4, Panel B, show that the coefficient estimates for LBUY are always significant and positive for all trading periods when local institutional investors trade. This is not surprising given that local analysts' recommendations are more accessible to local institutional investors. A surprising result reported in Table 4, Panel B, is that local analysts' buy recommendations also generate significant selling from local institutional investors during the same period. We argue that excessive selling by local individual investors – one of the most important investor groups in the market – neutralizes any price impact that local institutional investors may have due to their buying. It, therefore, results in lower value of local analysts' buy recommendations.

Our results in Table 4, Panel C, show that the coefficient estimates for LSELL are always insignificant for all trading periods when foreign investors trade. It indicates low value of sell recommendations issued by foreign analysts in the eyes of foreign investors. We argue that selling decisions made by foreign institutional investors are

[9] We also create several other variables to capture investors' trading behavior and rerun Equation (2) with the alternate variables. The alternate variables are: TA = $TI_{S,x,T,t}$ – Mean($TI_{S,x,T,t}$), TB = ($BVol_{S,x,T,t}$ – $SVol_{S,x,T,t}$), and TC = ($BVol_{S,x,T,t}$ – $SVol_{S,x,T,t}$)/Mean(Total Annual Volume$_S$). The results were qualitatively the same.

usually governed by the Principals' requirements, which can simply force them to exit foreign stocks irrespective of analysts' recommendations during a period of crisis. It, therefore, causes prices not to react and results in lower value of foreign analysts' sell recommendations.

Table 4, Panel D, reports that local analysts' sell recommendations generate significant selling from local institutional investors. We show that the coefficient estimates for LSELL are always significant and negative for all trading periods when local institutional investors trade. , It, therefore, causes prices to go down and results in higher value of local analysts' sell recommendations.

Table 4. Trade reaction of different type of investors in response to foreign and local analysts' recommendations

This table reports the trade reaction of different types of investors in response to foreign and local analysts' recommendations for stocks traded at the Korea Stock Exchange. The analysis is done using Equation (2). 1% significance is denoted by ***, 5% by ** and 10% by *.

Panel A. Buy recommendations issued by foreign analysts (FBUY)

	1-Day Period	2-Day Period	5-Day Period	14-Day Period	28-Day Period
Foreign Investors	0.102**	0.118**	0.124**	0.123***	0.174***
Local Institutional Investors	-0.006	-0.049	-0.045	0.006	0.105***
Local Individual Investors	-0.037	-0.012	-0.014	-0.016	-0.020

Panel B. Buy recommendations issued by local analysts (LBUY)

	1-Day Period	2-Day Period	5-Day Period	14-Day Period	28-Day Period
Foreign Investors	-0.009	0.020	0.112***	0.118***	0.044
Local Institutional Investors	0.165***	0.158***	0.107***	0.217***	0.159***
Local Individual Investors	-0.015	-0.024	-0.032**	-0.070***	-0.041***

Panel C. Sell recommendations issued by foreign analysts (FSELL)

	1-Day Period	2-Day Period	5-Day Period	14-Day Period	28-Day Period
Foreign Investors	0.001	0.019	-0.002	-0.063	0.067
Local Institutional Investors	-0.127***	-0.145***	-0.063	-0.015	0.015
Local Individual Investors	0.025	0.032**	0.014	0.004	-0.007

Panel D. Sell recommendations issued by local analysts (LSELL)

	1-Day Period	2-Day Period	5-Day Period	14-Day Period	28-Day Period
Foreign Investors	-0.002	-0.001	0.045	0.055	0.029
Local Institutional Investors	-0.004	-0.620**	-0.098***	-0.087***	-0.113***
Local Individual Investors	0.013	0.010	0.008	-0.015**	-0.009

4.2 Implications of investors' trading behavior on the relative performance of foreign and local analysts' recommendations

As indicated earlier, one of the implications of the above findings is that foreign analysts' buy recommendations should be more valuable than local analysts' buy recommendations, while local analysts' sell recommendations should outperform foreign analysts' sell recommendations. In order to test whether these implications hold, we estimate the following regression equation with T-day cumulative market-adjusted returns for stock 'S' following the issuance of recommendations on date 't' ($CMAR_{S,T,t}$) and four dummy variables – $FBUY_{S,t}$, $LBUY_{S,t}$, $FSELL_{S,t}$, and $LSELL_{S,t}$ – as independent variables. In addition, we also control for a number of factors that can affect cumulative market-adjusted returns. These control factors are: total debt to total asset ratio ($LEVERAGE_{S,t}$), market capitalization of a firm ($SIZE_{S,t}$), analyst following ($ANALYST_{S,t}$), and a dummy variable representing the initial panic in the stock markets ($TRANSITION_{S,t}$). We also include industry dummies (IDUM) in our regression equation. Our regression takes the following form:

$$\begin{aligned} CMAR_{S,T,t} &= \alpha + \beta_1(LBUY_{S,t}) + \beta_2(FBUY_{S,t}) + \beta_3(LSELL_{S,t}) + \\ &+ \beta_4(FSELL_{S,t}) + \beta_5(LEVERAGE_{S,t}) + \beta_5(SIZE_{S,t}) + \\ &+ \beta_5(ANALYST_{S,t}) + \beta_5(TRANSITION_{S,t}) + \\ &+ \sum_{Ind} \beta^{Ind}(IDUM) + \varepsilon_{S,T,t} \end{aligned} \quad (3)$$

Our results are reported in Table 5. Our results in Table 5, Panel A, show that foreign analysts' buy recommendations are followed by significantly positive returns for all post-recommendation periods, while local analysts' sell recommendations are followed by significantly negative returns for all post-recommendation periods. We argue that this result is

driven by the fact that foreign analysts' buy recommendations and local analysts' sell recommendations are able to generate more buy trades than their counterpart recommendations. Table 5, Panel B, also shows foreign analysts' buy recommendations and local analysts' sell recommendations significantly outperform local analysts' buy recommendations and foreign analysts' sell recommendations, respectively, for all post-recommendation periods.

Table 5. Performance of foreign and local analysts' recommendations

This table uses Equation (3) to document the performance of foreign and local analysts' buy and sell recommendations. The sample period is from July 2, 1997 to August 31, 1998. Panel A documents regression coefficient estimates of foreign and local analysts' buy and sell recommendations. While, Panel B documents the difference between CMAR following foreign and local analysts' buy and sell recommendations using Welch's test. 1% significance is denoted by ***, 5% by ** and 10% by *.

Panel A. Regression coefficients for foreign and local analysts' recommendations

	1-Day Period	2-Day Period	5-Day Period	14-Day Period	28-Day Period
Foreign Buy	0.023*	0.032*	0.049***	0.035***	0.027*
Local Buy	-0.005	0.021	0.027*	0.028***	0.011
Foreign Sell	-0.001	0.003	0.008	0.001	-0.017
Local Sell	-0.022**	-0.034*	-0.051***	-0.067***	-0.118***

Panel B. Difference between returns following foreign and local analysts' recommendations

	1-Day Period	2-Day Period	5-Day Period	14-Day Period	28-Day Period
Foreign Buy – Local Buy	0.028**	0.011*	0.022***	0.007	0.016*
Foreign Sell – Local Sell	0.021***	0.037***	0.059***	0.068***	0.101***

Table 6. Optimism in analysts' recommendations

This table reports the regression coefficients for Equation (4) and Equation (5). The sample period is from July 2, 1997 to August 31, 1998.

1% significance is denoted by ***, 5% by ** and 10% by *.

	Equation (4)	Equation (5)
LOCAL	-0.036	-0.073
ANALYST		0.039**
SIZE		-0.0457***
LEVERAGE		0.005**
TRANSITION		0.045

5. Empirical tests regarding the alternate explanations

One of the reasons cited for the asymmetric performance of foreign and local analysts' recommendations is that local analysts are overly optimistic in their recommendations. Lai and Teo (2008) argue that because local analysts are more eager to issue buy recommendations, their buy recommendations contain less positive information than foreign analysts' buy recommendations. They conclude that for this very reason, foreign analysts buy recommendations outperform local analyst buy recommendations. Moreover, they also suggest that due to local analysts' stronger reluctance to issue sell recommendations as compared to foreign analysts, their sell recommendations contain more negative information than foreign analysts' sell recommendations. They believe that this is the main reason why local analyst sell recommendations outperform foreign analyst sell recommendations.

In order to gauge the validity of arguments presented by Lai and Teo (2008), we test whether there is any difference in optimism between foreign and local analysts in South Korea during the crisis period. Similar to Lai and Teo (2008), we do so by estimating a regression equation with optimism in the recommendation of analyst 'i' regarding stock 'S' on date 't' ($OPT_{S,i,t}$) as a dependent variable and a dummy variable representing whether the recommendation was issued by a local or a foreign analyst ($LOCAL_{S,i,t}$) as an independent variable.[10]

[10] Optimism variable is defined as the difference between analysts' recommendation and last month consensus recommendation (Lai and Teo, 2008).

$LOCAL_{S,i,t}$ takes the value of 1 if the analyst 'i' who issues recommendation about stock 'S' on date 't' is a local analyst and 0 otherwise. If local analysts are more optimistic than foreign analysts, we should obtain a statistically positive coefficient of $LOCAL_{S,i,t}$. In addition, we also add a number of variables to control for some of the firm-specific characteristics that can have impact on analysts' optimism. These control variables are: market capitalization of a firm ($SIZE_{S,t}$), analyst following ($ANALYST_{S,t}$), and a dummy variable representing the initial panic in the stock markets ($TRANSITION_{S,t}$). We also include industry dummies (IDUM) in our regression equation. Our regression equations take the following form:

$$OPT_{S,i,t} = \alpha + \beta_1(Local_{S,i,t}) + \varepsilon_{S,i,t} \quad (4)$$

$$OPT_{S,i,t} = \alpha + \beta_1(Local_{S,i,t}) + \beta_2(SIZE_{S,t}) + \beta_3(ANALYST_{S,t}) + \beta_4(TRANSITION_{S,t}) + \sum_{Ind}\beta^{Ind}(IDUM) + \varepsilon_{S,i,t} \quad (5)$$

Results from the estimation of Equation (4) and Equation (5) are reported in Table 6. The OLS coefficient estimates on the local analyst dummy ($LOCAL_{S,i,t}$) are insignificant for both equations. This implies that there is no significant difference in the optimism between foreign and local analysts during the crisis period.[11] In the presence of no optimism difference, arguments proposed by Lai and Teo (2008) would predict no significant difference between the buy and sell recommendations issued by foreign and local analysts. However, our results in Table 5 show that foreign analysts' buy recommendations outperform local analysts' buy recommendations and local analysts' sell recommendations outperform foreign analysts' sell recommendations. Therefore, it seems unlikely that optimism in local analysts' recommendations is causing the asymmetric performance of foreign and local analysts' recommendations at least in our sample period.

6. Conclusion

This paper shows that analysts' ability to influence investors, especially during the periods of crises, may explain the relative performance of foreign and local analysts better than the traditional information centric arguments. We argue that the ability of foreign analysts' buy recommendations and local analysts' sell recommendations to generate considerable subsequent trade is responsible for superior performance foreign analysts' buy recommendations and local analysts' sell recommendations in emerging stock markets. Our results support our arguments when they show that foreign analysts' buy recommendations and local analysts' sell recommendations generate significantly more buying and selling respectively than their counterpart recommendations (i.e. local analysts' buy recommendations and foreign analysts' sell recommendations respectively) during the Asian financial crisis. We also show that trade generating potential of foreign analysts' buy recommendations and local analysts' sell recommendations lead to better performance of these recommendations. Our results are consistent with the previous literature that shows that buying and selling pressures, i.e. demand and supply shocks, have a strong impact on stock prices and returns. We also show that earlier explanations proposed to explain the asymmetric performance of foreign and local analysts' recommendations do not hold in our sample period. Since our sample exhibits no significant difference between foreign and local analysts in terms of optimism, we rule out this argument when looking for an explanation for the performance difference.

[11] In a separate analysis, we tested for optimism difference in two other crisis-hit countries, i.e. Thailand and Indonesia. Our results show no significant difference between foreign and local analysts in optimism in these countries during the crisis period. Moreover, we run equation (2) by using optimism variable defined as difference between analysts' recommendation and last month median recommendation. Our results remain unchanged. We also did the above analysis by using those recommendations where last month's mean and median recommendations are generated by at least 5 analysts. The results still remain unchanged.

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SUCCESSFUL MERGER DECISIONS IN GREECE: FACTS OR DELUSIONS?

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Abstract

This study examines the success of merger decision in Greece during the last years through an extensive accounting study. The events of mergers and acquisitions (M&As) that have been performed from all merger-involved firms listed on the Athens Stock Exchange in the period from 2005 to 2007 are evaluated using accounting data (financial ratios), and from them the final sample of the study that is finally investigated consists from thirty five Greek firms, which executed one merger or acquisition in the period from 2005 to 2007 as acquirers and have not performed any other important acquiring decision in a three-year-period before or after the examined M&As transactions. For the purpose of the study, a set of sixteen ratios is employed, in order to measure firms' post-merger performance and to compare pre- and post-merger performance for three years (or two years or one year) before and after the M&As announcements (with data analysis from 2002 to 2010). Furthermore the impact of the means of payment, of international or domestic M&As and of conglomerate or non-conglomerate mergers are evaluated. The results revealed that mergers have not any impact on the post-merger performance of the acquiring firms. Thus, the final conclusion that conducted is that the M&As activities of the Greek listed firms of this research have not lead them to enhanced post-merger accounting performance. Last, from the research results, it is clear that there is no difference from the mean of payment (cash or stock exchange) on the post-merger performance at the acquiring firms, and there is a better performance for international and conglomerate M&As.

Keywords: Merger, Acquisition, Performance, Method of Payment, International Merger, Conglomerate Merger

JEL classification: G32, G34, M21, M40

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1. Introduction

Presently, one of the main elements of contemporary corporate restructuring is the realisation of mergers and acquisitions (M&As). Notwithstanding, the process of internationalisation and the expansion of the European Union has fostered the whole activity in recent years: foreign direct investment by multinational companies has grown rapidly, international trade increase faster than the rate of growth of national economies, and supra-national institutions, such as the EU and the WTO, promoted ever more inter-linked economies over national governments, which evolve an international perspective of M&As and an increasingly competitive business environment (Agorastos et al., 2011).

The strategy literature commonly argues that M&As are one of the mechanisms by which firms gain access to new resources and, via resource redeployment, increase revenues and reduce cost. The main hypothesis in successful merger decisions is that potential economic benefits arising from them are changes that increase business performance that would not have been made in the absence of a change in control (Pazarskis, 2008). However, many researchers and business practitioners regard with scepticism this hypothesis, despite the fact that many others are confident and enthusiastic (Mantzaris, 2008; Pazarskis et al., 2010; 2011).

In order to examine the success of merger decision in Greece, this research proceeds to an extensive accounting comparative analysis of the post-merger operating performance of a sample of thirty five firms after M&As activities, listed at the Athens Stock Exchange (ASE) in Greece, that executed an M&As transaction in the period from

2005 to 2007, using accounting characteristics (financial ratios), and attempts to investigate the M&As' effects on their post-merger performance, by examining simultaneously several other merger characteristics, such as: the means of payment, the prospect of the merger or not, and the character of a conglomerate or non-conglomerate merger. Furthermore, in this study, the terms "merger" and "mergers and acquisitions (M&As)" are used in many cases at the text, providing similar meanings for the terms "merger" and "acquisition", while in others, wherever it is necessary, there is a clear distinction among them and always exists a provision of the exact meaning.

The structure of the paper is as follows: the next section analyses the research design of this study (related past researches with accounting data, selection of variables-financial ratios, sample and data, research hypotheses and data analysis). The following section presents and analyses the results. The next section provides further evidence from the results according to several merger characteristics and the last section concludes the paper.

2. Research design

2.1 Literature review

Several past studies on post-merger performance after M&As that employed accounting characteristics (financial ratios) concluded on ambiguous results (Pazarskis, 2008). Many of them supported an improvement in the business performance after the M&As action (Cosh et al., 1980; Parrino & Harris, 1992; and others), while other researchers claimed that there was a deterioration in the post-merger firm performance (Meeks, 1977; Salter & Weinhold, 1979; Mueller, 1980; Kusewitt, 1985; Neely & Rochester, 1987; Ravenscraft & Scherer, 1987; Dickerson et al., 1997; Sharma & Ho, 2002; and others), and others researchers concluded a "zero" result or ambiguous results from the M&As action (Kumar, 1984; Healy et al., 1992; Chatterjee & Meeks, 1996; Ghosh, 2001; and others).

2.2 Methodology and selection of accounting variables

The M&As action of each company from the sample is considered as an investment that is evaluated by the NPV criterion (if NPV≥0, the investment is accepted). Based on this viewpoint, the study proceeds to its analysis and regards the impact of an M&As action similar to the impact of any other positive NPV investment of the firm to its ratios over a specific period of time (Healy et al., 1992; Pazarskis, 2008).

For the purpose of the study, the selected financial ratios for each company of the sample over a three-year period before or after the M&As event are calculated, and the mean from the sum of each financial ratio for the years before is compared with the equivalent mean from the years after the M&As, respectively[12].

Similarly, the selected financial ratios of the sample over a two or one-year period before or after the M&As event are evaluated.

The study does not include in the comparisons the year of M&A event (Year 0) because this usually includes a number of events which influence post-merger firm performance in this period (as one-time M&As transaction costs, necessary for the deal, etc.) (Healy et al., 1992; Pazarskis, 2008).

Furthermore, to test the above research form of hypothesis two independent sample mean t-tests for unequal variances are applied, which are calculated as follows:

$$t = \frac{\overline{X}_1 - \overline{X}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

where,

n = number of examined ratios

$\overline{X}_1$ = mean of pre-merger ratios

$\overline{X}_2$ = mean of post-merger ratios

s = standard deviation

1 = group of pre-merger ratios

2 = group of post-merger ratios

Last, the post-merger performance of a firm is evaluated with its post-merger performance at some financial ratios. In this study, sixteen financial ratios are employed, which are tabulated with their code and their calculation analysis at the Table 1.

There are many other approaches for accounting evaluation performance, different from the above. Return on investment (ROI) type of measures are considered as the most popular and the most frequently used when accounting variables are utilised to determine performance. However, in considering Kaplan's (1983) arguments against excessive use of ROI types of measurements, the above referred ratio selection of this study is confirmed as better, as:

"…any single measurement will have myopic properties that will enable managers to increase their score on this measure without necessarily contributing to the long-run profits of the firm" (Kaplan, 1983, p. 699).

Thus, an adoption of additional and combined measures is believed to be necessary in order to provide a holistic view of the long-term profitability and performance of a firm, in accordance with the short-term one (Pazarskis, 2008).

[12] In this study, the mean from the sum of each financial ratio is computed than the median, as this could lead to more accurate research results (Pazarskis, 2008). This argument is consistent with many other researchers diachronically (Philippatos et al., 1985; Neely & Rochester, 1987; Cornett & Tehnarian, 1992; Sharma & Ho, 2002; Pazarskis et al, 2006; 2008; 2009; Pramod Mantravadi & A. Vidyadhar Reddy, 2008; and others).

Table 1. Classification of financial ratios

Code	*Variable Name*	*Description*
V01	current ratio	current assets/current liabilities
V02	acid test ratio	(current assets-inventory)/current liabilities
V03	days sales in receivables	accounts receivable/(sales/360)
V04	inventory turnover	cost of goods sold/inventory
V05	days purchases in accounts payable	accounts payable / (cost of goods sold/365)
V06	total debt to total assets	total debt/total assets
V07	total debt to equity	total debt/equity
V08	short-term liabilities turnover	sales / short-term liabilities
V09	ROA before taxes	earnings before taxes/total assets
V10	ROE before taxes	earnings before taxes/equity
V11	ROA after taxes	earnings after taxes/total assets
V12	ROE after taxes	earnings after taxes/equity
V13	capital employed turnover	sales/total assets
V14	gross profit margin	gross profit/sales
V15	EBIT margin	EBIT/sales
V16	EBITDA margin	EBITDA/sales

2.3 Sample and data

From a sample of all M&As, the transactions of listed firms in the period from 2005 to 2007 in Greece are tracked. Secondly, from them for further analysis, are excluded the firms that performed M&As activities in less than a three-year period before and after the several M&As examined events. Also, in case of that some firms from this preliminary sample firms have been de-listed from the ASE for various reasons (bankruptcy, not meeting the standards of the market, etc.), they were excluded from the sample, as well as the firms with bank activities, which present special peculiarities in their accounting evaluation. Finally, they are selected and examined only thirty five acquiring firms which is the final firm sample that executed at least one M&As action as acquirers in Greece during the period from 2005 to 2007. The percentage of the M&As events of firms by year for the research sample is illustrated at the next table (Table 2).

