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STATEMENT OF PURPOSE

Journal of Economic and Social Studies (JECOSS) aims to develop scientific knowledge in the areas that include, and are related to Economics, Management, Financial Economics and Banking, Accounting, Marketing, Quantitative Methods and Econometrics, International Relations and Policy Development. As an international social sciences journal with interdisciplinary feature, it will set a ground to bring social science communities across disciplines identified above with a view for sharing information and debate. The journal publishes refereed articles and technical research notes that build on theory and contemporary scientific knowledge. Articles submitted to JECOSS will be peer-reviewed and expected to report previously unpublished scientific work. Submitted manuscripts should follow journal format and referencing guide and should not be under consideration elsewhere.

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CONTENT

Refereed Articles

What Determines the Firm's Net Trade Credit? Evidence from Macedonian Listed Firms

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Abstract: *This paper analyses the net trade credit and its determinants for a sample of 25 non-financial firms for the period 2011-2013. The sample is derived from the Macedonian Stock Exchange. The net trade credit is the dependent variable. The dependent variable is defined as the difference between trade receivables and liabilities, and then this difference is divided by total assets. The maturity structure of assets, profitability, inventory investment, cash to assets ratio, long-term financing, total debt financing, and converting sales into cash are the independent variables. This study used the Shapiro-Wilk W test for normality, Kernel density estimation, Variance Inflation Factor for multicollinearity, and the model specification link test for single-equation models. The obtained results show that more profitable firms and with higher current assets and cash ratio have positive net trade credits. The net trade credit is significantly negatively associated with inventory to total assets ratio and net cash flows from operating activities to sales. On the other hand, the net trade credit is significantly positively associated with current assets to total assets ratio and profitability.*

Introduction

Days' sales in receivables, days' purchases in payables and days' sales in inventory determine a firm's net trade credit. Hence, the longer the net trade cycle, the larger is a firm's working capital requirement (Bernstein and Wild, 1998, p. 418). On the other hand, the operating cycle (conversation period) is found as days to sell inventory plus collection period (see Bernstein and Wild, 1998, p. 425).

There is no doubt that neither net trade credit nor operating cycles can be analysed as short-term liquidity measures isolated from others financial measures. Namely, the purpose of this paper is to take into account some of factors that are thought to explain the conjunction between the credit offered to clients and credit obtained from suppliers. This is a pioneer study in Macedonia. The approach used could be a starting point for further studies in this subject. At the same time, it can support decision makers at the macro and micro economic levels, at a time when the Law for Financial Discipline in the Republic of Macedonia has already entered into force.

The basic problem starts from selling and buying on credit. Firms do not realize all sales in cash, as they do not pay all invoices (bills) with cash on the transaction date. Thus, in this process between debtor and creditor, goods are delivered, and/or services are provided without cash involvement. For accountants, this problem is known as accrual vs. cash base. To be precise, the concept of trade credit explains those relationships between a firm, its customers and suppliers. Petersen and Rajan (1996, pp. 2-4) list three main theories which explain trade credit. These are financing advantage theories of trade credit (advantage in information acquisition, advantage in controlling the buyer, advantage in salvaging value from existing assets), price discrimination through trade credit, and transactions costs theories.

For trade credit, many papers have been written and different evidence found from the micro and macro perspective. For example, Ferrando and Mulier (2012, p. 1) found that "firms that are more vulnerable to financial market imperfections, and therefore more likely to be financially constrained, rely more on the trade credit channel to manage growth." Kohler, Britton and Yates (2000, p. 20) found that "firms with direct access to capital markets – firms that are quoted on the UK stock exchange – both extend more and receive less trade credit during a recession. They therefore unambiguously provide unquoted firms with more net trade credit."

Delannay and Weill (2004) have examined the determinants of trade credit of about 9,300 firms from nine transitional countries (Central and Eastern European Countries). They provided evidence which suggest that "both financial and commercial motives explain the credit behaviour of firms." (p. 1) Moreover, they came to the conclusion that "suppliers act as financial intermediaries in favour of firms with a limited access to bank credit." (p. 21)

Altunok (2011, p. 2) found evidence that "suppliers' willingness to price discriminate, information asymmetry between suppliers and customers, market structure, stages

of business cycles, and customers' creditworthiness all play an important role in the determination of contract terms."

Garcia-Teruel and Martinez-Solano (2006) analyzing 3,589 small and medium sized firms in the UK found evidence that "larger firms, with better access to alternative internal and external financing and with a lower cost, use less credit from suppliers."