Table 2. Percentage of sample firm's M&As events by year

Year	Number of Mergers	Number of Acquisitions	Number of All Events	Percentage of All Events
2005	7	8	15	43%
2006	4	3	7	20%
2007	13	0	13	37%
Total	24	11	35	100%

The final sample with thirty five M&As events is satisfying as it includes all the M&As events of listed firms in the Greek market at the above referred period (according to the sample criteria of this study) and reliable in comparison to prior accounting studies conducted in significantly larger markets such as US and UK (Sharma & Ho, 2002), with similar sample firms, as: Healy et al., 1992 : n = 50, Cornett & Tehranian, 1992 : n = 30, Clark & Ofek, 1994 : n = 38, Manson et al., 1995 : n = 38, etc.

The study proceeds to an analysis only of listed firms as their financial statements are published and it is easy to find them and evaluate from them firm post-merger performance. Furthermore, it should be remarked that the M&As activities of the listed Greek firms have been tracked from their announcements on the web sites of the ASE. The data of this study (accounting ratios) are computed from the financial statements of the M&As-involved firms and the databank of the Library of the University of Macedonia (Thessaloniki, Greece).

2.4 Research hypotheses and data analysis

In this study the following hypotheses have been formulated:

H_1: Mergers are not expected to have a relative change on the post-merger performance of the acquiring firms at a long run perspective (three years after M&As).

H_2: Mergers are not expected to have a relative change on the post-merger performance of the acquiring firms in a short-term or mid-term perspective (one year or two years after M&As).

H_3: There is no significant difference in the post-merger performance for acquiring firms using different method of payment (cash or share) of M&As.

H_4: There is no significant difference in the post-merger performance for acquiring firms that performs domestic or international M&As.

H_5: There is no significant difference in the post-merger performance for acquiring firms that performs conglomerate or non-conglomerate M&As.

3. Data analysis

The study tries to investigate the evaluation of the post-merger performance for the sample firms from many sides in a particular way. Firstly, tries to find the final post-merger performance of the sample firms in general after a three-year-period, secondly, to reveal eventual changes in performance in the short- or mid-term (after the first year or the second) from the M&As announcement, and thirdly, from the whole sample examines different particular characteristics, such as: the impact of the means of payment at the post-merger performance of the acquiring firms, the choice of domestic or international M&As or conglomerate or non-conglomerate M&As.

(i) Post-merger performance - all mergers (three years after M&As event)

The post-merger performance of the sample firms that executed M&As during the period 2005-2007 is evaluating for three years before and after the M&As event. The selected financial ratios for each company of the sample over a three-year period before (year T-3, T-2, T-1) or after (year T+1, T+2, T+3) the M&As event are calculated, and the mean from the sum of each financial ratio for the years T-3, T-2 and T-1 is compared with the equivalent mean from the years T+1, T+2 and T+3, respectively.

(ii) Post-merger performance - influences at short-term and mid-term perspective

The post-merger performance of the sample firms that executed an M&As transaction during the period 2005-2007 is evaluating for two/one year(s) before and after the M&As event in similar process than the above. The results are discussed in comparison with the received results for the three years period before and after the event for depicturing the existence of eventual special peculiarities.

(iii) Post-merger performance - impact of several merger characteristics (method of payment, international or not merger, conglomerate or not merger)

The post-merger performance of the sample firms is calculating for three years before and after the M&As event. Then, the differences between the means of post-merger and pre-merger ratios are computed, the firm's choice for the means of payment (cash or share) is provided for each firm and after their statistical analysis, there is a conceptual comparison among the received results to reveal further research details.

Similarly, as described above, the differences between the means of post-merger and pre-merger ratios are analysed with the firm's choice to perform a domestic or not M&As. After their statistical analysis, the received results are discussed in details.

Last, the differences between the means of post-merger and pre-merger ratios are analysed with the firm's choice to perform a conglomerate or non-conglomerate M&As. After their statistical analysis, the received results are also discussed in details.

The results for each hypothesis separately are presented in the following section.

4. Analysis of Results

(i) Post-merger performance - all mergers (three years after M&As event)

The hypothesis H_1 of this research is that: "Mergers are not expected to have a relative change on the post-merger performance of the acquiring firms at a long run perspective (three years after M&As)". Within this prospect in this section presented the results of the final post-merger performance of the sample firms in general after a three-year-period for M&As activities in Greece.

The results revealed that over a three-year-period before and after the M&As event all of the sixteen accounting ratios (current ratio*;* acid test ratio*;* days sales in receivables*;* inventory turnover*;* days purchases in accounts payable*;* total debt to total assets*;* total debt to equity*;* short-term liabilities turnover*;* ROA before taxes*;* ROE before taxes*;* ROA after taxes*;* ROE after taxes*;* capital employed turnover*;* gross profit margin*;* EBIT margin*;* EBITDA margin) did not change significantly and they did not have any particular impact (positive or negative) on post-merger accounting performance of merger-involved firms (see, Table 3). Furthermore, the results of this study revealed that as M&As have not had any impact on post-merger performance of merger-involved firms, merger decisions were finally investment actions of zero value for the sample firms, even three years after the M&A transaction, and they do not lead to enhanced business performance.

This result is consistent with the results of some studies such as Kumar, 1984; Healy et al., 1992; 1997; Chatterjee & Meeks, 1996; and Ghosh, 2001. However, it is not consistent with the results of some other studies whereby: Neely & Rochester (1987) found a decline of the profitability ratios, especially the ROA, in the post-merger period, for the US market for the year 1976. Sharma & Ho (2002) also found a decline for the ROA and the ROE ratios. Similar results, with a decline of the profitability ratios, have been found by Meeks (1977), Salter & Weinhold (1979), Mueller (1980), Kusewitt (1985), Mueller (1985), Ravenscraft & Scherer (1987); Kaplan & Weisbach (1992); Dickerson et al. (1997).

Furthermore, our results for the Greek market, since there is no significant profitability improvement, do not support the hypothesis of market power (Lubatkin, 1983; 1987). According to this approach, the market power that was gained by the acquirer after

the merger or the acquisition should increase the new firm's profit margins and therefore, its profitability.

From the above it is clear that mergers have not a relative change on the post-merger performance of the acquiring firms, even three years after M&As, as none of the examined accounting ratios had changed significantly due to the M&As event. Thus, the above stated proposition of the hypothesis H_1 is accepted.

Table 3. Mean pre-merger and post-merger ratios before/after M&As

Table values are the mean computed for each ratio (as shown above) for the research sample of 35 M&As of Greek listed firms between 2005 and 2007. The ratio mean computed from -3 to -1 represents the mean ratio (3 years avg.) of the third (*T*-3), second (*T*-2) and first year (*T*-1) before the completion of M&As event. The rest two means (from -2 to -1, from -1 to -1) are computed in similar way for the pre-merger period. The year 0 (*T*=0) is omitted, because this usually includes a number of events which influence firm's economic performance in this period, as one-time M&As transaction costs, necessary for the deal, etc. (Healy et al., 1992). The ratio mean computed from +1 to +3 represents the mean ratio (3 years avg.) of the third (*T*+3), second (*T*+2) and first year (*T*+1) after the M&As transaction. The rest two means (from +2 to +1, from +1 to +1) are computed in similar way for the post-merger period.

Code	Variable Name	Mean Pre-merger			0	Mean Post-merger		
		From -3 to -1	From-2 to -1	From-1 to -1		From +1 to +1	From +1 to +2	From +1 to +3
V01	current ratio	2,58	2,50	2,61		3,96	1,87	2,59
V02	acid test ratio	1,96	1,91	1,97		3,08	1,54	2,07
V03	days sales in receivables	224	241	249		247	228	235
V04	inventory turnover	22,0	20,1	17,0		18,5	13,0	15,0
V05	days purchases in accounts payable	2,76	2,88	3,04		3,03	2,52	2,70
V06	total debt to total assets	2,2	1,83	6,30		2,60	1,49	1,31
V07	total debt to equity	1,17	1,16	0,95		1,09	1,36	1,27
V08	short-term liabilities turnover	2,62	2,46	3,98		3,32	1,77	2,04
V09	ROA before taxes	0,133	0,162	0,159		0,113	0,120	0,118
V10	ROE before taxes	0,23	0,25	0,37		0,31	0,38	0,36
V11	ROA after taxes	0,060	0,070	0,167		0,089	0,042	0,058
V12	ROE after taxes	0,030	0,009	0,163		0,152	0,156	0,154
V13	capital employed turnover	0,567	0,592	0,634		0,581	0,603	0,595
V14	gross profit margin	1,25	1,25	1,36		1,28	1,39	1,35
V15	EBIT margin	0,31	0,30	0,44		0,34	0,30	0,32
V16	EBITDA margin	0,44	0,44	0,54		0,42	0,39	0,40

Note:
[a, b, c] indicate that the mean change is significantly different from zero at the 0.01, 0.05, and 0.10 probability level, respectively, as measured by two independent sample mean t-tests.
More analytically, the P-value interpretation levels for the above referred three cases are described below:
p<0.01 strong evidence against Ho (see, [a])
0.01□p<0.05 moderate evidence against Ho (see, [b])
0.05□p<0.10 little evidence against Ho (see, [c])
0.10□p no real evidence against Ho

(ii) Post-merger performance - influences at short-term and mid-term perspective

The hypothesis H_2 of this research is that: "Mergers are not expected to have a relative change on the post-merger performance of the acquiring firms in a short-term or mid-term perspective (one year or two years after M&As)". Within this prospect in this section aims to reveal eventual changes in performance in the short- or mid-term (after a one or two-year-period) from the M&As announcement.

For the sub-case of two-year-period before and after the M&As event, there is not any significant change at any accounting ratio (current ratio*;* acid test ratio*;* days sales in receivables*;* inventory turnover*;* days purchases in accounts payable*;* total debt to total assets*;* total debt to equity*;* short-term liabilities turnover*;* ROA before taxes*;* ROE before taxes*;* ROA after taxes*;* ROE after taxes*;* capital employed turnover*;* gross profit margin*;* EBIT margin*;* EBITDA margin) (see, Table 3).

Similarly, concerning the sub-case of one-year period before and after the M&As event, there is not any significant change at any accounting ratio in the post-merger accounting performance of merger-involved firms (see, Table 3). That means that there is no significant change for the first or second year and the management shortcomings have not any positive impact on the firm performance after the first and the second year of their business unity due to M&As.

From the above it is clear that mergers have not a relative change on the post-merger performance of the acquiring firms, in a sort-term or mid-term

perspective (one or two years after M&As), as none of the examined accounting ratios had changed significantly due to the M&As event. Thus, the above stated proposition of the hypothesis H_2 is accepted.

5. Interpretation of results and further evidence

The hypothesis H_3 of this research is that: "*There is no significant difference in the post-merger performance for acquiring firms using different method of payment (cash or share) of M&As*".

According to Jensen's (1986) free cash flow theory, the financing method matters, for the post-merger performance of the acquirers. Specifically, debt or cash financed acquisitions would have lower profits than those financed with equity, because the former would raised the costs of debt, hence decreasing profitability (Pazarskis et al., 2008).

In order to examine the impact of the payment method at the post-merger accounting performance with the research examined sixteen ratios, regarding to the above referred argument, the study analyses this data of the sample firms and categorize them in two groups from this respect:

77% (27 firms) has done their deal with a stock exchange and minor cash amounts and

23% (8 firms) of the sample firms have preferred cash payment for their M&As transaction.

Next, the differences between the means of post-merger and pre-merger ratios (ratios V1 to V16) are computed as below:

$$\Delta VX_i = \overline{X}_{2i} - \overline{X}_{1i}$$

where,

ΔVX = difference between the means of post- and pre-merger ratios

i = examined ratios {V1, V2, ..., V16}

$\overline{X}_1$ = mean of pre-merger examined ratios

$\overline{X}_2$ = mean of post-merger examined ratios

Then, for these data (see, ΔVX_i), after the rejection of the null hypothesis that the data sample has the normal distribution, a non-parametric test is applied, as non-parametric tests imply that there is no assumption of a specific distribution for the data population: the Kruskall-Wallis test.

The Kruskall-Wallis test is a nonparametric test alternative to a one-way ANOVA. The test does not require the data to be normal, but instead uses the rank of the data values rather than the actual data values for the analysis. The general calculation form of the Kruskall-Wallis test statistic is for H:

$$H = \frac{12\sum n_j[\overline{R}_j - \overline{R}]^2}{N(N+1)}$$

where,

n_j = the number of observations in group j

N = the total sample size

$\overline{R}_j$ = the average of the ranks in group j,

$\overline{R}$ = the average of all the ranks.

The received results are presented in the Table 4 (see, below).

From the above received results, it is clear that there is no difference from the mean of payment (cash or stock exchange) for the acquiring firms of the research sample at any accounting ratio.

Thus, the result of this study is not consistent with Jensen's (1986) free cash flow theory, that the financing method matters, for the post-merger performance and profitability of the present examined acquirers.

Table 4. Kruskal-Wallis test for cash and stock exchange M&As payment

Code	Variable name of examined ratio	Median		P-Value
		Cash Payment	Stock Exchange	
ΔV01	current ratio	-0,0467	0,02167	0,678
ΔV02	acid test ratio	0,00667	0,0100	0,624
ΔV03	days sales in receivables	18,33	-20,17	0,234
ΔV04	inventory turnover	0,1267	0,6567	0,450
ΔV05	days purchases in accounts payable	0,000	0,000	0,473
ΔV06	total debt to total assets	0,03747	0,11440	0,308
ΔV07	total debt to equity	0,05667	0,29833	0,180
ΔV08	short-term liabilities turnover	-0,1267	0,1100	0,227
ΔV09	ROA before taxes	-0,0532	-0,0324	0,597
ΔV10	ROE before taxes	-0,0694	-0,0651	0,821
ΔV11	ROA after taxes	-0,0408	-0,0298	0,624
ΔV12	ROE after taxes	-0,0021	-0,0505	0,571
ΔV13	capital employed turnover	-0,0733	0,01833	0,180
ΔV14	gross profit margin	0,02850	-0,0287	0,473
ΔV15	EBIT margin	-0,0310	-0,0293	0,970
ΔV16	EBITDA margin	-0,0234	-0,0461	0,597

Notes:[a, b, c] indicate that the median change is significantly different from zero at the 0.01, 0.05, and 0.10 probability level, respectively. At the choice of stock exchange as a means of M&As payment, the sample firms may have completed their value transaction with minor cash amounts.

Table values are the median computed for each ratio (as shown above) for the research sample of 35 M&As of Greek listed firms between 2005 and 2007. The median of each ratio that computed for cash payment represents the median of each ratio from the mean differences of the average of 3 years before the M&As event (the third, *T*-3; the second, *T*-2; and the first year, *T*-1) and after the completion of M&As event (the third, *T*+3; the second, *T*+2; and the first year, *T*+1). The other (stock exchange) is computed in similar way for the sample firms that financed their transaction with stock exchange (and maybe with minor cash amount). From all the calculations the year 0 (*T*=0) is omitted, because this usually includes a number of events which influence firm's economic performance in this period, as one-time M&As transaction costs, necessary for the deal, etc.

The hypothesis H_4 of this research is that: "There is no significant difference in the post-merger performance for acquiring firms using enchorial or international M&As".

With similar process than the above a non-parametric test is applied in order to examine if domestic or international mergers provide a better performance for the acquirers.

The data of the sample firms within this respect are in two groups:

86% (30 firms) has done a domestic merger and

14% (5 firms) of the sample firms have preferred an international M&As transaction.

The results reveal that two variables (ΔV10, ΔV12) present a significant change due to the M&As events. And thus, it signalizes a better performance of acquirers firms with international M&As than these with domestics M&As.

Table 5. Kruskal-Wallis test for domestic and international M&As

Table values are the median computed for each ratio (as shown above) for the research sample of 35 M&As of Greek listed firms between 2005 and 2007. The median of each ratio that computed for domestic mergers and acquisitions represents the median of each ratio from the mean differences of the average of 3 years before the M&As event (the third, *T*-3; the second, *T*-2; and the first year, *T*-1) and after the completion of M&As event (the third, *T*+3; the second, *T*+2; and the first year, *T*+1). The other (international M&As) is computed in similar way for the sample firms. From all the calculations the year 0 (*T*=0) is omitted, because this usually includes a number of events which influence firm's economic performance in this period, as one-time M&As transaction costs, necessary for the deal, etc.

Code	Variable name of examined ratio	Median		P-Value
		Domestic M&As	International M&As	
ΔV01	current ratio	-0,04333	0,34333	0,396
ΔV02	acid test ratio	-0,01667	0,1700	0,637
ΔV03	days sales in receivables	-5,167	-37,000	0,671
ΔV04	inventory turnover	0,5267	-0,1500	0,346
ΔV05	days purchases in accounts payable	0,000	-5,03333	0,480
ΔV06	total debt to total assets	0,1029	0,1305	0,925
ΔV07	total debt to equity	0,26167	-0,07667	0,370
ΔV08	short-term liabilities turnover	-0,02500	0,26667	0,409
ΔV09	ROA before taxes	-0,03671	0,00400	0,637
ΔV10	ROE before taxes	-0,06965	0,01790	0,066*
ΔV11	ROA after taxes	-0,03516	0,003300	0,637
ΔV12	ROE after taxes	-0,05308	0,01103	0,021**
ΔV13	capital employed turnover	0,0000	0,0300	0,759
ΔV14	gross profit margin	-0,02877	0,04180	0,144
ΔV15	EBIT margin	-0,03397	0,02070	0,604
ΔV16	EBITDA margin	-0,03898	-0,00466	0,671

Notes:[a, b, c] *indicate that the median change is significantly different from zero at the 0.01, 0.05, and 0.10 probability level, respectively. At the choice of stock exchange as a means of M&As payment, the sample firms may have completed their value transaction with minor cash amounts.*

The hypothesis H_5 of this research is that: "There is no significant difference in the post-merger performance for acquiring firms using diagonal or not diagonal M&As".

With similar process than the above also a non-parametric test is applied in order to examine if conglomerate or non-conglomerate mergers provide a better performance for the acquirers.

The data of the sample firms within this respect are in two groups:

75% (26 firms) has done a non-conglomerate merger and

25% (9 firms) of the sample firms have preferred a conglomerate M&As transaction.

The results reveal that two variables (ΔV04, ΔV08) present a significant change due to the M&As events. And thus, it further signalizes a better performance of acquirers firms with international M&As than these with domestics M&As.

Table 6. Kruskal-Wallis test for conglomerate or not M&As

Table values are the median computed for each ratio (as shown above) for the research sample of 35 M&As of Greek listed firms between 2005 and 2007. The median of each ratio that computed for conglomerate mergers and acquisitions represents the median of each ratio from the mean differences of the average of 3 years before the M&As event (the third, *T*-3; the second, *T*-2; and the first year, *T*-1) and after the completion of M&As event (the third, *T*+3; the second, *T*+2; and the first year, *T*+1). The other (non-conglomerate M&As) is computed in similar way for the sample firms. From all the calculations the year 0 (*T*=0) is omitted, because this usually includes a number of events which influence firm's economic performance in this period, as one-time M&As transaction costs, necessary for the deal, etc.

Code	Variable name of examined ratio	Median		P-Value
		Conglomerate M&As	Non-Congl. M&As	
ΔV01	current ratio	-0,0400	0,02167	0,706
ΔV02	acid test ratio	-0,0400	0,0250	0,706
ΔV03	days sales in receivables	-22,000	-1,667	0,473
ΔV04	inventory turnover	2,6833	0,000	0,005***
ΔV05	days purchases in accounts payable	1,0700	-0,1183	0,089*
ΔV06	total debt to total assets	0,12027	0,09363	0,406
ΔV07	total debt to equity	0,2267	0,2617	0,291
ΔV08	short-term liabilities turnover	0,41333	-0,06667	0,054*
ΔV09	ROA before taxes	-0,02950	-0,04640	0,940
ΔV10	ROE before taxes	-0,05083	-0,06940	0,940
ΔV11	ROA after taxes	-0,02303	-0,03517	0,792
ΔV12	ROE after taxes	-0,04617	-0,05067	0,970
ΔV13	capital employed turnover	0,17000	-0,03167	0,168
ΔV14	gross profit margin	-0,02686	-0,00538	0,706
ΔV15	EBIT margin	0,01687	-0,03707	0,345
ΔV16	EBITDA margin	-0,04617	-0,03650	0,546

Notes:[a, b, c] indicate that the median change is significantly different from zero at the 0.01, 0.05, and 0.10 probability level, respectively. At the choice of stock exchange as a means of M&As payment, the sample firms may have completed their value transaction with minor cash amounts.

6. Summary and Conclusions

One of the main elements of contemporary corporate restructuring, with a universal acceptance, is the formation of new business entities via mergers and acquisitions (M&As). This study examines the success of merger decision in Greece during the last years through an extensive accounting study.

The events of mergers and acquisitions (M&As) that have been performed from merger-involved firms listed on the Athens Stock Exchange are evaluated using accounting data (financial ratios) from a sample of all Greek M&As transactions from 2005 to 2007. The final sample of the study that is investigated consists from thirty five Greek listed firms, which executed one merger or acquisition in the period from 2005 to 2007 as acquirers.

In order to evaluate this trend, this study tries to analyse the pre- and post-merger performance of a sample of Greek listed acquirer firms for a three-year-period before and after M&As using an explanatory set of sixteen accounting ratios (current ratio; acid test ratio; days sales in receivables; inventory turnover; days purchases in accounts payable; total debt to total assets; total debt to equity; short-term liabilities turnover; ROA before taxes; ROE before taxes; ROA after taxes; ROE after taxes; capital employed turnover; gross profit margin; EBIT margin; EBITDA margin) and attempted to investigate the M&As effects on the post-merger accounting performance of this sample. Also, for a more comprehensive research analysis is examined the sub-cases of the two years and one year, before and after, of the same M&As transactions.

The final conclusion that conducted is that the M&As activities of the Greek listed sample firms of this research have not lead them to enhanced post-merger accounting performance. Thus, these results for the Greek market, since there is no significant profitability improvement, do not support the

hypotheses of market power (Lubatkin, 1983; 1987). According to this approach, market power that gained by the acquirer after the merger or the acquisition should increase the new firm's profit margins and therefore, its profitability.

Thus in order to answer the question if the majority of merger decisions in Greece were successful or not, the answer is no. However, it cannot be ignored the event that if these mergers had never happened may sample firms that were examined could have a different or more disappointing business performance without the M&As.

Also, from the research results, it is clear that there is no difference from the mean of payment (cash or stock exchange, plus minor cash amount) for the acquiring firms of this research sample. This result is not consistent with Jensen's (1986) free cash flow theory, that the financing method matters, for the post-merger performance of the acquirers.

Furthermore, from the sample firms, these acquiring firms that performed an international or conglomerate merger present a better pros-merger performance.

Last, future extensions of this study could examine a larger sample that could include not only M&As-involved Greek firms listed in the Athens Exchange, but also non-listed firms and within other or larger time frame periods.

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FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH IN DEVELOPING COUNTRIES: EVIDENCE FROM SAUDI ARABIA

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Abstract

This study investigates the long-term and short-term relationships between capital market development and economic growth in the Kingdom of Saudi Arabia (KSA) for the period from January 1993 to December 2009. It employs a wide range of vector autoregression (VAR) models to evaluate the importance and impact of capital market development on economic growth.

We used real GDP growth rates and None Oil GDP as proxies for economic growth and the stock market index (SMI), the bank credits to the private sector (BCP) and the broad money supply (M2) as proxies for the capital market development.

The VAR models indicate a positive and significant long-term causal relationship between capital market development and economic growth. Granger causality tests show that economic growth Granger-cause capital market development and vice versa when using the real GDP growth rate variables.

The study implications are as follows. Firstly, investment in real economic activities leads to economic growth. Secondly, the stock market might hinder economic growth due to its volatile and international risk sharing nature, low free-floating share ratio, number of listed companies and the domination of Saudi Individual Stock Trades (SIST) characteristics. Thirdly, policymakers should seek to minimise stock market volatility and fluctuations, increase both the free-floating share ratio and number of listed companies and shift investment domination toward corporate investors by considering its effect on economic growth when formulating economic policies. Fourthly, the banking sector might hinder economic growth due to its lack of small and medium enterprises lending and shareholder concentration issues. Finally, policymakers should seek to encourage banks toward more involvement in small and medium enterprises SMEs' lending, which will strengthen the private sector role.

Keywords: Saudi Arabia, Capital Market Development, Economic Growth, VAR Model, Cointrgration, Granger Causality

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1 Introduction

Economic development and growth issues continue to capture the interests of academics and policy makers around the globe. In recent times, the shift in emphasis has been from the classical concepts of maximising production outputs and wealth distribution towards economic sustainability, as a reaction to globalisation. This has resulted in major economic reforms, especially among developing countries as they expand their markets. Economic sustainability is heavily tied to investment, which in turn relies on the capital market. Hence, development of a stable domestic capital market underpins sustainability. Within the capital market, development of the equity and debt markets is an important part of any economic reform. Securities trading is the dominant financial market function that mobilises saving, allocates capital, exerts corporate control and eases financial risks (Levine & Zervos 1996, 1998).

As a developing economy and a member of the Group of Twenty (G-20), Saudi Arabia is not an exception in this international trend. In the last three Five-Year Saudi National Development Plans (2000–2014), major legal, economic and financial reforms were implemented to promote sustainable economic growth. Such reforms were made to diversify the oil-based economy towards greater sustainability in line with international economic practices (Ramady 2010).

Although industrialisation is relatively recent in Saudi Arabia, it has witnessed a steady development with distinguished accomplishments that are attributed to the industrial sector and the support it receives from the government owing to its important role in achieving strategic and economic goals of the country. The government's support has covered several spheres, including implementation of required infrastructure, construction of Jubail and

Yanbu industrial cities, construction of industrial cities in various regions of KSA, establishment of the Saudi Industrial Development Fund (SIDF), and continued provision of other industrial support and incentives. The private sector's response to and cooperation with the governmental plans and efforts have had an effect on the actualisation of industrial development.

In addition to the Saudi intention to move the country's income from non-renewable resources, the conservative Islamic investment environment in Saudi prohibit usury-interest on loans, which means a bigger emphasis on raising capital through capital markets, such as initial public offerings (IPOs) and *sukuk*s (Islamic bonds) than bank loans (Al-Bqami 2000).

To date, these reforms have not been replicated in securities exchange practices; further, there are no adequate capital market development and economic growth relationship studies to provide guidance for decision makers in the anticipated transformation. This research attempts to fill this empirical gap.

The aim of the research is to determine the relationship between capital market development and economic growth in Saudi Arabia. Such study on the capital market developments become because Saudi Arabia is moving aggressively toward strengthening the private sector role in the economy via privatisation, establishment of the Capital Market Authority (CMA) in 2003, and the creation of the new seven economic cities.

The academic benefits of this research are; first, this research will fill the significant gap in the literature on the Saudi capital market and its relationship to economic growth; second, this research will offer updated findings on the relationship between Saudi capital market development and economic growth, as the extant empirical data predates the radical changes in the capital market in 2003.

In addition, the practical benefits of this research is to provide contemporary information on the Saudi economy as a whole and the capital market, particularly for Saudi decision makers, academics and the industry.

2. Financial Market Developments and Economic Growth

2.1 Capital market

The capital markets can be defined as a market that specialises in offering long run loans to the economy (Gurusamy 2009); It is also part of the financial system that is responsible for channelling funds from surplus to deficit areas of the economy (Levine & Zervos 1998); Capital markets are the act of financial intermediary institutions that facilitate capital formation, mobilisation and channelling of capital funds on long term basis to investors across the economy (Obiakor & Okwu 2011). In addition, capital markets combine markets and institutions that specialise in the issuance as well as the trading of financial instruments in the long run. Thus, for this study we follow the views of Obiakor and Okwu (2011) and Gurusamy (2009) on the capital market as an institutional arrangement involving efficiently mobilising and channelling long run financial resources through a set of financial services that could affect economic growth. Moreover, capital market development can be defined as the capital market capability at low cost to acquire information, enforce contracts, facilitate transactions and create incentives for the emergence of particular types of financial contracts, markets and intermediaries (Levine & Zervos 1998, Obiakor & Okwu 2011). Furthermore, Randall Dodd offered an extended definition of capital markets:

A more complete view of capital markets is, by analogy, a four-legged table made up of securities markets (issuing and trading bonds and equity shares), banking industry (issuing loans and providing payment and settlement services), insurance and pension funds (providing future income and collateral for lending), and derivatives markets (risk management and price discovery). All four legs serve to support the table, and it is no more stable than its weakest leg. (Ocampo & Stiglitz 2008:290)

Note, the terms "capital market development", "financial development", "financial intermediation" are used interchangeably in this study. Capital market development, however, should be thought of as a broader concept that also includes financial innovations that occur outside the banking system. Because of the lack of data regarding non-bank financial innovation in developing countries like Saudi Arabia, the level of financial intermediation effectively measures the degree of capital market development by the banking system. For a comprehensive survey of recent evidence see Levine (1997).

2.2 Economic Growth

Economic growth can be quantitatively defined as an increase in real gross domestic product (GDP). Many factors could affect economic growth, for example these include investment ratio (Pagano 1993, Greenwood & Jovanovic 1990), human capital (Romer 1986), research and development (Solow 1956, Darrat & Al-Sowaidi 2010). Economic development and growth issues continue to capture the interests of academics and policy makers around the globe. In recent times, the shift in emphasis has been from the classical concepts of maximising production outputs and wealth distribution towards economic sustainability, as a reaction to globalisation. This has resulted in major economic reforms, especially among developing countries as they expand their markets. Economic sustainability is heavily tied to investment, which in turn relies on the capital

market. Hence, development of a stable domestic capital market underpins sustainability (Levine & Zervos 1998).

2.3 Capital Market Development & Economic Growth Main Hypotheses (Views)

According to modern growth theory, the financial sector may affect long-run growth through its impact on capital accumulation and the rate of technological progress. Financial sector development has a crucial impact on economic growth and poverty reduction, especially in developing countries; without it, economic development may be constrained, even if other necessary conditions are met (DFID 2004).

The theoretical relationships between capital market development and economic growth have been analysed extensively in the literature and may be summarised under four hypotheses or views:

First, the conventional view of the supply leading hypothesis postulates that the direction of causality flows from capital market development to steady-state economic growth. In a world without frictions caused by transaction, information, and monitoring costs, no financial intermediaries are needed. If those costs are sufficiently high, no exchanges among economic agents will take place. The need to reduce those costs for exchanges to take place has led to the emergence of financial institutions and markets constituting the financial sector. A well-developed financial sector provides critical services to reduce those costs and thus to increase the efficiency of intermediation. It mobilises savings, identifies and funds good business projects, monitors the performance of managers, facilitates trading, diversification of risks, and fosters exchange of goods and services. These services result in a more efficient allocation of resources, a more rapid accumulation of physical and human capital, and faster technological innovation, thus inducing faster long-term economic growth.

This view can be traced back to Schumpeter (1912), Goldsmith (1969), McKinnon (1973), Shaw (1973) King and Levine (1993) and Pagano (1993) all of whom investigated the effect of capital market development on economic growth (Demirhan, Aydemir & Inkaya 2011; Levine & Zervos 1998). Schumpeter's (1912) important early study proposed a causal link whereby capital markets promote economic growth by funding entrepreneurs and channelling capital to them with higher return investments (Ake & Ognaligui 2010; Demirhan, Aydemir & Inkaya 2011; Dritsaki & Dritsaki-Bargiota 2005; Levine & Zervos 1998). Schumpeter's (1912) view was that economic change could not simply be predicated on previous economic conditions alone, although prevailing economic conditions were a result of this. Similarly, Goldsmith (1969) emphasised the effect of the financial structure and development on economic growth.

Second, the demand following hypothesis proposes that economic growth leads to capital market development (Jung 1986). This view suggests that as the economy grows, more financial institutions, financial products and services emerge in markets in response to a higher demand for financial services (Zang & Chul Kim 2007, Athanasios & Antonios 2010, Odhiambo 2010, Obiakor & Okwu 2011). If this hypothesis is correct, reform efforts should sequentially emphasise the development of the real sector, such as privatisation, labour market reforms to increase employment, tax reforms to provide a level playing field for investment, or legal and regulatory reforms to encourage private sector development.

The third view is the 'Feedback' causality that exists when there are a bi-directional causality between capital market development and economic growth (Hondroyiannis, Lolos and Papapetrou 2005, Majid 2007, Demirhan, Aydemir & Inkaya 2011, Al-Malkawi, Marashdeh & Abdullah 2012). A country with a well-developed capital market could promote high economic expansion through technological changes, products and services innovation, which in turn creates a high demand for the financial institutions. As the financial institutions effectively respond to this demand, these changes will stimulate higher economic achievement. Both capital market and economic developments are therefore positively interdependent (Majid 2007).

The fourth view is the 'Independent' causality that capital market and economic growth is not causally related (Stiglitz 1985, Mayer 1988, Boyd & Smith 1998, Mosesov & Sahawneh 2005, Abu-Bader & Abu-Qarn 2006). Large and well-developed capital markets are insignificant sources of corporate finance (Mayer 1988). Capital market liquidity will not enhance incentives for acquiring information about firms or exerting corporate governance (Stiglitz 1985, 1993). Risk sharing through internationally integrated capital markets can actually reduce saving rates and slow economic growth (Devereux & Smith 1994). Capital market development can harm economic growth by easing counter-productive corporate takeovers (Morck, Shleifer & Vishny 1990a, 1990b; Shleifer & Summers 1988).

2.4 Capital Market Development & Economic Growth Empirics

The literature review shows that the debate continues in both theoretical and empirical studies regarding the importance and causality directions of the relationship between capital market development and economic growth. For example, there are similar inconsistencies in empirical data on Saudi Arabia: on one hand Darrat (1999) investigated empirically the relationship between financial deepening and economic growth for three developing Middle-Eastern countries (Saudi

Arabia, Turkey and the UAE). His empirical results suggested that the economic stimulus of more sophisticated and efficient financial markets in Saudi Arabia become noticeable only gradually as the economies grow and mature in the long-run, and financial deepening may influence only some, but not all, sectors of the economy. On the other hand Naceur and Ghazouani's (2007) analysis of data from 1991 to 2003 found that developing the capital market is not important to the economies in 11 Middle Eastern and North African (MENA) countries, including Saudi Arabia. This resulted to their underdeveloped financial systems and unstable growth rates.

The objective of this chapter is to provide policy makers, academics and both profit and non-profit organisations, who desire to undertake research in the field or learn more about it, with an idea of the theoretical and empirical relationship between capital market development and economic growth as proposed by key economists in the field. Therefore it is important to determine how the capital market and the economy are correlated. Other objective is to offer a review of the relevant empirical research regarding capital market development and economic growth. It is essential to review the empirical literature, because this will assist academics and the research community to choose most appropriate data and methodologies when investigating the significance of and relationship between capital market development and economic growth. It could also help policy makers to decide which policy is best for the economy or, in other words, to determine what advantages they might acquire in terms of economic growth if they direct their policy toward developing the capital market. An empirical literature review also provides insights on the inconsistent results regarding capital market development and economic growth in the case of Saudi Arabia.

There is evidence of a direct relationship between capital market development and economic growth. Large capital markets can lower the cost of mobilising saving and thereby facilitate investment in productive technologies (Greenwood & Smith 1997). Bencivenga, Smith and Starr (1996) and Levine (1991) find that capital market liquidity is important for growth. Efficient capital markets may increase investment through enhancing the flow of information on firms, which also improves corporate governance (Holmstrom & Tirole 1993; Kyle 1984). International risk sharing through internationally integrated stock markets improves resource allocation and increases the economic growth rate (Obstfeld 1994).

There is also country-specific evidence of a strong relationship between capital market development and economic growth (Ghali 1999). Hondroyiannis, Lolos and Papapetrou (2005) used monthly data sets over the 1986–1999 period to empirically assess how the development of the banking system and the stock market relates to economic performance in Greece. They used vector autoregression (VAR) models and showed that there was bidirectional causality between capital market development and economic growth in the long run. Error-correction models show that capital market promote economic growth in the long run: for example, Ghali's (1999) study on Tunisia, Khan Qayyum and Sheikh's (2005) study on Pakistan and Agrawalla and Tuteja's (2007) study on India.

However, large and well-developed capital markets are insignificant sources of corporate finance (Mayer 1988). Capital market liquidity will not enhance incentives for acquiring information about firms or exerting corporate governance (Stiglitz 1985, 1993). Risk sharing through internationally integrated capital markets can actually reduce saving rates and slow economic growth (Devereux & Smith 1994). Capital market development can harm economic growth by easing counter-productive corporate takeovers (Morck, Shleifer & Vishny 1990a, 1990b; Shleifer & Summers 1988).

Demirhan, Aydemir and Inkaya (2011) resolved previous inconsistencies in empirical data on Turkey by providing evidence of bidirectional causality between capital market development and economic growth. There are similar inconsistencies in empirical data on Saudi Arabia: on one hand Darrat (1999) investigated empirically the relationship between financial deepening and economic growth for three developing Middle-Eastern countries (Saudi Arabia, Turkey and the UAE). His empirical results suggested that the economic stimulus of more sophisticated and efficient financial markets in Saudi Arabia become noticeable only gradually as the economies grow and mature in the long-run, and financial deepening may influence only some, but not all, sectors of the economy. On the other hand Naceur and Ghazouani's (2007) analysis of data from 1991 to 2003 found that developing financial structures is not as important to the economies in 11 Middle Eastern and North African (MENA) countries, including Saudi Arabia, due to their underdeveloped financial systems and unstable growth rates. Thus, there appears to be no existing research on the proposed topic of this study.

The empirical literature in the case of Saudi Arabia with the exception of Masih et. al. (2009) is limited to MENA and GCC regions. These cross-country specific studies led to diverse results (Darrat 1999, Xu 2000, Al-Tamimi et al., 2002, Al-Yousif 2002, Omran and Bolbol 2003, Boulila & Trabelsi, 2004, Chuah & Thai 2004, Al-Awad & Harb, 2005, Naceur & Ghazouani 2007, Masih et. al. 2009, Goaied et. al. 2011, Kar et. al. 2011). These studies shared the lack of a capital market variables that fully reflect the banking sector and the stock market. Also these empirics used annual data that both old and short with low frequencies as low as 20 observations. These noticeable remarks motivated this study on Saudi Arabia to be country-specific, using long time period, and more frequent and updated data.

Some empirics indicated a significant long run

relationship in the capital market-economic growth nexus. Al-Tamimi et. al. (2002) examined the relationship between financial development and economic growth by using VAR method for Arab countries including Saudi Arabia over the period 1964-1998. The results indicate that capital market development and real GDP growth are strongly linked in the long-run. However, Granger causality tests and the impulse response functions indicate that the linkage is weak in the short-run. In addition, Xu (2000) used a multivariate vector-autoregressive (VAR) method to examine the effects of capital market development on domestic investment and output in 41 countries over the period 1960-1993. The findings support the supply leading view. However, a negative long term relationship between financial development and economic growth is found in the case of Saudi Arabia using data from 1962-1992.

In addition, couple of empirics supports the independent view: Boulila and Trabelsi (2004) used a sample of sixteen MENA countries for the period 1960–2002. They applied the bivariate vector autoregressive (bVAR) model on these variables: Real GDP per capita. Ratio of M3 to GDP, ratio of credit allocated to the private sector, ratio of financial savings to GDP. Ratio of M3 to GDP, ratio of credit allocated to the private sector, ratio of financial savings to GDP. They found no link between capital market development and economic growth in the case of Saudi Arabia over the period 1960-1999. Similar results of no significant relationship between capital market development and growth is found in the study of Naceur and Ghazouani (2007) that applied a dynamic panel model with GMM estimators on the data of 11 MENA countries, hence data on Saudi Arabia for the period 1991-2003.

Moreover, empirics that support the supply leading view do exist. Omran and Bolbol (2003) construct a growth equation that captures the interaction between FDI and various indicators of capital market development in the context of Arab countries. They used averaged five years cross-sectional data for the period 1975–1999. The estimation model is based on the growth accounting framework of the Cobb-Douglas production function where y is the growth rate of GDP per capita in the Arab world, and x represents capital market development indicators of the banking sector and the stock market. z is a vector of control variables that are usually used in the estimation (initial per capita income, human capital, investment/GDP, inflation rate, government consumption/GDP, openness of trade/GDP, and exchange rate), and is the error term. They found that FDI has a positive impact on economic growth, which depends on local conditions and absorptive capacities, where capital market development is one of the important capacities.