This paper also tries to study some of factors that are supposed to determine the net trade credit for selected firms. The paper is organized as follows: introduction, research design, analyses, and discussion of results, conclusions, references, and appendixes.

Research Design

The analysis performed in this study includes three basic financial statements. Firstly, the dependent variable, defined as (Trade receivables – Trade liabilities) / Total assets, means that both numerator and dominator are balance sheet articles. On the other hand, independent variables such as Current assets / Total assets, Inventory / Total assets, Cash and cash equivalents / Total assets, Long-term debt / Total assets, and Total liabilities / Total assets, contain balance sheet articles. Secondly, independent variable defined as Profit (Loss) / Sales contains income statement articles. Finally, the independent variable defined as Net cash flows from operating activities / Sales contains cash flow statement and income statement articles.

From an accounting point of view, it is well known that a balance sheet as a statement can be viewed as a photo, whereas the other two statements (cash flow and income statement) can be viewed as a movie. This is because a balance sheet denotes a balance sheet equation expressed as Assets = Liabilities + Equity at a specific point in time (usually a specific date, as it is in Macedonia, i.e. 31 December). On the other hand, cash flow statements list cash flows from operating, investing, and financing activities over a given accounting period. In this case, cash flows from operating activities cover one year, for example from 01 January to 31 December, 2013. This is a reason why in cash flow statements and income statements it is written "as for the year ended at 31 December", and not "as of 31 December 2013" as in the case of balance sheets (financial position). Finally, an income statement denotes a firm's financial performance over a certain accounting period. In this case, this accounting period covers one year, i.e. from 01 January to 31 December, 2013. With other words, the regression model contains some variables that express something as it was at date 31 December 2013, and others express something that was generated during year 2013. After all, at the end of the accounting period, income statements, cash flow and statements of changes in equity are merged on the balance sheet.

In this study quantitative methods and regression and spearman analyses are used. The study begins with a brief theoretical framework for trade credit and its determinants. The study ends up with conclusions related with net trade credit for analysed firms.

The section below is focused on the process of data selection, sample-selected firms, processing the data, panel data, and finally the methodology of quantitative variables calculation.

This study starts from the general and a briefly theoretical part in order to come later to some specific conclusions. With other words, a deductive and result-oriented approach is used. Principally, case study as a research method is used in this study. Case study is used because the study is limited in two aspects. Firstly, the sample comprised just non financial firms which are listed on the Macedonian Stock Exchange, and therefore limited in the aspect of the number of firms. Secondly, the analysed period covers 2011-2013.

The sample is comprised of 25 non-financial firms (for more see the list of firms in the Appendix). Banks were not selected for analyze due to their specific characteristics that they have in comparison with other selected firms.

In total, 74 observations are examined and regression analysis is performed. Selected firms are non-financial entities. They belong to different types of businesses such as industry, services, construction, catering, trade and agriculture. In the industry sector there are nine firms or 36 percent as a structure of the sample; in the services sector there are five firms or 20 percent; in the construction sector are two firms or 8 percent; in the catering sector are three firms or 12 percent; in the trade sector are five firms or 20 percent; and in the agriculture sector there is one firm or 4 percent of the total of 25 firms.

Data are derived from firms' annual reports published on the Macedonian Stock Exchange web page (for more see: http://www.mse.org.mk/). Data are organized in the form of panel data. Unbalanced panel data are used. Analyses are performed by the Stata 10 software package. Some statistically performed analyses in this paper are based on concepts, ideas, and methodologies from UCLA.

In this study, seven independent variables are used. Net trade credit is a dependent variable. Maturity structure of assets, profitability, inventory investment, cash to total assets ratio, long-term financing, total debt financing, and converting sales into cash are independent variables. Both types of variables, dependent and independent, are expressed as their book values.

Table 1 describes the methodology of measuring quantitative variables used in this study. By using those seven independent variables in the regression model, there is an attempt to analyse the dependence of the net trade credit on these proxies.

The initial generalized regression model used in this study can be written as:

$$Y_i = \alpha + \sum_{k=1}^{7} X_{kit}\beta_{kit} + \varepsilon_i \qquad (1)$$

where,

      Yit is the net trade credit of a firm (i) to the period (t),

      i = 1, 2, 3,..., 25,
      k = 1, 2, 3,…, 7, and.
      t = 1, 2, 3.