Likewise, empirics within the MENA region of Al-Awad and Harb (2005) who used a sample of ten MENA countries for the period 1969–2000 and by using panel cointegration approach concluded that the long-run capital market development and economic growth may be related to some level. In addition, the evidence of unidirectional causality that runs from capital market development to economic growth can be seen in Saudi Arabia in the short-run. However, Kar et. al. (2011) researched a sample of fifteen MENA countries over the period 1980–2007. They used GMM method and found a unidirectional relationship runs from economic growth to capital market development when using the ratio of private sector credit to income as a proxy for capital market development. Different results were found using a similar GMM method, Goaied et. al. (2011) investigated 16 MENA countries using annual data over the period 1962-2006. They found a negative and signification relationship in the long run when using bank based variables.

A recent country-specific study on Saudi Arabia concluded a supply leading view done by Masih et. al. (2009). They examined the relationship between capital market development and economic growth by applying VAR method and using annual data from 1985-2004 (20 observations). Note, they only used banking based measurement as proxies for the capital market development variable.

Furthermore, bidirectional relationship was found in the early study of Darrat (1999) who investigated the relationship between financial deepening and economic growth for three developing Middle-Eastern countries (Saudi Arabia, Turkey and the UAE). He applied Granger-Causality tests and VAR method over the period of 1964-1993 for Saudi Arabia. The study found long run bidirectional relationship between financial deepening and economic growth in the case of Saudi Arabia. Likewise, Al-Yousif (2002) examined the nature and direction of the relationship between financial development and economic growth employing a Granger-causality test within a VECM method. He used both time-series and panel data from 30 developing countries including Saudi Arabia for the period 1970-1999. The study found bidirectional causality between capital market development and economic growth. Similar results found by Chuah and Thai (2004), they used real non-hydrocarbon GDP in order to capture the real impact of bank based development variables on economic growth for six GCC countries including Saudi Arabia. Chuah and Thai (2004) used annual data over the period 1962-1999 for Saudi Arabia. They applied a bivariate time series model and concluded that capital market development provides critical services to increase the efficiency of intermediation, leading to a more efficient allocation of resources, a more rapid accumulation of physical and human capital, and faster technological innovation.

Table 2.1. Empirics Included Saudi Arabia

Author(s)	Empirical study	Sample	Period	Method	Results
Darrat (1999)	Are financial deepening and economic growth causality related? Another look at the evidence	Saudi Arabia, Turkey & UAE,	1964-93	Granger-Causality tests within VAR model	Feedback view
Xu (2000)	Financial development, investment, and economic growth	41 Countries	1960-93	VAR	Supply-leading view, a negative long term relationship
Al-Tamimi et. al. (2002)	Finance and Growth: Evidence from Some Arab Countries	8 Arab countries	1964-98	VAR	Positive and signification relationship in the long run when using bank based variables
Omran & Bolbol (2003)	Foreign direct investment, financial development, and economic growth: evidence from the Arab countries	17Arab countries	1975-99	OLS & Causality tests	Supply-leading view
Al-Awad & Harb (2005)	Financial development and economic growth in the Middle East	10 MENA countries	1969-2000	J-J & Granger panel cointegration tests	Supply-leading view in short term
Chuah & Thai (2004)	Financial Development and Economic Growth: Evidence from Causality Tests for the GCC countries	6 GCC countries	1962-1999	bVAR	Supply-leading view
Goaied et. al. (2011)	Financial Development, Islamic Banking and Economic Growth Evidence from MENA Region	16 MENA countries	1962-2006	GMM	Negative and signification relationship in the long run when using bank based variables
Kar et. al. (2011)	Financial development and economic growth nexus in the MENA countries: Bootstrap panel granger causality analysis	15 MENA countries	1980-2007	GMM	Demand-following view
Al-Yousif (2002)	Financial development and economic growth: another look at the evidence from developing countries	30 Developing countries	1970-99	VECM	Feedback view
Boulila & Trabelsi (2004)	The Causality Issue in the Finance and Growth Nexus: Empirical Evidence from Middle East and North African Countries	16 MENA countries	1960–2002	bVAR	Independent view
Naceur and Ghazouani (2007)	Stock markets, banks, and economic growth: empirical evidence from the MENA region	11 MENA countries	1991-2003	GMM	Independent view
Masih et. al. (2009)	Causality between financial development and economic growth: an application of vector error correction and variance decomposition methods to Saudi Arabia	Saudi Arabia	1985-2004	VAR	Supply-leading view

3 Data, Scope and Variables

This study investigates the relationship between capital market development and economic growth of the Saudi economy over the period January 1993 to December 2009. The secondary monthly data (204 observations) of the variables selected for the VAR models are collected from the IMF, SAMA and the Saudi stock exchange Tadawul.

We used real GDP growth rate (GDP) and real non-oil GDP growth rate (NOGDP) as proxies for economic growth; Stock market development (SMI)

proxied by the Tadawul All share index (TASI), the broad money supply (M2) and bank credit (BCP) of local commercial banks for the private sector as proxies for capital market development. Controlled by (1) a short term interest rate (IR), the Saudi Arabia Interbank Offered Rate (Isa3); (2) inflation (INF) in the Saudi economy measured by the consumer price index (CPI);

(3) world oil price (OP) proxied by the UK-Brent crude price oil.

3.1 Economic Growth Variables

Economic growth in Saudi Arabia has been based, to a large extent, on the development of hydrocarbon (oil and gas) resources. The production of hydrocarbon sector, while having met world demand, has also been conditioned by the need to finance domestic development. To a more limited extent, economic growth has also reflected the development of non-hydrocarbon sector in response to the economic diversification policy initiated in the late1970s aiming at minimising the negative effects of international oil price fluctuations. The development of the non-hydrocarbon sector is based mostly on the development of industries using the abundant hydrocarbon resources as inputs, such as petrochemicals, fertilisers, electricity generation for aluminium production. It has also been derived from growth in industries that are not based on hydrocarbon and that are important in specific countries. To measure economic growth in Saudi Arabia, we use two proxies.

3.1.1 Real GDP Growth Rates (GDP)

Economic growth is defined as the increase in a nation's ability to produce goods and services over time as is shown by increased production levels in the economy. This thesis employs real GDP growth rates as a proxy for economic growth as it focuses on actual domestic production per person, which has a bearing on the general welfare of a country's citizens. Following the empirical study of King and Levine (1993), the variable of economic growth (GDP) is measured by the rate of change of real GDP. Due to the unavailability of monthly data for GDP in Saudi Arabia, monthly figures are obtained from annual data through geometric interpolation, following Darrat and Al-Sowaidi's (2010) empirical study.

3.1.2 Real Non-Oil GDP Growth Rate (NOGDP)

The proxy for economic growth refers to real non-oil GDP growth rate. A distinguishing feature of the oil exporting countries such as Saudi Arabia is the substantial contribution of the oil sectors to the overall economy. This sector averages 60 per cent of the Saudi total economy. While financial intermediation affects all sectors of the economy, it may be argued that the performance of the oil sector reflects more global economic conditions than domestic capital market development. Therefore, total GDP may not accurately capture the impact of capital market development on economic performance. To address this concern, the oil sector of the economy is removed from GDP to form the non-oil GDP growth rate proxy (Chuah & Thai 2004).

The testing of this relationship with non-oil GDP growth rate is an attempt to see, in a broad perspective, whether capital market development may be seen as a way to meet the policy challenge facing Saudi Arabia to diversify its economy into non-oil sectors so as to reduce their vulnerabilities to international oil price fluctuations. Due to the unavailability of monthly data for GDP in Saudi Arabia, monthly figures are obtained from annual data through geometric interpolation, following Darrat and Al-Sowaidi's (2010) empirical study.

3.2 Capital Market Development (CMD) Variables

The nonfinancial sector is less developed than the banking sector. Therefore, this study is not using the following stock market related variables used in the literature review.

3.2.1 Stock Market Index (SMI)

The All-Share Index and the number of listed companies have a positive significant effect on economic growth (Asiegbu & Akujuobi 2010, Athanasios & Antonios 2010). This is supported by Olweny and Kimani's (2011) findings that imply that the causality between economic growth and the stock market runs unilaterally from the NSE 20-share index to the GDP. From their results, it was inferred that the movement of stock prices in the Nairobi stock exchange reflect the macroeconomic condition of the country and can therefore be used to predict the future path of economic growth. Similarly, the study by Kirankabes and Başarir (2012) found that there is a long-term relationship between economic growth and the ISE 100 Index, and a one-way causality relationship with the ISE 100 towards economic growth.

Tadawul All Share Index (TASI) is the only general price index for the Saudi stock market. It is computed based on the calculation that takes into account traded securities or free-floating shares. According to Saudi capital law, shares owned by the following parties are excluded from TASI calculations: the Saudi government and its institutions; a foreign partner, if he or she is not permitted to sell without the prior approval of the supervision authority; a founding partner during the restriction period; and owners who hold 10% or more of a company's shares listed on the Saudi stock

market (Tadawul website 2013). At the end of 2010, free-floating shares on the TASI index accounted for 41% of total issued shares. TASI reflects the performance of all the 146 listed companies within fifteen sectors in the Saudi stock market taking into account the free-floating shares. Thus, it is expected to provide better insight into the overall performance of the Saudi stock market in response to fundamental changes within the Saudi economy.

The stock markets are very small, shallow, and illiquid. The secondary market for government papers is limited, the private capital markets nascent and insurance and pension funds not fully developed. Foreign investment in the nonbank financial sector, similar to the banking sector, is restrictive. The stock market data are on only available from 1985. The bond and ETF markets are established in 13 June 2009 and 28th March 2010 respectively.

3.2.2 Bank Credit to Private Sector (BCP)

The banking sector, which constitutes the core of the Saudi Arabian financial sector possess a number of common features. It is very concentrated and government dominated. However, as part of the policy to promote the private sector, divestiture of some state-owned banks has taken place in recent years. Banks are closely regulated and supervised, and are compliant or largely compliant with most Basel Core Principles as well as with international standards on anti-money laundering and the combating of terrorism financing. Banks face little changes in competition due in part to the restrictive policy for new bank entries during the past decades. In 2001, GCC banks were allowed to establish in other GCC countries; but as of end-2003, only a few banks have been licensed. Entry of non-GCC banks is still under consideration.

Banks are profitable and efficient. They offer a wide range of financial instruments for deposits and loans. In recent years, they have introduced new products (mortgage in Saudi Arabia), broadened or intensified their activities (private and investment banking, project financing, and Islamic banking), adopted new technologies (ATM, internet banking), and updated their financial skills.

Banks also benefit from well functioning payment systems which have been updated to international standards to ensure prompt registration, clearing, and settlement of transactions. Credit bureaus have been introduced in some countries, and are underway in others. Deposit insurance schemes exist in some countries and they have been considered for some time in others; although in the latter, bank deposits are implicitly guaranteed by the governments.

The bank credit to the private sector as a ratio of nominal GDP (BCP) represents more accurately the role of intermediaries to channel funds to private sector and it is more closely associated with investment and hence economic growth. Levine, Loyaza and Beck (2000) emphasised that BCP is (1) a good representation of the role of capital intermediaries in channelling funds to private market participants. (2) BCP can be an indicator of the functioning of the capital market because it is a measure of the quantity and quality of investment. (3) BCP excludes credit to the public sector which better reflects the extent of efficient resources allocation.

Commercial banks, in the modern economy, create most of the money supply by issuing loans. Therefore, when banks create an excess supply of money, the prices of assets, goods, and services tend to rise. Conversely, when not enough money is created, the prices of assets, goods, and services decrease. Thus, it is reasonable to hypothesise that a strong positive relationship exists between asset prices and bank lending.

Thus, this study will use BCP as a measurement for capital market development by following the steps of Omran and Bolbol (2003), Boulila and Trabelsi (2004), Chuah and Thai (2004), Al-Awad and Harb (2005), Naceur and Ghazouani (2007), Masih et. al. (2009), Goaied et. al. (2011) and Kar et. al. (2011).

The link between commercial banks in the Saudi economy is unique, in the sense that banks have a significant position in both the debt and equity markets since the intermediation function of the Saudi stock market was restricted by the law to commercial banks (SAMA 1997). Banks are the second largest supplier of credit in the Saudi economy after the government's mutual funds (Ramady 2010, SAMA 2011).

Bank credit to the private sector is used, for example, in King and Levine (1993), Gregorio and Guidotti (1995), Demetriades and Hussein (1996) and Khan and Senhadji (2000). However, bank credit to the private sector may be negatively correlated with growth as a result of negative correlation between bank credit and nonbank financial intermediation. The latter situation stems from the possibility that financial innovation may induce a substitution away from credit to stock market and other forms of direct financing. This possibility is unlikely to occur in the GCC countries because the stock markets have not been fully developed and direct financing of firms by bonds is still nascent and sufficiently long time series for these proxies are not available. As a result, this paper does not include measures of stock and bond markets as part of financial development.

In this study, it is vital to include BCP to help determine the effect of credit banks' lending behaviour on the Saudi economy. Examining the historical relationship between bank lending behaviour and the economy may also provide the Saudi authority with reliable knowledge about the role of bank loans in transmitting financial shocks to the real sector. In other words, understanding this channel may help authorities to stimulate bank loans as a way to boost real activity in the local economy.

3.2.3 Broad Money Supply (M2)

Darrat (1999), Al-Yousif (2002) and Kar et. al. (2011) used the degree of financial deepening is the inverse of the broad-money velocity, that is, the ratio of broad money stock (M2) to nominal GDP. This measure, suggested by McKinnon (1973) and Shaw (1973), and recently used by King and Levine (1993) is often called the monetisation variable (Z), which could measure the size of the financial market or 'financial depth'. An increase in this variable indicates further expansion in the financial intermediary sector relative to the rest of the economy since it implies faster accumulation of a wide range of financial assets (primarily saving accounts). As is typical with any empirical measurement of economic phenomenon, these proposed proxies are not perfect measures of the degree of financial deepening. In particular, changes in K and Z may not solely reflect financial deepening. For example, currency substitution could ignite similar changes in K. Nevertheless, in the absence of better alternatives, researchers continue using K and Z to approximately monitor financial development in various countries.

M2 is a broad measure of the money supply in the Saudi economy, and consists of the narrow money supply (M1) components, time deposits and savings deposits. Examining this measure is expected to give a comprehensive view of the role that the money supply plays in explaining movements in the Saudi economy.

3.3 The Control Variables (CV)

3.3.1 Interest Rate (IR)

In line with the literature review most empirics used real interest rate to measure financial repression. For example, Khan Qayyum and Sheikh (2005) found that changes in real interest rate exerted positive (negative) impact on economic growth. However, the response of real interest rate is very small in the short run.

Investigating the relationship between the interest rate and the Saudi economy is of particular interest to researchers for at least two reasons. First, the Saudi Monetary Authority works in a unique institutional environment in which charging interest is prohibited by Islamic law. That is, Islamic law does not consider money as an asset, and thus, money is viewed only as a measurement of value. For that reason, SAMA, the central bank in Saudi Arabia, has no direct control over the interest rate (Ramady 2010). Second, the Saudi currency has been pegged to the US dollar at a fixed exchange rate since 1986. This restriction makes local monetary policy conditional on the monetary policy of the US. In such an environment, interest rate based assets are not the primary alternative for the majority of investors in the Saudi economy. Money and capital markets in the Saudi economy are not substitutes but rather are independent.

Most empirical studies related to the Saudi economy use a short or a long term interest rate of the US market as a proxy for the Saudi market due to the Saudi exchange rate policy. However, this study do not use this variable for the reasons mentioned earlier.

3.3.2 Inflation (INF)

In line with, Bekaert and Harvey (1997), Darrat (1999), Al-Tamimi et. al. (2002), Omran and Bolbol (2003), Naceur and Ghazouani (2007) and Goaied et. al. (2011) they used inflation rate as an important variable on the economy. Fisher (1930) believes that the real and monetary sectors of the economy are independent, and claims that the nominal interest rate fully reflects the available information concerning the possible futures values of the rate of inflation. Thus, he hypothesises that the real return on interest rates is determined by real factors such as the productivity of capital and time preference of savers, hence, the real return on interest rates and the expected inflation rate are independent.

Thus, investors may benefit from this study to learn how to allocate their recourses more efficiently to protect the purchasing power of their investments, especially during inflationary periods. However, there are no enough available data on this variable that pre-date 1980.

3.3.3 Oil Price (OP)

Oil price was used in empirics associated with oil producing countries such as Mosesov and Sahawneh (2005) on the UAE and Naceur and Ghazouani (2007) on the MENA region.

The Saudi economy is a small oil-based economy that possesses nearly 20 per cent of the world's known petroleum reserves and is ranked as the largest exporter of petroleum (OPEC 2013). The oil sector in the Saudi economy contributes more than 85 per cent of the country's exports and government revenues (SAMA 2013). As a result, oil revenue plays a vital role in all major economic activities in Saudi Arabia. Hence, the Saudi economy also imports almost all manufactured and raw goods except for oil from developed and emerging countries.

Even though high oil prices impose a positive impact on the economy this may indirectly harm the economy through its influence on the prices of imported products. In other words, a high oil price may be fed back to the local economy as imported inflation, which increases future interest rates.

This study uses the Brent oil price rather than other oil benchmarks - and Dubai-Oman oil prices - mainly because it is used to price two-thirds of the crude oil internationally traded.

4. Methodology

In this study the method of vector autoregressive model (VAR) is adopted to estimate the effects of stock and credit market development on economic growth. In order to test the causal relationships, the following multivariate model is to be estimated.

$$Y = f(CMD, CV) \quad (4.1)$$

Where:

Y = Economic Growth variables.
CMD = Capital Market Development variables.
CV = Control variables.

4.1 Analytical Framework

The analytical framework of this study can be modelled in VAR form for the proposed empirical investigation:

$$Y_t = \alpha + \Phi Y_{t-1} + \varepsilon_t \quad (4.2) \quad \varepsilon_t \text{ IID } (0, \Omega)$$

Where: Φ = a matrix of AR (1) coefficients
Ω = a covariance matrix of the error terms
Y_t = a vector, which contains Y, CMD and CV

Many researchers use Vector Autoregression (VAR) modelling (Agrawalla & Tuteja 2007; Ake & Ognaligui 2010; Demirhan, Aydemir & Inkaya 2011; Khan, Qayyum & Sheikh 2005). The VAR model, according to Juselius (2006), is a flexible model for the analysis of multivariate time series. It is a natural extension of the univariate autoregressive model for dynamic multivariate time series. The VAR model is especially useful for describing the dynamic behaviour of economic and financial time series. Due to these advantages, VAR and vector error correction models (VECM) were generally used in previous studies. However, VAR models may require a large lag length to adequately describe a series; thus, there is a loss of precision due to the extent of the parameters estimated.

4.2 VAR Models

4.2.1 VAR(1)

$$GDP = f(SMI, IR, INF, OP) \quad (4.3)$$

4.2.2 VAR(2)

$$GDP = f(BCP, IR, INF, OP) \quad (4.4)$$

4.2.3 VAR(3)

$$GDP = f(M2, IR, INF, OP) \quad (4.5)$$

4.2.4 VAR(4)

$$NOGDP = f(SMI, IR, INF, OP) \quad (4.6)$$

4.2.5 VAR(5)

$$NOGDP = f(BCP, IR, INF, OP) \quad (4.7)$$

4.2.6 VAR(6)

$$NOGDP = f(M2, IR, INF, OP) \quad (4.8)$$

Where: GDP = Real GDP Growth Rates.
NOGDP = Real Non-Oil GDP Growth Rate.
SMI = Stock Market Index.
BCP = Bank Credit to Private Sector.
M2 = Broad Money Supply.
IR = Interest Rate.
INF = Inflation Rate.
OP = Oil Price.

All variables are in logarithm except GDP because of some negative values.

5. Results

5.1Descriptive Analysis

Table 5.1 summarises the basic statistical features of the data under consideration, including the mean, the minimum and maximum values, standard deviation, kurtosis, skewness and the Jarque-Bera test for the data in their levels. This descriptive statistics provide a historical background for the behaviour of the data in this study. For instance, the standard deviations indicate that GDP, SMI, BCP, IR and OP are more volatile than M2 and INF (see Table 5.1). This is perhaps because the nature of the oil-based economy dependents on the fluctuations of the oil prices (SAMA 2013). Furthermore, the standard deviation indicates that the inflation rate (INF) is the least volatile compared to other macroeconomic variables during the same time.

P-values associated with the Jarque-Bera statistics, a test for departures from normality, show that the sample skewness and kurtosis are significantly different from zero and three respectively (Table 5.1). Given that the kurtosis of GDP, SMI, BCP, M2, INF and OP variables are all less than three, the distributions of these variables exhibit non-normality (Stock & Watson 2006). The positive values of the skewness tests for GDP, SMI, BCP and FDI suggest that these variables have long right tails, while negative values of the skewness tests for NOGDP and IR suggest that these two variables have long left tails (Stock & Watson 2006).

Although there is no indication of causation, the results reported in Table 5.2 reveal information on the strength of the relationships connecting the macroeconomic variables. In particular, Table 5.2 shows a positive relationship between both of the economic growth variables (GDP and NOGDP) and the rest of the macroeconomic variables in the time-series (SMI, BCP, M2, INF and OP). On the other hand, a negative relationship exists between all the variables in the series with the interest rate (IR).

Table 5.1. Statistical features of the Macroeconomic variables

	GDP	NOGDP	SMI	BCP	M2	IR	INF	OP
Mean	2.619588	1.199035	8.063292	5.394410	12.63631	1.273278	4.627449	3.385611
Median	2.645867	1.309770	7.768527	5.187218	12.48041	1.577301	4.610257	3.244349
Maximum	7.946421	1.656937	9.878306	6.618427	13.65092	1.955241	4.834002	4.897093
Minimum	-1.102634	-0.227042	7.041587	4.491553	12.03999	-1.599868	4.548790	2.282382
Std. Dev.	2.177265	0.471524	0.788889	0.642629	0.487986	0.683222	0.064257	0.620824
Skewness	0.356721	-1.503642	0.599593	0.621988	0.677363	-1.713942	1.853055	0.517218
Kurtosis	2.490407	4.426502	2.002002	2.027919	2.212334	6.241557	5.613883	2.220229
Jarque-Bera	6.533817	94.16865	20.68942	21.18555	20.87348	189.1936	174.8249	14.26385
Probability	0.038124	0.000000	0.000032	0.000025	0.000029	0.000000	0.000000	0.000799
Sum	534.3960	244.6031	1644.912	1100.460	2577.807	259.7486	943.9996	690.6647
Sum Sq. Dev.	962.3182	45.13402	126.3362	83.83340	48.34039	94.75871	0.838184	78.24084
Observations	204	204	204	204	204	204	204	204

Table 5.2. Covariance Analysis

Correlation								
Probability	GDP	NOGDP	SMI	BCP	M2	IR	INF	OP
GDP	1.000000							

NOGDP	0.538188	1.000000						
	0.0000	-----						
SMI	0.551938	0.641640	1.000000					
	0.0000	0.0000	-----					
BCP	0.369023	0.539090	0.872268	1.000000				
	0.0000	0.0000	0.0000	-----				
M2	0.366674	0.561516	0.851604	0.994213	1.000000			
	0.0000	0.0000	0.0000	0.0000	-----			
IR	-0.184546	-0.232547	-0.380673	-0.511778	-0.561539	1.000000		
	0.0082	0.0008	0.0000	0.0000	0.0000	-----		
INF	0.077054	0.226045	0.412037	0.760032	0.780904	-0.499872	1.000000	
	0.2733	0.0012	0.0000	0.0000	0.0000	0.0000	-----	
OP	0.377939	0.557204	0.899214	0.918510	0.912904	-0.413084	0.618628	1.000000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-----

5.2 Long-Run Analysis

5.2.1 Unit Root Test

The results from the augmented Dickey-Fuller (1979) (ADF) unit root test, and Phillips-Perron (1988) (PP) tests provide additional support for treating all the individual series as non-stationary in their levels but stationary in their first differences.

5.2.2 Optimal Lag Tests

We precede our analysis using 3 lags suggested by Schwarz information criterion (SC) and Hannan-Quinn information criterion (HQ).

5.2.3 Cointegration Test

Following the rough guide in the EViews 7 User's Guide II (2012), and since we believe that all of the data series have stochastic trends, the analysis proceeds to examine the long run and short run relationships between the economic growth variables and the rest of the macroeconomic variables in the system assuming a linear trend in the VAR and the cointegrating relationship only has an intercept. Hence, in the presence of more than cointegration vector Johansen and Juselius (1990) suggested that the first eigenvector is the most useful to use in examining the long run relationship between variables in the system (Mukherjee and Atsuyuki, 1995).

The major implications derived from these two tests are:

(1) The macroeconomic variables in the system share a long run relationship. Hence each variable in the system tends to adjust proportionally to remove short run deviations from the long run equilibrium.

(2) There is at least one direction of causality among the variables in the system as expected by the

Granger representation theorem.

Finding a long run relationship between the economic growth variable (NOGDP) and the capital market development variables in the Saudi economy is consistent with a large body of empirical studies including Levine (1991); King and Levine (1993); Atje and Jovanovic (1993) Levine and Zervos (1996,1998); Demirguc-Kunt and Levine (1996); Arestis et al (2001); Al-Yousif (2002); Thangavelu and James (2004); Mosesov and Sahawneh (2005); Abu-Sharia (2005); Abu-Bader and Abu-Oarn (2006); Athanasios and Antonios (2010); Mishal (2011); Demirhan, Aydemir and Inkaya (2011); and Al-Malkawi et al. (2012).

However, there is only a negative and significant relationship between the economic growth variable (GDP) and the capital market development variable (SMI).

Given that there is at least one cointegration vector among the variables in the system, the analysis normalises the cointegrating vector on (GDP, NOGDP). Equations (5.1-5.6) presents these findings, which indicate, in general, that all capital market development variables included in the VAR models are statistically significantly contributing to the long run relationships with the economic growth when using NOGDP variable.

VAR (1): (5.1)

D(GDP) = A(1,1)*(B(1,1)*GDP(-1) + B(1,2)*LSMI(-1) + B(1,3)*LIR(-1) + B(1,4)*LINF(-1) + B(1,5)*LOP(-1) + B(1,6)) + C(1,1)*D(GDP(-1)) + C(1,2)*D(GDP(-2)) + C(1,3)*D(GDP(-3)) + C(1,4)*D(LSMI(-1)) + C(1,5)*D(LSMI(-2)) + C(1,6)*D(LSMI(-3)) + C(1,7)*D(LIR(-1)) + C(1,8)*D(LIR(-2)) + C(1,9)*D(LIR(-3)) + C(1,10)*D(LINF(-1)) + C(1,11)*D(LINF(-2)) + C(1,12)*D(LINF(-3)) + C(1,13)*D(LOP(-1)) + C(1,14)*D(LOP(-2)) + C(1,15)*D(LOP(-3)) + C(1,16)

D(RGDPR) = - 0.00179720602569*(GDP(-1) - 1.76668529906*LSMI(-1) - 0.353315200157*LIR(-1) - 7.40096025985*LINF(-1) - 0.296731969874*LOP(-1) + 47.3433452632) + 1.48090630713*D(GDP(-1)) - 0.159900957692*D(GDP(-2)) - 0.370311818447*D(GDP(-3)) + 0.00327814943376*D(LSMI(-1)) + 0.0437628631718*D(LSMI(-2)) + 0.0437245379792*D(LSMI(-3)) - 0.0128262318107*D(LIR(-1)) + 0.00108704944885*D(LIR(-2)) + 0.00552818338651*D(LIR(-3)) - 0.17652891817*D(LINF(-1)) - 0.148810619315*D(LINF(-2)) - 0.00620030889853*D(LINF(-3)) + 0.0147960720268*D(LOP(-1)) - 0.00478542745239*D(LOP(-2)) - 0.00536411925617*D(LOP(-3)) - 0.0009139834765

VAR (2): (5.2)

D(RGDPR) = A(1,1)*(B(1,1)*GDP(-1) + B(1,2)*LBCP(-1) + B(1,3)*LIR(-1) + B(1,4)*LINF(-1) + B(1,5)*LOP(-1) + B(1,6)) + C(1,1)*D(GDP(-1)) + C(1,2)*D(GDP(-2)) + C(1,3)*D(GDP(-3)) + C(1,4)*D(LBCP(-1)) + C(1,5)*D(LBCP(-2)) + C(1,6)*D(LBCP(-3)) + C(1,7)*D(LIR(-1)) + C(1,8)*D(LIR(-2)) + C(1,9)*D(LIR(-3)) + C(1,10)*D(LINF(-1)) + C(1,11)*D(LINF(-2)) + C(1,12)*D(LINF(-3)) + C(1,13)*D(LOP(-1)) + C(1,14)*D(LOP(-2)) + C(1,15)*D(LOP(-3)) + C(1,16)

D(RGDPR) = - 0.00104868081916*(GDP(-1) + 0.292659428027*LBCP(-1) - 0.166643334979*LIR(-1) - 9.26056180223*LINF(-1) - 2.5893231905*LOP(-1) + 47.6427682274) + 1.51473447189*D(GDP(-1)) - 0.208510644915*D(GDP(-2)) - 0.354571261551*D(GDP(-3)) + 0.00885338309744*D(LBCP(-1)) - 0.100133163851*D(LBCP(-2)) + 0.0985660628442*D(LBCP(-3)) - 0.0128577409165*D(LIR(-1)) - 0.000321993972595*D(LIR(-2)) + 0.00440330334655*D(LIR(-3)) - 0.128329711138*D(LINF(-1)) - 0.103576536977*D(LINF(-2)) - 0.196954741946*D(LINF(-3)) + 0.0207210040137*D(LOP(-1)) + 0.0108269907915*D(LOP(-2)) + 0.00503480475442*D(LOP(-3)) - 0.000606057158487

VAR (3): (5.3)

D(RGDPR) = A(1,1)*(B(1,1)*GDP(-1) + B(1,2)*LM2(-1) + B(1,3)*LIR(-1) + B(1,4)*LINF(-1) + B(1,5)*LOP(-1) + B(1,6)) + C(1,1)*D(GDP(-1)) + C(1,2)*D(GDP(-2)) + C(1,3)*D(GDP(-3)) + C(1,4)*D(LM2(-1)) +C(1,5)*D(LM2(-2)) + C(1,6)*D(LM2(-3)) + C(1,7)*D(LIR(-1)) + C(1,8)*D(LIR(-2)) + C(1,9)*D(LIR(-3)) + C(1,10)*D(LINF(-1)) + C(1,11)*D(LINF(-2)) + C(1,12)*D(LINF(-3)) + C(1,13)*D(LOP(-1)) + C(1,14)*D(LOP(-2)) + C(1,15)*D(LOP(-3)) + C(1,16)

D(RGDPR) = 0.000138886897223*(GDP(-1) + 0.968158512723*LM2(-1) - 0.263857820774*LIR(-1) - 10.0320975533*LINF(-1)-5.75497472121*LOP(-1) + 51.4078481577) + 1.50899406532*D(GDP(-1)) - 0.173964679883*D(GDP(-2)) - 0.385726321604*D(GDP(-3)) + 0.0455698971217*D(LM2(-1)) + 0.253032025605*D(LM2(-2)) - 0.0252147952512*D(LM2(-3)) -0.00934317195848*D(LIR(-1)) - 0.000820650405583*D(LIR(-2))- 0.00172555822101*D(LIR(-3)) - 0.110032505443*D(LINF(-1)) - 0.0347867690477*D(LINF(-2)) - 0.0853591131399*D(LINF(-3))+0.0286838973307*D(LOP(-1)) + 0.00972534403679*D(LOP(-2)) + 0.00429022203878*D(LOP(-3)) - 0.00300481437013

VAR (4): (5.4)

D(RNOIL) = A(1,1)*(B(1,1)*LNOGDP(-1) + B(1,2)*LSMI(-1) + B(1,3)*LIR(-1) + B(1,4)*LINF(-1) + B(1,5)*LOP(-1) + B(1,6)) + C(1,1)*D(LNOGDP(-1)) + C(1,2)*D(LNOGDP(-2)) + C(1,3)*D(LNOGDP(-3)) + C(1,4)*D(LSMI(-1)) + C(1,5)*D(LSMI(-2)) + C(1,6)*D(LSMI(-3)) + C(1,7)*D(LIR(-1)) + C(1,8)*D(LIR(-2)) + C(1,9)*D(LIR(-3)) + C(1,10)*D(LINF(-1)) + C(1,11)*D(LINF(-2)) + C(1,12)*D(LINF(-3)) + C(1,13)*D(LOP(-1)) + C(1,14)*D(LOP(-2)) + C(1,15)*D(LOP(-3)) + C(1,16)

D(RNOIL) = - 0.000985545647958*(LNOGDP(-1) + 0.759102743443*LSMI(-1) - 0.198248676173*LIR(-1) - 4.07994215652*LINF(-1) - 2.19036998715*LOP(-1) + 19.2397473113) + 1.64819382976*D(LNOGDP(-1)) - 0.489950771976*D(LNOGDP(-2)) - 0.201257983605*D(LNOGDP(-3)) + 0.00564669471079*D(LSMI(-1)) + 0.00438411657755*D(LSMI(-2)) + 0.00431212309293*D(LSMI(-3)) + 0.00306493386399*D(LIR(-1)) - 0.000235896365299*D(LIR(-2)) - 0.00222836651304*D(LIR(-3)) - 0.123107433756*D(LINF(-1)) - 0.0636532196547*D(LINF(-2)) - 0.0439096303692*D(LINF(-3)) - 0.00666281573893*D(LOP(-1)) - 0.00350771290205*D(LOP(-2)) - 0.00214987390671*D(LOP(-3)) + 0.000401437621344

VAR (5): (5.5)

D(RNOIL) = A(1,1)*(B(1,1)*LNOGDP(-1) + B(1,2)*LBCP(-1) + B(1,3)*LIR(-1) + B(1,4)*LINF(-1) + B(1,5)*LOP(-1) + B(1,6)) + C(1,1)*D(LNOGDP(-1)) + C(1,2)*D(LNOGDP(-2)) + C(1,3)*D(LNOGDP(-3)) + C(1,4)*D(LBCP(-1)) + C(1,5)*D(LBCP(-2)) + C(1,6)*D(LBCP(-3)) + C(1,7)*D(LIR(-1)) + C(1,8)*D(LIR(-2)) + C(1,9)*D(LIR(-3)) + C(1,10)*D(LINF(-1)) + C(1,11)*D(LINF(-2)) + C(1,12)*D(LINF(-3)) + C(1,13)*D(LOP(-1)) + C(1,14)*D(LOP(-2)) + C(1,15)*D(LOP(-3)) + C(1,16)

D(RNOIL) = - 0.000965408577069*(LNOGDP(-1) + 1.09855630459*LBCP(-1) - 0.132186020658*LIR(-1) - 8.11174983846*LINF(-1) - 1.9595517293*LOP(-1) + 37.2204824303) + 1.67058640794*D(LNOGDP(-1)) - 0.537868607607*D(LNOGDP(-2)) -0.173617810544*D(LNOGDP(-3)) - 0.00991715324502*D(LBCP(-1)) + 0.0115741281591*D(LBCP(-2)) - 0.0166563009356*D(LBCP(-3)) + 0.00276505885787*D(LIR(-1)) - 9.23488218473e-05*D(LIR(-2)) - 0.00235175947012*D(LIR(-3)) - 0.116535496131*D(LINF(-1)) - 0.0698183801019*D(LINF(-2)) - 0.0423674684253*D(LINF(-3)) - 0.0044037105407*D(LOP(-1)) - 0.00202884873897*D(LOP(-2)) - 0.000327631913615*D(LOP(-3)) + 0.00060631065353

VAR (6): (5.6)

D(RNOIL) = A(1,1)*(B(1,1)*LNOGDP(-1) + B(1,2)*LM2(-1) + B(1,3)*LIR(-1) + B(1,4)*LINF(-1) + B(1,5)*LOP(-1) + B(1,6)) + C(1,1)*D(LNOGDP(-1)) + C(1,2)*D(LNOGDP(-2)) + C(1,3)*D(LNOGDP(-3)) + C(1,4)*D(LM2(-1)) + C(1,5)*D(LM2(-2)) + C(1,6)*D(LM2(-3)) + C(1,7)*D(LIR(-1)) + C(1,8)*D(LIR(-2)) + C(1,9)*D(LIR(-3)) + C(1,10)*D(LINF(-1)) + C(1,11)*D(LINF(-2)) + C(1,12)*D(LINF(-3)) + C(1,13)*D(LOP(-1)) + C(1,14)*D(LOP(-2)) + C(1,15)*D(LOP(-3)) + C(1,16)

D(RNOIL) = - 0.000687200999305*(LNOGDP(-1) + 3.08295034883*LM2(-1) + 0.00987930170814*LIR(-1) - 11.9892166942*LINF(-1) - 3.106999132*LOP(-1) + 25.834680305) + 1.673609996*D(LNOGDP(-1)) - 0.5369869769*D(LNOGDP(-2)) - 0.177344037017*D(LNOGDP(-3)) + 0.0273581857273*D(LM2(-1)) - 0.00880678375625*D(LM2(-2)) -0.0176647320278*D(LM2(-3)) + 0.00213330131843*D(LIR(-1)) - 0.000982716625643*D(LIR(-2)) - 0.003017304147 14*D(LIR(-3)) - 0.122548182321*D(LINF(-1)) - 0.0607138579366*D(LINF(-2)) - 0.0597315575112*D(LINF(-3)) - 0.00479899427036*D(LOP(-1)) - 0.00266084682408*D(LOP(-2)) - 0.000114161865417*D(LOP(-3)) + 0.00043601065477

The normalised cointegrating vectors given in Equations (5.1-5.6) suggest the following results.

5.2.3.1 VAR (1)

A significant and negative long-run relationship between GDP and SMI is found in this study. This result is in alignment with the empirical studies by Athanasios and Antonios (2010) and Olweny and Kimani's (2011) findings imply that the causality between economic growth and stock market runs unilaterally from the NSE 20-share index to the GDP. From the results, it was inferred that the movement of stock prices in the Nairobi stock exchange reflect the macroeconomic condition of the country and can therefore be used to predict the future path of economic growth; Kirankabes and Başarir (2012) found that there is a long-term relationship between economic growth and the ISE 100 Index, and a one-way causality relationship with the ISE 100 towards economic growth. Asiegbu and Akujuobi (2010) found that the All-Share Index and number of listed companies have a positive significant effect on economic growth.

The negative relationship results do make sense because:

1. At the end of 2009, free-floating shares on the TASI index accounted for 37.9 per cent of total issued shares.

2. The number of listed companies is very little compare to the size of the market as the Arab, Middle East and North Africa biggest capital market. Kolapo and Adaramola (2012)

3. Recommended that the regulatory authority should initiate policies that would encourage more companies to access the market and also be more proactive in their surveillance role in order to check sharp practices which undermine market integrity and erode investors' confidence.

4. The stock market is still characterised by a high degree of sectoral concentration and the dominance of banking, electricity and telecommunications, with six companies accounting for nearly 70 per cent of the total market capitalisation.

5. 90 per cent of investors are Saudi individuals who are characterised by irrational exuberance and herd mentality (Al-Twaijry 2007; Ramady 2010).

As a young and rapidly developing stock market, a positive relationship with the economic growth might exist once it has matured as observed in the literature. The establishment of the CMA has helped to overcome some of the previous obstacles in expanding the capital market, namely an increase in the number of listed companies, increase in the number of shareholders, expansion of brokerage and investment advisory services and licensing of non-bank financial institutions. The benefits of the CMA could be felt in several areas: potential to draw back Saudi resources invested abroad, growth of non-oil financial services sector, improvement in risk management practices and response to the infrastructure services demand. The Saudi stock market has made some progress in opening up to foreign investors through swap facilities and there are some developments in expanding the use of ETFs and index funds.

5.2.3.2 VAR (2)

A positive long-run relationship (although statistically insignificant) between GDP and BCP is found in this study. These results are in alignment with the 'independent' view that argues that capital market and economic growth is not causally related (e.g. Stiglitz

1985, Mayer 1988, Boyd and Smith 1998, Boulila & Trabelsi 2004, Mosesov & Sahawneh 2005, Abu-Bader & Abu-Qarn 2006, Naceur & Ghazouani 2007). These empirics were mostly conducted in the developing Middle East and North Africa (MENA) countries. In addition, this is supported by Mohamed (2008) who related this result to the inefficient allocation of resources by banks, the absence of proper investment climate, and to the poor quality of credit disposal of the banking sector. Furthermore, this lack of relationship between BCP and GDP can be related to the banking environment in Saudi Arabia that is characterised of;

1. The issue of shareholder concentration is one of the major concerns for the Saudi banking sector, as it is for most other publicly listed Saudi joint stock companies. The trend towards far fewer shareholders is unmistakable and there are several implications. First, holding a higher concentration of shares in fewer hands might enable some business groups to influence day-to-day operations and bank management through board representation. Second, the concentration of shares in a few hands with block votes 'de-democratises' the role of annual general meetings in joint stock companies. Concentration eliminates transparency and leads to joint stock companies operating like partnerships.