Since net trade credit is a function of variables of interest, and then regression, model (1) can be expanded as follow (2):

$$\left(\frac{\text{Trade receivables - Trade liabilities}}{\text{Total assets}}\right)_i = \alpha + \beta_1\left(\frac{\text{Current assets}}{\text{Total assets}}\right)_i + \beta_2\left(\frac{\text{P ofit (Loss)}}{\text{Sales}}\right)_i +$$

$$\beta_3\left(\frac{\text{Inventory}}{\text{Total assets}}\right)_i + \beta_4\left(\frac{\text{Cash and cash equivalents}}{\text{Total assets}}\right)_i + \beta_5\left(\frac{\text{Long} - \text{term debt}}{\text{Total assets}}\right)_i + \beta_6\left(\frac{\text{Total liabilities}}{\text{Total assets}}\right)_i +$$

$$\beta_7\left(\frac{\text{Net cash flows from operating activities}}{\text{Sales}}\right)_i + \varepsilon_i \qquad (2)$$

In this study, two types of regression are used: Pooled OLS (OLS regression without option vce, i.e. default standard errors) and OLS with vce (cluster-robust standards errors). Vce option performs cluster-robust standard errors. Clustering is done on the firm. As Cameron and Trivedi (2010) explained the error (here in equation 1) is likely to be correlated over time for a given individual (here firm) which is within correlation and possible correlation over individuals (here firms) which is between correlation. Hence, vce option is used to control this issue. According to Wiggins (1999) … "regress …, vce (cluster) estimates the model by OLS but uses the linearization/Huber/White/ sandwich (robust) estimates of variance (and thus standard errors). These variance estimates are robust in the sense of providing correct coverage rates to much more than panel-level heteroskedasticity. In particular, they are robust for any type of correlation within the observations of each panel/group."

Table 1: The Methodology of Quantitative Variables Calculation

Description	Abbreviation	Calculation
Net trade credit	trtpas	(Trade receivables – Trade liabilities) / Total assets
Maturity structure of assets	currasas	Current assets / Total assets
Profitability	profsales	Net income / Sales
Inventory to assets ratio	invas	Inventory / Total assets
Cash to assets ratio	cashas	Cash and cash equivalents / Total assets
Long-term financing	ldebtas	Long-term debt / Total assets
Total liabilities ratio	liabas	Total liabilities / Total assets
Converting sales into cash	coasales	Net cash flows from operating activities / Sales

Source: Grave (2011), Garcia-Teruel and Martinez-Solano (2006), Xhafa (2005), author.

Net trade credit, generally, net trade credit as a dependent variable, is differently defined by different authors. Net trade credit as a dependent variable used in this study is calculated as the difference between trade receivables (accounts receivables or debtors) and trade liabilities (accounts payables or creditors), and then this difference is divided

by total assets. This calculation is based on Grave (2011), which also analyses trade receivables divided by total assets and trade payables divided by total assets.

Some authors examined separately trade receivables and payables with others determinants, while some others authors separately and jointly. For example, Alatalo (2010, p. 27) uses trade credit provided (trade receivables per sales), trade credit obtained (trade credit payables per cost of goods sold) and net trade credit (difference between trade receivables and payables scaled by sales). Ge and Qiu (2007, p. 521) as a dependent variable use accounts payable/total assets, accounts payable/sales, (accounts payable - accounts receivable)/total assets, (accounts payable - accounts receivable)/sales.

Analyses

This section includes descriptive statistics, data and regression analyses. This section presents the overall picture of data and variables analysed in this study. Shapiro-Wilk W test for normality is performed. Obtained results from regression analysis are controlled and tested via necessary tests. These processes are carried out in order to get as far as possible reliable conclusions at the end of this study.

Descriptive statistics and analyses

Descriptive statistics presented in this section include number of observations, mean, standard deviation, minimum and maximum. Table 1 presents descriptive statistics and table 2 presents the mean for each variable according to years.

As table 2 shows, there are 74 observations per each variable. For one firm, there is missing data for one year. This implies that the panel data is unbalanced. Mean and standard deviation of each variable are less than one, except standard deviation for 'profsales'. From observed data, there are cases where firms have minus net cash flows from operating activities, i.e. inflows are less than outflows from the operating activities section. This is why on the 'min' column for 'coasales' is appeared a negative value. In the 'min' column, negative values appear also for the dependent variable 'trtpas' and the profitability variable 'profsales'. On the other hand, the 'max' column denotes that all values are less than one, except for 'profsales' and 'coasales'.