2. The issue of competition, the same three banks, NCB, SAMBA and Al Rajhi, dominated, although Riyad Bank came a close fourth. Despite new entrants into the Saudi banking sector, the top three continued to dominate, the only erosion being seen in their loan and asset share. Studies conducted in the area of bank concentration and economic efficiency indicates that a high concentration ratio may induce banks to charge borrowers with higher interest rates than when there is a low banking concentration. According to Saudi studies, the non-interventionist policy of SAMA in this area of bank regulation could hamper the growth of companies, particularly SMEs, due to more restrictive credit conditions by the banks within a system of imperfect competition (Essayyad, Ramady & Al Hejji 2003).

3. Saudi banks have traditionally a low loans-to-deposit ratio and thus more liquidity compared to other Western institutions. The majority of bank lending was of less than a year's duration, which is not conducive to long-term industrial investment and planning. Filling a need for long-term investment capital was the prime reason for the Saudi government's establishment of its own lending agencies.

4. Saudi banks suffer from widening asset-liability maturity mismatch, raising major concerns about banks' liquidity risk as well as credit risk.

5. Consumer loans represented around 38 per cent of all private sector loans. According to SAMA (2011), the majority were for financing motor vehicles and 'other' unspecified personal loans; real estate and credit-card financing remained steady.

Commercial banks are the second largest supplier of credit in the Saudi economy after the government's mutual funds and special purposes banks. In the modern economy, they create most of the money supply by issuing loans. Therefore, when banks create an excess supply of money, the prices of assets, goods, and services tend to rise. Conversely, when not enough money is created, the prices of assets, goods, and services decrease (Ramady 2010).

5.2.3.3 VAR (3)

A positive long-run relationship (although statistically insignificant) between GDP and M2 is found in this study. These results are contrasted with, King and Levine (1993), Levine and Zervos (1998), Al-Yousif (2002), Ake and Ognaligui (2010), Demirhan, Aydemir and Inkaya (2011), Dritsaki and Dritsaki-Bargiota (2005), the cointegration tests revealed is a significant and positive relationship for M2. Still, the existing theoretical and empirical studies show no consensus regarding the relationship between the money supply (M2) and GDP (Jung 1986, Demirhan, Aydemir & Inkaya 2011).

5.1.3.4 VAR (4)

A significant positive long-run relationship between RNOIL and SMI is found in this VAR model. This is contrasted to the VAR (1) model result and in line with empirical studies by Athanasios and Antonios (2010) and Olweny and Kimani's (2011) findings imply that the causality between economic growth and stock market runs unilaterally from the NSE 20-share index to the GDP. From the results, it was inferred that the movement of stock prices in the Nairobi stock exchange reflect the macroeconomic condition of the country and can therefore be used to predict the future path of economic growth; Kirankabes and Başarir (2012) found that there is a long-term relationship between economic growth and the ISE 100 Index, and a one-way causality relationship with the ISE 100 towards economic growth. Asiegbu and Akujuobi (2010) found that the All-Share Index and number of listed companies have a positive significant effect on economic growth.

5.2.3.5 VAR (5)

A significant positive long-run relationship between RNOIL and BCP is found in this VAR model. Similar to the VAR (2) model result however significant this result is in line with Chuah and Thai (2004), they used real non-hydrocarbon GDP in order to capture the real impact of bank based development variables on economic growth for six GCC countries including Saudi Arabia. Chuah and Thai (2004) used annual data over the period 1962-1999 for Saudi Arabia. They applied a bivariate time series model and concluded that capital market development provides

critical services to increase the efficiency of intermediation, leading to a more efficient allocation of resources, a more rapid accumulation of physical and human capital, and faster technological innovation.

5.2.3.6 VAR (6)

A significant positive long-run relationship between RNOIL and M2 is found in this VAR model. This result is in line with, King and Levine (1993), Levine and Zervos (1998), Al-Yousif (2002), Ake and Ognaligui (2010), Demirhan, Aydemir and Inkaya (2011), Dritsaki and Dritsaki-Bargiota (2005), the cointegration tests revealed is a significant and positive relationship for M2. Still, the existing theoretical and empirical studies show no consensus regarding the relationship between the money supply (M2) and GDP (Jung 1986, Demirhan, Aydemir & Inkaya 2011).

This result is contrasted to the VAR (3) and with Darrat (1999) who investigated the relationship between financial deepening and economic growth for three developing Middle-Eastern countries (Saudi Arabia, Turkey and the UAE). He applied Granger-Causality tests and VAR method over the period of 1964-1993 for Saudi Arabia. The study found no long run relationship between financial deepening variable (M2) and economic growth in the case of Saudi Arabia.

5.3 Short-Run Analysis

Having established that most of the macroeconomic variables in the analysis are cointegrated, the fundamental question that needs to be asked is: what is the nature of the dynamic relationship between these variables in the short run? This question can be answered using the causality tests. The following sub sections present the results for these methodologies.

5.3.1 Causality Tests

The short run analysis is performed using a vector error correction model as developed by Engle and Granger (1987). Granger (1988) states that using a VECM rather than a VAR in differences will not result in any loss in long run information, as is the case for the Granger (1969) causality test. The following two sections present the results of both the VECM and Granger causality tests.

5.3.1.1. VECM Causality Tests

In this section, a VECM is estimated to investigate the short and long run dynamic adjustment of a system of cointegrated variables. The estimation equation (5.7) is:

$$\Delta Xt = \delta + \sum + \quad + vt$$

where ΔXt is an nx1 vector of variables and δ is an (*nx1*) vector of constants. Π is the error- correction mechanism, which has two components: $\Pi=\alpha\beta'$ where α is an (*nx1*) column vector representing the speed of the short run adjustment to the long-run equilibrium, and β′ is a (*1xn*) cointegrating vector with the matrix of long run coefficients. Γ is an (*nxn*) matrix representing the coefficients of the short run dynamics. Finally, *vt* is an (*nx1*) vector of white noise error terms, and *p* is the order of the auto-regression. Interestingly, Equation 5.7 has two channels of causation. The first channel is through the lagged exogenous variables' coefficients. The second channel of causation is through the error correction term. The ECT captures adjustment of the system towards its long run equilibrium.

Since the VECM technique is a more general case of the standard VAR model, the analysis proceeds to determine the lag length, , for the dynamic terms, i.e., the lagged variables in first difference form, the number of cointegrating vectors, and the structural cointegrating vector of the VECM. The optimal lag is p = 3 based on the previous equations (4.3-4.8).

The VECM short run results shows only a unidirectional relationship run from M2 to NOGDP this results are consistent with First, the conventional view of the supply leading hypothesis postulates that the direction of causality flows from capital market development to steady-state economic growth. In a world without frictions caused by transaction, information, and monitoring costs, no financial intermediaries are needed. If those costs are sufficiently high, no exchanges among economic agents will take place. The need to reduce those costs for exchanges to take place has led to the emergence of financial institutions and markets constituting the financial sector. A well-developed financial sector provides critical services to reduce those costs and thus to increase the efficiency of intermediation. It mobilises savings, identifies and funds good business projects, monitors the performance of managers, facilitates trading, diversification of risks, and fosters exchange of goods and services. These services result in a more efficient allocation of resources, a more rapid accumulation of physical and human capital, and faster technological innovation, thus inducing faster long-term economic growth

This view can be traced back to Schumpeter (1912), Goldsmith (1969), McKinnon (1973), Shaw (1973) King and Levine (1993) and Pagano (1993) all of whom investigated the effect of capital market development on economic growth (Demirhan, Aydemir & Inkaya 2011;

Levine & Zervos 1998). Schumpeter's (1912) important early study proposed a causal link whereby capital markets promote economic growth by funding entrepreneurs and channelling capital to them with higher return investments (Ake & Ognaligui 2010; Demirhan, Aydemir & Inkaya 2011; Dritsaki &

Dritsaki-Bargiota 2005; Levine & Zervos 1998). Schumpeter's

(1912) view was that economic change could not simply be predicated on previous economic conditions alone, although prevailing economic conditions were a result of this. Similarly, Goldsmith (1969) emphasised the effect of the financial structure and development on economic growth.

5.3.1.2 Granger Causality Tests

This section presents Granger causality test results for the short-run relationship between both of the economic growth variables (RGDP & RNOIL) and the capital market development variables of (SMI, BCP & M2). Since these variables are cointegrated. As concluded earlier, the Granger causality test is appropriate to examine the short-run dynamic relationships between these five variables.

The reported results of the Granger causality test (1969) in Table 5.3 are based on a (3) lag model that was suggested by SC and HQ previously in the VAR models. The result of the (3) lags models shows a bidirectional relationship between GDP and SMI, and a unidirectional relationship from GDP to BCP. In addition, M2 found to Granger-cause both of the economic growth variables (GDP &NOGDP) at the 10 per cent significant level. This is another evidence of none existence census among scholars along with the influence of methodology, data period, frequency and variables used in the study on results.

Table 5.3. Pairwise Granger Causality Tests (Sample: 1993M01 2009M12)

Lags: 3

VAR (1)			
Null Hypothesis:	Obs	F-Statistic	Prob.
SMI does not Granger Cause GDP	201	2.82713	0.0398
GDP does not Granger Cause SMI		2.75884	0.0435
VAR (2)			
Null Hypothesis:	Obs	F-Statistic	Prob.
BCP does not Granger Cause GDP	201	1.28443	0.2810
GDP does not Granger Cause BCP		6.00138	0.0006
VAR (3)			
Null Hypothesis:	Obs	F-Statistic	Prob.
M2 does not Granger Cause GDP	201	2.54884	0.0571
GDP does not Granger Cause M2		0.49871	0.6836
VAR (4)			
Null Hypothesis:	Obs	F-Statistic	Prob.
SMI does not Granger Cause NOGDP	201	1.29748	0.2766
NOGDP does not Granger Cause SMI		0.88313	0.4508
VAR (5)			
Null Hypothesis:	Obs	F-Statistic	Prob.
BCP does not Granger Cause NOGDP	201	1.90116	0.1307
NOGDP does not Granger Cause BCP		1.49050	0.2184
VAR (6)			
Null Hypothesis:	Obs	F-Statistic	Prob.
M2 does not Granger Cause NOGDP	201	2.60196	0.0533
NOGDP does not Granger Cause M2		1.82815	0.1434

6. Conclusion

This study aimed to determine the relationship between capital market development and economic growth in Saudi Arabia. The study is particularly significant because Saudi Arabia is moving aggressively towards strengthening the private sector role in the economy via privatisation, its establishment of the CMA in 2003, and the creation of seven new economic cities.

This study provided a comprehensive theoretical consideration of how the financial system and stock market development could affect real economic growth. In finance theory, there are four basic functions and channels in which the stock market may influence economic growth:

(1) the stock market provides investors and entrepreneurs with a potential exit mechanism;

(2) capital inflows in both foreign direct investment and portfolio are potentially important sources of investment funds; (3) the provision of liquidity through an organised stock market encourages both international and domestic investors to transfer their surplus from short-run assets to the long-run capital market; and (4) the stock market provides important information that improves the efficiency of financial intermediation generally.

In contrast, the endogenous growth model in economic theory illustrates that stock market development may affect economic growth through an increase in the saving rate, the channelling of more savings to investment, and the improvement of capital

productivity with better resource allocation towards their most productive use. Thus, savings channeled through the stock market is allocated more efficiently, and the higher capital productivity leads to higher economic growth.

This study investigated the relationship between financial market development and the real GDP growth rate per capita of the Saudi economy from January 1993 to December 2009. The secondary data was collected from the IMF, SAMA and TadawuL. The VAR model was used to estimate the effects of stock and credit market development on economic growth. In order to test the causal relationships, the following multivariate model was estimated:

$$Y = f(CMD, CV) \quad (4.1)$$

Where:

Y = Economic Growth variables (GDP & NOGDP).

CMD = Capital Market Development variables (SMI, BCP & M2).

CV = Control variables (IR, INF & OP).

Controlling variables from previous studies were also used. All variables were in logarithm except GDP because of some negative values:

The VAR model is a flexible model for the analysis of multivariate time series. It is a natural extension of the univariate autoregressive model for dynamic multivariate time series. The VAR model is especially useful for describing the dynamic behaviour of economic and financial time series. In addition to data description, the VAR model is also used for structural inference and policy analysis. VAR models and VECMs were generally used in previous studies. They also offered a feasible approach to this study due to the robustness and rigour of the data.

This study investigates the relationship between capital market development and economic growth of the Saudi economy over the period January 1993 to December 2009. The secondary monthly data (204 observations) of the variables selected for the VAR models are collected from the IMF, SAMA and the Saudi stock exchange Tadawul.

We used real GDP growth rate (GDP) and real non-oil GDP growth rate (NOGDP) as proxies for economic growth; Stock market development (SMI) proxied by the Tadawul All share index (TASI), the broad money supply (M2) and bank credit (BCP) of local commercial banks for the private sector as proxies for capital market development. Controlled by (1) a short term interest rate (IR), the Saudi Arabia Interbank Offered Rate (Isa3); (2) inflation (INF) in the Saudi economy measured by the consumer price index (CPI);

(3) world oil price (OP) proxied by the UK-Brent crude price oil.

These variables were statistically analysed, starting with descriptive statistics and then undertaking long-run and short-run analyses using Johansen-Juselius cointegration tests, the VECM and the Granger causality test. The results from the ADF and PP unit root tests provided additional support for treating all the individual series as non-stationary in their levels but stationary in their first differences. The analysis was preceded by the use of 3 lags suggested by the SC and HQ tests.

The VAR models indicate a positive and significant long-term causal relationship between capital market development and economic growth. The VECM short-run results showed a unidirectional relationship run from M2 to NOGDP. This is consistent with the supply-leading view, which states that economic growth follows financial development. Granger causality tests show that economic growth Granger-cause capital market development and vice versa when using the real GDP growth rate variables. These results are consistent with previous studies of developing countries.

A well-developed capital market will lead to economic growth and vice versa. The Saudi capital market should develop through increases in the number of listed companies and the free-float shares ratio, as well as the shift towards financial and corporate invertors' market orientation. The banking sector needs to focus on more small and medium business lending, with less shareholders' concentration. These improvements will strengthen the role of the private sector to shift the Saudi economy into sustainability away from an oil-based economy.

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INVESTMENT BANKS EFFICIENCY AND CORPORATE GOVERNANCE FRAMEWORK: FINDING UNIQUE PECULIARITIES?

Yuliya Lapina*

Abstract

The main aim of this paper is to research the features of investment banks in comparison with commercial banks, what has allowed distinguishing principal differences in their functioning. The research identifies the main economic factors, which give the opportunity to evaluate the financial intermediaries' performance in the investment banking sphere. The author suggests the phased system of scientific and methodological approach to assess the effectiveness of quantitative determination of specific investment banking activities, which will include system of the most relevant indicator for this specific banking area. In complex this method assesses efficiency of assets, cost, risk, capital and liquidity management. The author defined the investment banking efficiency by using the comprehensive procedure which allows input indicators base, highlighted integrated assessment which is based on the calculation of synthetic investment banking key performance index (SIBKPI).

Keywords: Corporate Governance, Investment Banking, SIBKPI, CMIB, Bank Efficiency

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1. Introduction

Investigation of the specificity of the investment-banking activity of specialized and universal banks allowed to distinguish fundamental differences in their operation, namely, to identify the main economic indicators by which to assess the effectiveness of financial intermediaries in the market for investment banking. Thus, at this stage of dissertation the urgency is the gradual development of scientific and methodological approach to determining the quantitative assessment of the effectiveness of specific investment banking activities, which will include system most relevant to specific areas of banking indicators are assessed using a set of criteria of financial performance, namely, asset management effectiveness, costs, risks, capital and liquidity.

Determination of the effectiveness of specific investment banking - a complex procedure which allows input based on a set of indicators by their transformation and aggregation determine the integrated assessment based on the calculation of the synthetic index of financial efficiency of investment banking (SIBKPI - synthetic investment banking key performance index). So, let's consider the sequence of steps proposed by the scientific and methodical approach.

As a result, the proposed model provides an adequate comprehensive assessment of the effectiveness of the specific banking intermediaries, without requiring complex analysis and aggregation of a large number of financial indicators.

2. Model Description

Stage 1. Selection and justification of backbone components, by means of which to evaluate performance characteristics and to analyze investment banking efficiency: regulatory capital adequacy (CA), return on equity (ROE), return on annual average tangible assets (ROATA), cost-to-income ratio (CIR) and ratio of equity capital to debt (Leverage). Thus, the formation of an information base through research of these five indicators is due to the fact that these factors comprehensively to assess financial performance and characterize the correlation between corporate governance factors and investment banking efficiency.

Stage 2. Collecting the statistical data in terms of selected objects observation. Rating list of such investment banks was formed in terms of the size of the fee income earned from investment banking transactions during 2012 (see table 1). Analysis of the functioning of foreign investment banks will determine the leading banks and outsiders, and highlight the main factors of corporate governance, which allowed achieving certain results. Subsequently, the findings will be useful in building

effective corporate governance models for banks, which provide investment banking services.

Table 1. The Leading Bank by the factor of commission fee, mln. $, 2012 – 2013

Rating place, 2013	Name of Investment Bank	Year		
		2013		2012
		Change comparing with 2012	Fee	Change of fee, %
1	Bank of America ***Merrill Lynch***	+1	1,522	28,6
2	JP Morgan	-1	1,479	10,8
3	***Goldman Sachs***	No change	1,274	37,4
4	***Morgan Stanley***	+1	1,217	40,5
5	Citi	+1	1,171	35,9
6	Deutsche Bank	+1	998	17,9
7	***Barclays***	+1	977	26,6
8	Credit Suisse	-4	814	-11,4
9	***UBS***	No change	718	23,1
10	Wells Fargo & Co	+1	615	36,3
11	***RBC Capital Markets***	-1	573	15,1
12	HSBC Holdings PLC	No change	367	-9,3
13	BNP Paribas SA	+1	310	-7,2
14	Jefferies & Co Inc	+6	276	33,3
15	Mizuho Financial Group	No change	265	-10,4
16	RBS	-3	263	-30,1
17	Nomura	+1	262	13,3
18	Sumitomo Mitsui Finl Grp Inc	-2	227	-10,1
19	Mitsubishi UFJ Financial Group	No change	198	-11,5
20	***BMO Capital Markets***	-3	187	-21,2
21	Societe Generale	+2	180	6,2
22	Credit Agricole CIB	+3	187	5,1
23	Scotiabank	+1	155	0,3
24	Rothschild	+5	137	31,5
25	TD Securities Inc	-3	133	-29,9
			19782	**5,9**

This stage involves filling out the information base in tabular form in the context of the banks` financial performance, which identifying in the previous step. In addition, we provide complex systematic analysis of input data to identify the main ways to increase the efficiency of the financial activities of investment banks.

Table 2. Financial data of the investment banks performance

Bank	ROATA, %	CIR, %	CA, %	ROE, %	Leverage, %
Bank of America Merrill Lynch	0,19	133,33	16,31	1,94	129,30
JP Morgan	0,92	303,03	15,30	11,48	162,20
Goldman Sachs	0,79	136,99	20,10	10,94	279,50
Morgan Stanley	0,01	202,02	19,85	0,11	305,80
Citi	0,40	155,76	14,10	4,11	154,20
Deutsche Bank	0,01	104,17	17,10	0,37	420,60
Barclays	-0,07	156,25	17,00	-1,98	268,00
Credit Suisse	0,13	138,89	22,30	3,83	469,80
UBS	-0,15	93,90	25,20	-5,20	278,20
Wells Fargo & Co	1,39	346,25	14,63	13,78	117,10
RBC Capital Markets	0,92	327,00	15,10	9,80	109,30
HSBC Holdings PLC	0,53	192,31	16,10	8,40	29,80
BNP Paribas SA	0,40	153,85	15,60	8,90	277,00
Jefferies & Co Inc	0,60	230,00	15,45	7,96	279,00
Mizuho Financial Group	0,46	165,00	14,18	8,60	335,40
RBS	-0,41	169,49	14,50	-7,98	178,10
Nomura	0,12	135,00	13,90	2,14	470,50
Sumitomo Mitsui Finl Grp Inc	0,34	245,00	14,71	8,89	238,40
Mitsubishi UFJ Financial Group	0,34	232,56	16,68	1,76	147,60
BMO Capital Markets	0,78	138,00	8,70	15,30	15,90
Societe Generale	0,06	151,98	9,90	1,42	875,00
Credit Agricole CIB	-0,42	151,98	15,23	-14,13	73,30
Scotiabank	0,98	205,34	13,50	17,60	72,60
Rothschild	0,50	120,92	14,34	5,10	359,60
TD Securities Inc	0,82	248,76	15,70	14,99	23,80

The research of trends changes which represents in Table 2 allows us to make conclusion about heterogeneity of index's values and wide range of fluctuation between the minimum and maximum possible values. In addition, the defining feature of international investment banks serving a relatively stable trend of variation of the indicators relative to the average level, as evidenced by acts averaged characteristic RMS deviation in the amount of 42 % compared to the expectation within the target set of banks.

Stage 3. Bringing the performance characteristics of banks efficiency to the comparable form by applying the normalization of Savage. The choice of this normalization approach of input information due to the presence of negative values and improving the financial activity with increasing values of the studied parameters. Thus, the ratio that allows you to bring statistics in comparable form takes the following form:

$$\hat{e}_i = \frac{e_i - \min\limits_j \{e_{ij}\}}{\max\limits_j \{e_{ij}\} - \min\limits_j \{e_{ij}\}}$$

where $\hat{e}_i$ - normalized value of financial performance indicator;

e_i - value of financial performance indicator;

$\min\limits_j \{e_{ij}\}$ ($\max\limits_j \{e_{ij}\}$) – minimum (resp. maximum) value of the financial performance indicator.

Table 3. Normalized value of financial performance indicator

Bank	ROATA, %	CIR, %	CA, %	ROE, %	Leverage, %
Bank of America Merrill Lynch	0,34	0,16	0,46	0,51	0,13
JP Morgan	0,74	0,83	0,40	0,81	0,17
Goldman Sachs	0,67	0,17	0,69	0,79	0,31
Morgan Stanley	0,24	0,43	0,68	0,45	0,34
Citi	0,45	0,25	0,33	0,57	0,16
Deutsche Bank	0,24	0,04	0,51	0,46	0,47
Barclays	0,19	0,25	0,50	0,38	0,29
Credit Suisse	0,30	0,18	0,82	0,57	0,53
UBS	0,15	0,00	1,00	0,28	0,31
Wells Fargo & Co	1,00	1,00	0,36	0,88	0,12
RBC Capital Markets	0,74	0,92	0,39	0,75	0,11
HSBC Holdings PLC	0,52	0,39	0,45	0,71	0,02
BNP Paribas SA	0,45	0,24	0,42	0,73	0,30
Jefferies & Co Inc	0,56	0,54	0,41	0,70	0,31
Mizuho Financial Group	0,49	0,28	0,33	0,72	0,37
RBS	0,01	0,30	0,35	0,19	0,19
Nomura	0,30	0,16	0,32	0,51	0,53
Sumitomo Mitsui Finl Grp Inc	0,42	0,60	0,36	0,73	0,26
Mitsubishi UFJ Financial Group	0,42	0,55	0,48	0,50	0,15
BMO Capital Markets	0,66	0,17	0,00	0,93	0,00
Societe Generale	0,27	0,23	0,07	0,49	1,00
Credit Agricole CIB	0,00	0,23	0,40	0,00	0,07
Scotiabank	0,77	0,44	0,29	1,00	0,07
Rothschild	0,51	0,11	0,34	0,61	0,40
TD Securities Inc	0,69	0,61	0,42	0,92	0,01

Preliminary analysis of the normalized performance of financial activity brings out the bank Wells Fargo & Co, which holds leading positions in such characteristics as ROATA and CIR. This situation is explained by the fact that the mentioned investment bank is using a business model diversification of services provided the same as trying to better meet customer needs, while diversifying risks in investment banking transactions. This development model is quite successful for Wells Fargo & Co and can receive 80% of the bank's revenue growth by providing various services a large number of existing customers. Get the highest level, only one indicator Leverage and ROE is typical of such foreign banks like Societe Generale and Scotiabank. It should be noted that Scotiabank, which is one of the five most successful banks in Canada, allows you to keep a leading position chosen strategy for global expansion. This investment bank has the most extensive network of subsidiaries and offices worldwide, so you can serve a large number of customers around the world. The main reason for the success of such banking institutions in Canada is the natural conservatism of the business, which is achieved by using a significant level of capital adequacy, conservative borrowing policy and strict financial supervision by an independent Canadian regulator - OSFI (Office of the Superintendent of Financial Institutions). Despite the relatively low capital base of the first level, Canadian banks should

be considered promising in terms of lending. Therefore, OSFI conducts reasonable policy for the implementation of Basel III. The lowest level of efficiency in terms of CA, Leverage and ROATA, ROE ranked according Credit Agricole CIB and BMO Capital Markets. Negative trends among selected indicators of bank Credit Agricole CIB are presents because of financial intermediary owned local banks, and the controls in which only 25% of non-voting . This complex organizational structure of corporate governance, on the one hand, allows you to get discounts on the stock exchange in France, on the other hand , complicates the management of the investment bank. It is also worth noting that despite the expansionary orientation recent decades Credit Agricole practically not represented in the UK and the U.S., which greatly reduces the number of potential customers of the bank. We need special attention to analyze the investment bank UBS, which is one indicator (CA) is the highest level of performance, while other parameters (CIR) significantly loses leading position.

Stage 4. Determination of the impact proportion of each of the indicators to measure the financial activities of banks on the integral level of efficiency. The need for this phase variations due to varying degrees of effective features by changing subjects factor variable. Therefore, priority of each performance indicator is proposed to calculate basing on the first count formula Fishburne:

$$r_i = \frac{2 \cdot (N - R_i + 1)}{N \cdot (N + 1)}$$

where:

r_i - weight of the i variable of bank's financial performance,

N – total number of selected variables of bank's financial performance,

j – priority level of the variable characterizing bank's financial performance

Using the results of peer review performance of investment banks, including the specific operations according to specialized intermediaries Rating of each financial indicator chosen among the set of factors, namely, CA – 1 (0,33%), ROE - 2 (0,267%), CIR- 3 (0,20%), ROATA - 4 (0,13), Leverage – 5 (0,067%). The input information that made it possible to rank the degree of influence these indicators is the view of experts engaged in research in the banking sector. Collection of information held by questionnaire.

Analysis of Table 3.4 reveals that the greatest power of influence on the integral level of effectiveness of the Bank shall indicator CA, which accounts for a third of the priority. With minor deviations from the most influential figure of 0.0667 of a unit second place in the ranking is ROE. All other financial indicators with weights within no more than 0.2000 of a unit, providing 40% of the amount of the received integral efficiency level.

Stage 5. The definition of the integral evaluation of the effectiveness of the financial activities of an investment bank based convolution values of normalized deviations from the normative level, weighted by the corresponding weights. Mathematical formalization of this approach to the calculation of the effective rate can be represented by the following relationship:

$$SIBKPI = \sum_{i=1}^{5} r_i \cdot (\hat{e}_i - 0.3)$$

0.3 - standart level of efficiency of investment bank (share units), i.e., a level that is considered to be statistically significant. Yes, in statistics there is a classical approach , according to which the relationship between the discussed parameters is confirmed and essential in making quantitative characteristic of the coupling values equal to or greater than the threshold of 30%. If the normalized financial indicator resultant variable characteristics of the investment bank's minimum required level, the level of efficiency is low (0.3 to 0.5 of a unit), medium (0.5 to 0.7 of a unit) and high (from 0.7 to 1.0 of a unit). If the level of financial normalized index less than 0.3, a quantitative assessment of the effectiveness is considered negligible, i.e., the expected effect of the variation factor variable is equal to zero.

The implementation of this phase of the research and methodological approach to the evaluation of the effectiveness of integrated financial activities of an investment bank provides, firstly, the identification of the effectiveness of each of the considered investment banks by calculating the deviation of normalized values of their standard level (columns 1-5 Table 4).

The sample of banks was formed by analyzing the most specialized banks that provide investment banking, based on the amount of fee income received by any financial intermediary in 2012. It was determined that the amount of fee income from providing investment banking services is logical to form this kind of rating, in fact, a group of banks that organize this type of financial intermediary, fall not only specialized investment banks, universal banks but also from separate division of investment banking and commercial banks to structure transactions where a significant proportion of the services of a specialized financial intermediary.

Table 4. The growth rate of the financial performance relatively standart (30% of value) level, integrated assessment and qualitative interpretation

Bank	ROATA, %	CIR, %	CA, %	ROE, %	Leverage, %	SKPI	Qualitative characteristic level
Bank of America Merrill Lynch	0,04	-0,14	0,16	0,21	-0,17	0,07	middle
JP Morgan	0,44	0,53	0,10	0,51	-0,13	0,32	high
Goldman Sachs	0,37	-0,13	0,39	0,49	0,01	0,28	high
Morgan Stanley	-0,06	0,13	0,38	0,15	0,04	0,18	high
Citi	0,15	-0,05	0,03	0,27	-0,14	0,08	middle
Deutsche Bank	-0,06	-0,26	0,21	0,16	0,17	0,06	middle
Barclays	-0,11	-0,05	0,20	0,08	-0,01	0,06	middle
Credit Suisse	0,00	-0,12	0,52	0,27	0,23	0,24	high
UBS	-0,15	-0,30	0,70	-0,02	0,01	0,15	middle
Wells Fargo & Co	0,70	0,70	0,06	0,58	-0,18	0,40	high
RBC Capital Markets	0,44	0,62	0,09	0,45	-0,19	0,32	high
HSBC Holdings PLC	0,22	0,09	0,15	0,41	-0,28	0,19	high
BNP Paribas SA	0,15	-0,06	0,12	0,43	0,00	0,16	high
Jefferies & Co Inc	0,26	0,24	0,11	0,40	0,01	0,23	high
Mizuho Financial Group	0,19	-0,02	0,03	0,42	0,07	0,15	middle
RBS	-0,29	0,00	0,05	-0,11	-0,11	-0,06	low
Nomura	0,00	-0,14	0,02	0,21	0,23	0,05	middle
Sumitomo Mitsui Finl Grp Inc	0,12	0,30	0,06	0,43	-0,04	0,21	high
Mitsubishi UFJ Financial Group	0,12	0,25	0,18	0,20	-0,15	0,17	high
BMO Capital Markets	0,36	-0,13	-0,30	0,63	-0,30	0,07	middle
Societe Generale	-0,03	-0,07	-0,23	0,19	0,70	0,00	middle
Credit Agricole CIB	-0,30	-0,07	0,10	-0,30	-0,23	-0,12	low
Scotiabank	0,47	0,14	-0,01	0,70	-0,23	0,26	high
Rothschild	0,21	-0,19	0,04	0,31	0,10	0,09	middle
TD Securities Inc	0,39	0,31	0,12	0,62	-0,29	0,30	high

Increase pace of the financial performance of foreign investment banks relative to normative values showed RBS Scottish and French bank Credit Agricole CIB. As defined earlier, the reason for this situation for the French investment bank was the specific complex structure of corporate governance factors that Royal Bank of Scotland has not overcome the crises associated with global destabilization is that this bank should focus on their activities in the UK, avoiding market investment banking services the U.S., where it has subsidiaries ceased activity due to inability to improve their financial situation a crisis.

The next step is the implementation of the fifth stage of the scientific and methodical approach advocates the definition of an integrated assessment of the efficiency by reducing the values of the graph 1-5 tables 4 into a single indicator using the formula (3), which in expanded form can be represented as follows:

$$SIBKPI_j = 0.33 \cdot (\hat{CA}_j - 0.3) + 0.27 \cdot (\hat{ROE}_j - 0.3) + 0.20 \cdot (\hat{CIR}_j - 0.3) + \\ + 0.13 \cdot (\hat{ROATA}_j - 0.3) + 0.07 \cdot (\hat{Leverage}_j - 0.3)$$

Stage 6. Qualitative characteristics of financial efficiency of investment banks. Based on the fact that in excess of normalized values for each financial indicator of each investment bank may correspond to one of three levels (as described in step 5), this will hold graduation and within a qualitative assessment. Thus, depending on the calculated quantitative assessment of the effectiveness of integrated financial activities considered investment banks allocate these limits its qualitative interpretation:

- Low level ((-0,12) – (-0,02)):

$$SIBKPI_j \in [\min_j \{SIBKPI_j\}; \frac{\min_j \{SIBKPI_j\} + \max_j \{SIBKPI_j\}}{3})$$

- Middle level ((-0,2) – (0,16)):

$$SIBKPI_j \in [\frac{\min_j \{SIBKPI_j\} + \max_j \{SIBKPI_j\}}{3}; \frac{2\left(\min_j \{SIBKPI_j\} + \max_j \{SIBKPI_j\}\right)}{3})$$

- High level (0,16 – 0,40):

$$SIBKPI_j \in [\frac{2\left(\min_j \{SIBKPI_j\} + \max_j \{SIBKPI_j\}\right)}{3}; \max_j \{SIBKPI_j\}].$$

Thus, developed scientific and methodological approach allows for integrated assessment of investment banking, based on a quantitative analysis of: category "performance" meaning (dynamic factor variable values exceeding the standard value), the importance and priority of each of the relevant parameters (using the formula Fishburn) and the nature and direction their impact (with normalization Savage).

3. Corporate Governance influence on the Investment banking efficiency

Determining the impact of the quality of corporate governance on the financial efficiency of investment banking requires building an evidence-based approach to identify quantitative relationship between the

efficiency of investment banking and qualitative performance indicators of corporate governance. To implement the task proposed calculation matrix display factors influence the effectiveness of corporate governance in investment banking - Corporate Governance Matrix Investment Banking (CMIB).

Construction of the model is divided into seven basic steps that will greatly facilitate the settlement system and allow for a comprehensive analysis of the structure and magnitude of the effect of selected characteristics of corporate governance. In addition, based on the analysis we propose an effective corporate governance system date just for banks engaged in investment banking operations.

Stage 1. Formation of information support of scientific and methodical approach by mixing and systematization of banks engaged in investment activities, to binary form, i.e., in such form, as relevant characteristics accepts: unit value in case of substantial impact on the efficiency of financial operations, and a zero value otherwise case.

Table 5. The Corporate Governance Characteristics

Bank	CRO in the Board of Directors (BD)	Number of directors in the BD	% of independent directors in the BD	Other factors	Ownreship structure	CRO subordinates to the CEO and Chairman	% of women in the BD	SIBKPI
Bank 1	b_{11}	b_{12}	b_{13}	b_{14}	b_{15}	b_{16}	b_{17}	$SIBKPI_1$
…	…	…	…	…	…	…	…	…
Bank i	b_{i1}	b_{i2}	b_{i3}	b_{i4}	b_{i5}	b_{i6}	b_i	$SIBKPI_i$
…	…	…	…	…	…	…	…	...
Bank n	b_{n1}	b_{n2}	b_{n3}	b_{n4}	b_{n5}	b_{n6}	b_{n7}	$SIBKPI_n$
Total	$\sum_{i=1}^{n} b_{i1}$	$\sum_{i=1}^{n} b_{i2}$	$\sum_{i=1}^{n} b_{i3}$	$\sum_{i=1}^{n} b_{i4}$	$\sum_{i=1}^{n} b_{i5}$	$\sum_{i=1}^{n} b_{i6}$	$\sum_{i=1}^{n} b_{i7}$	-
Structure Relative Indicator	$\frac{\sum_{i=1}^{n} b_{i1}}{\sum_{j=1}^{7}\sum_{i=1}^{n} b_{ij}}$	$\frac{\sum_{i=1}^{n} b_{i2}}{\sum_{j=1}^{7}\sum_{i=1}^{n} b_{ij}}$	$\frac{\sum_{i=1}^{n} b_{i3}}{\sum_{j=1}^{7}\sum_{i=1}^{n} b_{ij}}$	$\frac{\sum_{i=1}^{n} b_{i4}}{\sum_{j=1}^{7}\sum_{i=1}^{n} b_{ij}}$	$\frac{\sum_{i=1}^{n} b_{i5}}{\sum_{j=1}^{7}\sum_{i=1}^{n} b_{ij}}$	$\frac{\sum_{i=1}^{n} b_{i6}}{\sum_{j=1}^{7}\sum_{i=1}^{n} b_{ij}}$	$\frac{\sum_{i=1}^{n} b_{i7}}{\sum_{j=1}^{7}\sum_{i=1}^{n} b_{ij}}$	-
Corporate governance impact on the efficiency	E_1	E_2	E_3	E_4	E_5	E_6	E_7	-

Stage 2. Identification of the magnitude of the effect of each factor of corporate governance on banks financial performance based on the definition of the calculated value using the following formula:

$$E_{j,j=1\div7} = \begin{cases} 0 \mid \sum_{i=1}^{n} b_{ij} \le \frac{n}{3} \\ \frac{\sum_{i=1}^{n} b_{ij} - \frac{n}{3}}{\frac{n}{3}} \times 100\% \mid \sum_{i=1}^{n} b_{ij} > \frac{n}{3} \end{cases}$$

Where:

$E_{j,j=1\div7}$ - the impact strength of the j-th factor of corporate governance;

n - total number of examined banks;

b_{ij} - Binary characteristic.

Stage 3. Comprehensive analysis of the dependence of financial performance of banks engaged in investment instruments of corporate governance. The basis of this analysis are the calculated data.

In the context of this step is to determine the critical exponents arises in respect of which are relevant to a single assignment or zero value to a particular factor of corporate governance, which is studied in this paper. Thus, this factor of corporate governance as Chief Risk Officer, a member of the bank's board of directors that provides investment banking, was found in the previous stages of dissertation research, positive impact on the process of minimizing the risks of implementing such specific activities occurs during the decision- making board. Therefore, this factor in this condition takes a single value. In the opposite case, i.e., when the director of risk is not included in the board of directors or any bank has no such separate official, this factor gets zero. For the same pattern occurs assignment unit and zero values by factors of corporate governance as Chief Risk Officer, subordinate to the CEO and Chairman of the Board.

Considering such factors as corporate governance quantitative composition of the board of directors of banks engaged in investment activities

necessary question the definition of a critical number of directors.

Thus, if the number of directors on board more than twelve members, the bank receives a single value of the factor of corporate governance, if the rate is less than the critical level - zero.

Factors such as corporate governance ratio of independent directors on board and the number of women in its structure, have established normative values, which can calculate by the mathematical method. It is therefore proposed to the critical average value for the studied set of banks. Thus, higher ratio compared to the average for the set of assigned unit value of less - zero.

With respect to the following quality indicators, namely, other factors, which take into account the degree of diversification of investment banking services offered by the author to provide a single value of those financial intermediaries that specialize in more than one type of operation and zero - for those that are intended to focus only on one type of service.

Regarding the factor structure of ownership, financial intermediaries, controlling shareholding of which is owned by foreign or domestic banks receiving unit value, all of which are not included in the group under certain circumstances - zero.

7 Stage. Checking the adequacy of the proposed research and methodological approach to assess the impact of corporate governance on the cost-effectiveness of investment bank. Based on the fact that economic and mathematical model of this problem is formalized for the first time, it is impossible to verify the adequacy of using such common approaches like comparing simulation results with some experimental results obtained with the same (similar) conditions or by the use of other similar models. It is necessary to compare the structure and functioning of the constructed model of a real economic system based on the following requirements (Table 9).

Table 6. The Corporate Governance Characteristics in Investment Banks with high level of financial efficiency

Bank	CRO in the Board of Directors (BD)	Number of directors in the BD	% of independent directors in the BD	Other factors	Ownreship structure	CRO subordinates to the CEO and Chairman	% of women in the BD	SIBKPI
JP Morgan Chase	0	1	1,00	1	0	0	1,00	0,32
Goldman Sachs	0	1	1,00	1	1	1	1,00	0,28
Morgan Stanley	0	1	1,00	1	0	1	1,00	0,18
Credit Suisse	0	1	1,00	1	0	1	1,00	0,24
Wells Fargo & Co	0	1	1,00	1	0	1	0,00	0,40
RBC Capital Markets	0	1	0,00	1	1	0	0,00	0,32
HSBC Holdings PLC	0	1	1,00	1	0	0	0,00	0,19
BNP Paribas SA	0	1	1,00	1	0	0	0,00	0,16
Jefferies & Co Inc	1	0	1,00	1	0	1	1,00	0,23
Sumitomo Mitsui Finl Grp Inc	0	1	0,00	1	0	0	1,00	0,21
Mitsubishi UFJ Financial Group	1	1	0,00	1	1	0	1,00	0,17
Scotiabank	1	1	1,00	1	0	1	0,00	0,26
TD Securities Inc	0	1	1,00	1	1	0	0,00	0,30
Total	3,00	12,00	10,00	13,00	4,00	6,00	7,00	3,00
Structure Relative Indicator	5,45	21,82	18,18	23,64	7,27	10,91	12,73	5,45
Corporate governance impact on the efficiency	-40,00	140,00	100,00	160,00	-20,00	20,00	40,00	-40,00

Table 7. The Corporate Governance Characteristics in Investment Banks with middle level of financial efficiency

Bank	CRO in the Board of Directors (BD)	Number of directors in the BD	% of independent directors in the BD	Other factors	Ownreship structure	CRO subordinates to the CEO and Chairman	% of women in the BD	SIBKPI
Bank of America Merrill Lynch	0	1	1,00	1	1	1	0,00	0,07
Citi	0	1	1,00	1	0	0	0,00	0,08
Deutsche Bank	1	1	0,00	1	1	1	0,00	0,06
Barclays	0	1	1,00	1	0	1	1,00	0,06
UBS	0	1	1,00	1	0	1	0,00	0,15
Mizuho Financial Group	0	1	0,00	1	1	0	1,00	0,15
Nomura	0	1	1,00	1	0	0	1,00	0,05
BMO Capital Markets	1	1	1,00	1	1	0	0,00	0,07
Societe Generale	1	1	0,00	1	0	0	0,00	0,00
Rothschild	0	1	1,00	0	0	0	1,00	0,09
Total	3,00	10,00	7,00	9,00	4,00	4,00	4,00	3,00
Structure Relative Indicator	7,32	24,39	17,07	21,95	9,76	9,76	9,76	7,32
Corporate governance impact on the efficiency	-50,00	66,67	16,67	50,00	-33,33	-33,33	-33,33	-50,00

Table 8. The Corporate Governance Characteristics in Investment Banks with low level of financial efficiency

Bank	CRO in the Board of Directors (BD)	Number of directors in the BD	% of independent directors in the BD	Other factors	Ownreship structure	CRO subordinates to the CEO and Chairman	% of women in the BD	SIBKPI
RBS	0	1	1,00	1	1	0	0,00	-0,06
Credit Agricole CIB	1	1	0,00	1	1	1	1,00	-0,12
Total	1	2	1	2	2	1	1	1
Structure Relative Indicator	10,00	20,00	10,00	20,00	20,00	10,00	10,00	10,00
Corporate governance impact on the efficiency	0	100	0	100	100	0	0	0

Table 9. Criteria for checking the adequacy of economic and mathematical models for assessing the impact of corporate governance on the cost-effectiveness of investment banking (

Requirement	Content requirements
1. Authenticity	With a reasonable level of accuracy reflected the main characteristics of the corporate governance of the bank that provides investment, determining the variation trends and key patterns of influence tools of corporate governance on the efficiency of financial activities
2. Efficiency	Timely decision-making on necessary adjustments to areas of financial activity from obtaining and practical application of simulation results assess the impact of corporate governance on the effectiveness of the Bank
3. Consistency	Consideration of corporate governance as a holistic, complex and dynamic set of backbone elements interconnected at different levels of functioning, the relationship with other models, primarily to the financial performance of the bank that provides investment
4. The ability to control outcomes	The capability for logical control simulation results in terms of quantitative assessment of the impact of power tools of corporate governance on the efficiency of financial performance in terms of matching the extreme range of possible values at the theoretical level, control going beyond the accepted limits of the functioning of the economic system under consideration

Thus, based on the results of Table 9 it can be argued that the proposed scientific and methodical approach to assessing the impact of corporate governance on the cost-effectiveness of investment bank meets the general criteria of adequacy, and thus makes it possible on the basis of the results obtained on the basis of economic and mathematical model to isolate the most important for each group of banks, corporate governance factors in modern conditions of development.

4. Conclusions.

At the current stage of development, there is no single universal mechanism of corporate governance in banks that provide specific investment banking services. However, the calculations based on the proposed scientific and methodical approach in the paper provide an opportunity to assert that the impact of corporate governance factors in different groups of banks by a combined measure of efficiency is not the same. This trend has observed, on the one hand, the nature of the influence of corporate governance factors, on the other hand, its strength. This explains the need of identifying an effective model of corporate governance, which should be inherent of a particular group of banks that carry out investment banking activities.

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AN ANALYSIS OF INTEGRATION DEGREE BETWEEN MACROECONOMIC AND FINANCIAL VARIABLES THROUGH PRINCIPAL COMPONENTS (2002-2013)

Elmo Tambosi Filho*

Abstract

This work has as its objective to evaluate integration degree of these indexes: Sao Paulo Stock Exchange – IBOVESPA, New York Stock Exchange- Dow Jones, interest rate-SELIC, which fulfills as basic interest rate in Brazil, the civil construction index – CUB and the pricing index to the ample consumer- IPCA, which fulfills as an internal inflation rate in Brazil. The period of analysis was from January 2002 to March 2013. The methodology was principal component analysis (ACP). It shows a high relation degree among SELIC, CUB and IPCA. IBOVESPA and DOW JONES do not present relation with the other variables.

Keywords: Interest Rate, Stock Exchange, Principal Components

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1. Introdution

Considering the big dwelling lack in Brazil, it is important to have mechanisms that show real state behavior and its relation with macroeconomic variables.

Therefore, this work has as objective to evaluate integration degree of these indexes: Sao Paulo Stock Exchange – IBOVESPA, New York Stock Exchange- Dow Jones, interest rate-SELIC, which fulfills as basic interest rate in Brazil, the civil construction index – CUB and the pricing index to the ample consumer- IPCA, which fulfills as an internal inflation rate in Brazil.

According to Belleza (2001) real state and financial market were on the same track for long time, but they would be invariably when related to loan. Traditionally, banks have been actives in providing loaning either to the producer (constructor/incorporator) or to the final consumer. On the other hand, the investment banks did not have any kind of relations with real state, due to the lack of interest in that business. Among the big Brazilian financial corporations, during many times, the directors of investment bank did not even know the directors of real state credit. However, the situation has started changing. The concept of real state, in which the operation depends on a specific property, started to become business.

During analysis in such area, evaluation involves not only the real value of the property. It involves mainly how much an established business in that property will profit for the next years. It is based on a study of possible cash flow that the operation will provide in the long-term.

As some of such operations would show quite interesting profitability rates, investors became interested not only in investing on them, but also, in participating in their results. The financial market started to ponder real state either as a governmental bond operation or as a risk asset. Thus, their initial idea of just loan had investment included.

Vedrossi and Shinohara (2001) show that with the end of the dwelling financial system in 1999, the entrepreneur companies started to seek for new ways of loan, either for sources of business production or for its commercialization. A way found by most of the entrepreneurs was the usage of their own sources as loan. It is important to take into consideration that adaptation of production into the buyer's savings capacity is something difficult to figure. Another way was to take resources from financial institutions aiming to adapt its cash to loan for clients. Such way was carried out through mechanisms that were not specifics for real states' loans.

Such operations have extremely non-joined conditions in relation to long-term operations, considering interests and indexes, what reinforces the risk. Therefore, financial agents that are able to stand during the recovery period of allocation of their own resources into real state investments are crucial. Such fact sets the entrepreneur free to reallocate his resources in new projects, focusing in covering the dwelling lack in Brazil.

It is important to characterize investors whose profiles are for long-term investment products, such

as bonds related to real states assets what identifies the eventual demand characterized by those bonds.

Institutional investors, mainly pension funds and insurance companies, form the majority of that group. These investors have the necessity of long-term investments and considerable security, which is provided by the real state.

Besides that group, we can consider a potential demand formed by individual investors who, taking into consideration the real state development, might reallocate their assets into those bonds using a part of savings account.

Accordingly, we can identify the necessity of an institutionalized risk classification of bonds related to real state assets, involving all the characteristics of this business. Such classification would be as a standard for comparisons to other long-run investments.

Despite the fact that Brazilian real state market is in an early stage in terms of financial structure, it is in total development with new searches and experiences, which are mainly related to real state assets security. Such circumstance is due to the present lack of resources for loaning.

The lack of an investment risk classification results in the fact that the CUB index is considered as a thermometer in the civil construction area. Then, it was used in this analysis.

2. Brief Historical of the Cub

The CUB (Basic unit cost per square meter of construction) was settled through the law n° 4.591 on December 16 1964. Each trade union of the civil construction industry (Sinduscon's) started calculating and publishing until the fifth day of each month several specifications of the basic unit cost per square meter of construction.

According to Goncalves (2002) such cost is calculated based on different representative standard projects (1, 4, 8, 12 floors; 2 or 3 bedrooms; low, regular or high standard finish) taking into consideration materials, labors and equipments with their respective constant weighs, which were previously on the NB-140/64, and at present on NBR-12721/99, from the Technical Standard Brazilian Association – ABNT.

The basic CUB's objective is to control the real state market as basis for cost determination in the civil construction section. It is published monthly and represents a partial cost of the construction; it does not include additional costs such as elevators, special foundations, building installations (water, electricity and sewer), telephone, engineer earnings etc.

Wages, material and equipment prices that are predicted on the NBR – 12721/99, are monthly collected by Sinduscon's through a survey with 20 or more construction companies. Therefore, the survey is carried out according to the buyer's perspective, what eliminates possible misinterpretations especially in relation to prices provided by distributors/sales people. In agreement with NBR – 12721/99, which predicts one CUB published in currency, its calculation cannot be limited to the verification of the materials' average performance. For each material is necessary an average data that shows truly the real price evolution. Hence, in order to get closer to the effective reality, the market has adopted medium as central trend measure for the unit cost calculation. Besides, all CUB calculations are currently computerized.

Although the basic CUB's objective is to control the real state market in order to have cost price, it has been extremely important for the construction cost evolution. So, as an index, the CUB is trustful in determining average cost performance of the construction section.

3. Principal Component Analysis

3.1 Purpose and Methodology

Para Verdinelli (2000), the purpose of this analysis is to substitute a group of correlated variables for a group of new variables, which are no correlated. Such variables are lineal combinations of the correlated ones ordered in a way that their variances decrease from first to last.

Considering $D = d_{ij}$ (I = 1,2, … , n; j = 1,2, … , p) the data matrix with p variables (x_1, x_2, …, x_p) and whose position r is the same as the number of variables (r = p); it is possible to determine y_1, y_2, …y_p with the following properties:

1) If each y is a combination of p variables x,

$Y_1 = x_1u_{11} + x_2u_{21} + \ldots + x_pu_{p1}$

$Y_2 = x_1u_{12} + x_2u_{22} + \ldots + x_pu_{p2}$

$Y_P = x_1u_{1p} + x_2u_{2p} + \ldots + x_pu_{pp}$;

2) If the sum of the squares of the coefficients u_{ij} is as the same as 1.

$\sum_{i=1}^{p} (u_{ij})^2 = 1$;

3) If the lineal combinations of variables are ordered by their variances;

Var y_1 > Var y_2 > ... > Var y_p;

4) If the new y variables are not correlated among themselves.

The main idea is that the first k new y variables, which are the principal components, can cope with the most of variability of the original data, allowing not to compute (p-k) that are less important components.

It is important to mention that this analysis is just a way to get a distinguished and perhaps, a more convenient, method of expressing the same group of results.

Through a notation of matrix, it is also possible to conclude that in order to get the principal components, the data matrix (which is denoted for the letter D in a generic way and possesses p variables) must be transformed in another matrix F of

hypothetical non- correlated variables and whose variance declines from first to last.

In order to get the transformation, D must be postmutiplied by an orthogonal matrix A, whose columns are, in a first type of solution, the normalized auto vectors. Such auto vectors are calculated from the smallest product moment of D matrix.

Then,

$F_{(n \times p)} = D_{(n \times p)} A_{(p \times p)}$

The columns of A are ordered in a way that the first one is consisted of p components of the auto vector associated to the greatest value of D'D. The second column corresponds to the auto vector calculated since the second greatest value and successively.

F is recognized as the matrix of factorial scores, while A is the factorial load matrix. Taking into consideration such matrices, it is possible to reconstruct the original data table or approximate it, if the components' numbers or extracted factors are K< p.

Then,

$D_{(n \times p)} = F_{(n \times p)} A'_{(p \times p)}$

or

$D_{(n \times p)} \cong F_{(n \times k)} A'_{(k \times p)}$

For the second equation, it is possible to indicate the difference between the approximated value and the real one as a matrix of residues E (nxp), which allows completing the model.

4. Empyrical Results

Monthly data were collected, which corresponding to Sao Paulo Stock Exchange – IBOVESPA, New York Stock Exchange- Dow Jones, interest rate-SELIC, which fulfills as basic interest rate in Brazil, the civil construction index – CUB and the pricing index to the ample consumer- IPCA, which fulfills as an internal inflation rate in Brazil. The analyzed period was from January 2002 to March 2013.

Data were obtained through the Civil Construction Trade Union, Applied Economic Research Institute and Economatica Software.

This work had as objective to find out the level of integration or relation among those indexes, through the traditional multivariate technique of principal components analyzes. Correlation coefficients were extracted in order to identify a possible interaction among the variables.

Table 1 shows that the majority of the indexes have relatively low correlation coefficients, considering a level of statistical significance of 5%. It is important to mention that those indexes have a tendency to vary with national and international economical elements, as well as with variations of the economy growing rates.

In spite of the fact that positive correlation coefficients were found, whose value varied at the minimum of 7% between Ibovespa and CUB and at the maximum of 70% between SELIC, IPCA and CUB, it is possible to say that there is an insignificant integration between IBOVESPA and DOW JONES with the other variables.

Also, the principal component analysis was used as an evaluation method of the variable integration level.

Table 2 shows the variance proportion that is explained by the first two principal components, which corresponds to around 76.81% of the total variance for that period.

Through Figure 1, it is easy to observe that there are no variables near the center, what means that the variables might be represented significantly just through the first principal component.

IBOVESPA and DOW JONES have opposite behavior to the other variables. Due to this conflicting reason, the method of varimax-normalized rotation was also used. Such method aims to explain not only the factors but also the analyzed variable's behavior.

Clearly, Figure 2 shows two components of distinguished variables. The first component is formed mainly by SELIC, CUB and IPCA variables. The second component has IBOVESPA and DOW JONES. Since the two components are independent among themselves, it is possible to mention that SELIC, CUB and IPCA variables have independent behavior from IBOVESPA and DOW JONES variables.

On tables 3 and 4 the indexes' contribution with the respective unrotated and normalized rotated factor loadings are highlighted.

Through table 4, we can observe that on the first normalized rotated principal component the variables that most contributed statically are: SELIC,CUB and IPCA with 83,74%, 85,97% and 88,83% respectively. In addition, on the second component just IBOVESPA and DOW JONES have a significant contribution with 89.82% and 88.95% respectively. Finally, through the figures and the tables, it is possible to conclude that the IBOVESPA and DOW JONES indexes are not integrated with the other indexes.

5. Final Considerations

This paper had as objective to evaluate the integration level among IBOVESPA, DOW JONES, SELIC, CUB and IPCA variables. The principal component analyzes was used. Through such approach, it was possible to verify that SELIC, CUB and IPCA variables are integrated in components and present relatively low correlation coefficients. On the other hand, IBOVESPA and DOW JONES behaviors showed to be independent from the other variables' behavior, which form another component.

For further studies, other statistical and econometric techniques are recommended, such as: clusters analysis and causality and multiple correspondence analyses with the intention of testing the efficiency of different methods.

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Appendix A

Table A.1 Correlation coefficients among the indexes

VARIABLES	IBOVESPA	DOW JONES	SELIC	CUB	IPCA
IBOVESPA	1.00	0.60	0.13	0.07	0.20
DOW JONES	0.65	1.00	0.20	0.12	0.09
SELIC	0.13	0.20	1.00	0.51	0.70
CUB	0.07	0.12	0.51	1.00	0.70
IPCA	0.17	0.09	0.60	0.60	1.00

Table A.2 Eigenvalues of the extracted principal components

Components	Eingevalues	(%) Total Variance	(%) Cumulative
1	2.357161	46.53322	47.57352
2	1.503636	31.06789	76.81564

Table A.3 Indexes' factor loading: Unrotated Principal Components

VARIABLES	COMPONENT 1	COMPONENT 2
IB0VESPA	0.439595	-0.800265
DOW JONES	0.475253	-0.784584
SELIC	0.854358	0.254158
CUB	0.782350	0.382104
IPCA	0.866232	0.320434
EXPL VAR	2.347161	1.473836
PRP TOTL	0.475332	0.330726

Table A.4 Indexes' factor loading: Varimax Normalized Rotated Principal Components

VARIABLES	COMPONENT 1	COMPONENT 2
IB0VESPA	0.053312	0.898242
DOW JONES	0.083765	0.889556
SELIC	0.837487	0.172215
CUB	0.859793	-0.015020
IPCA	0.888368	0.071344
EXPL VAR	2.179817	1.611173
PRP TOTL	0.477743	0.314145

Figure A.1 Factor Loading

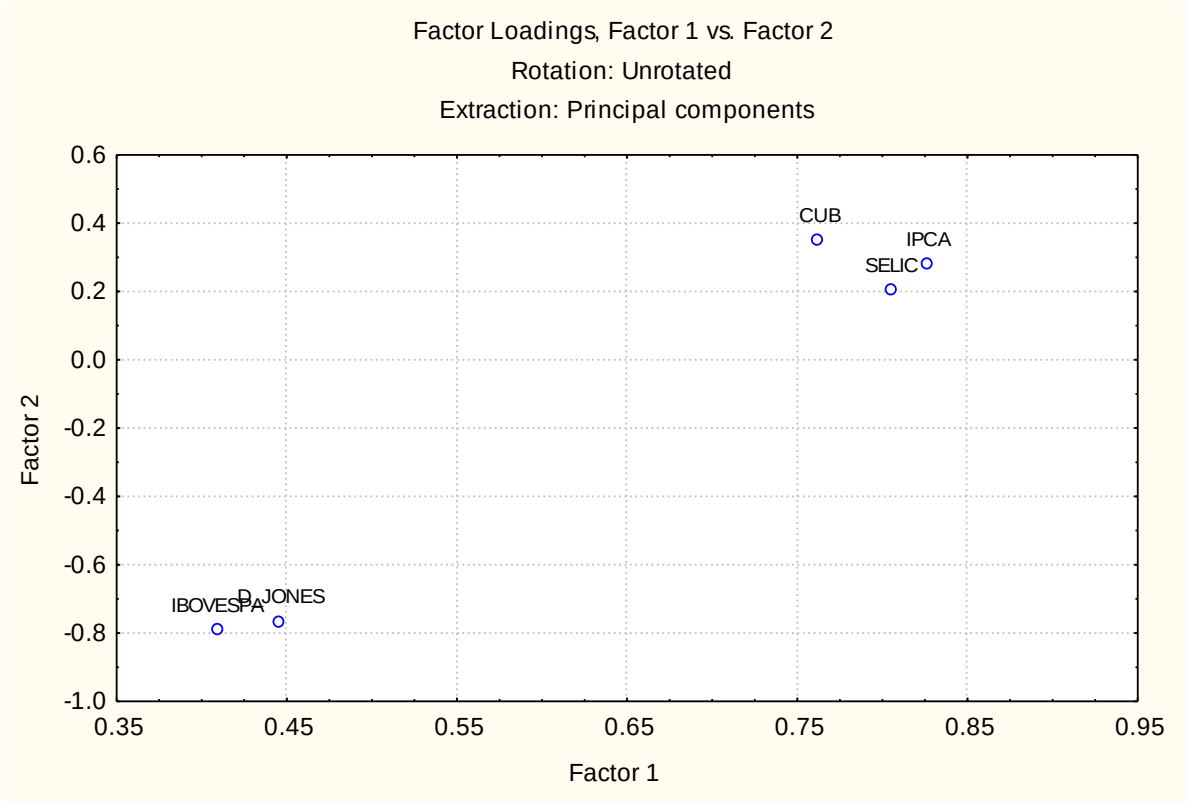

Figure A.2 Factor Loading