Table 2: Descriptive Statistics for 25 Firms

Variable	Obs	Mean	Std. Dev.	Min	Max
trtpas	74	0.028	0.111	-0.301	0.288
currasas	74	0.395	0.186	0.045	0.789
profsales	74	0.182	1.207	-1.693	9.850
invas	74	0.108	0.102	0.003	0.366
cashas	74	0.029	0.039	0.000	0.160
ldebtas	74	0.106	0.115	0.000	0.379

liabas	74	0.397	0.233	0.018	0.840
coasales	74	0.128	0.676	-0.613	5.744

Source: author's calculations

On average, based on obtained results from descriptive statistics, the following interpretation can be drawn for selected firms and the analysed period. Firstly, trade receivables are slightly higher than trade payables. Secondly, long-term assets are higher than short-term assets, i.e. 39% short-term and rest 61% are long-term assets. Thirdly, for each 100 denar sales, 18 denar profits is generated. Fourthly, inventory to total assets participates with 11%, and cash and its equivalents with 3%. Fifthly, for each 100 denar sales, 13 denar net cash flow from operating activities is received. Finally, assets are financed more with capital than liabilities.

Table 3: Mean of the Variables by Years

Years	trtpas	currasas	profsa~s	invas	cashas	ldebtas	liabas	coasales
2011	0.020	0.389	0.496	0.111	0.030	0.103	0.409	0.064
2012	0.038	0.407	-0.014	0.108	0.032	0.101	0.406	0.038
2013	0.025	0.387	0.059	0.104	0.024	0.115	0.377	0.290
Total	0.028	0.395	0.182	0.108	0.029	0.106	0.397	0.128

Source: author's calculations

Figure 1 shows the trend analysis of mean for trade receivables to total assets, trade payables to total assets, and the net trade credit to total assets. For the analysed period 2011-2013, on average accounts receivable are higher than account payables. The difference is even higher in 2012 when the mean of net trade credit is obviously increased. Based on the concept of the time value of money, in this case it is preferable to have a negative percentage of the net trade credit.

Figure 1: Trade Receivables, Trade Payables, and Net Trade Credit to Total Assets, Mean by Years
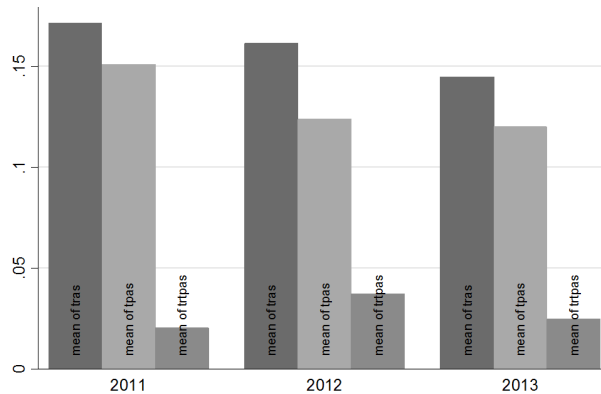
Source: author's calculations

Current assets to total assets ratio–besides others classifications, assets are classified on short-term and long-term, or current and non-current assets. Knowing the structure of assets based on time to maturity, or using period classification is important on the financial decision making process. The portion of current assets to total assets is different for different firms. In fact, this ratio can change for one firm's view from different periods. However, many explanations can be found why some firms have lower current assets to total assets ratio, and others have higher. Selected firms for the period 2011-2013 on average have remained almost the same for the current assets to total assets ratio.

Profitability–there are many indicators for showing the profitability of an entity. For example, profitability may be measured by gross margin, operating margin, contribution margin, profit margin, return on assets (ROA), return on equity (ROE), return on total capital (ROTC), etc. In this study, a measure that takes into consideration sales and costs is used. Hence, in this study profitability is measured using profit margin. This ratio denotes how much denar profit every sales in denar generates. It is calculated as profit (loss) / sales. There are observations in this study where net income (profit or loss) for the period (year) is not equal with the overall profit (loss) for the period (year). This is due to some accounting adjustments made after net profit (loss) for the period is calculated. Obtained results show that more profitable firms and with higher current assets and cash to total assets ratio have more trade receivable than payables. On the other hand, profitable firms have financed business activities more with capital rather than debt.

Inventory investment–inventory to total assets is a regular ratio which found in order to analyse the inventory level or investment. It is a very helpful analysis which gives a picture of assets composition. Selected firms for the period 2011-2013 on average have remained almost at the same inventory level.

Figure 2: Inventory to Assets; Cash and Cash Equivalents to Assets, Mean by Years
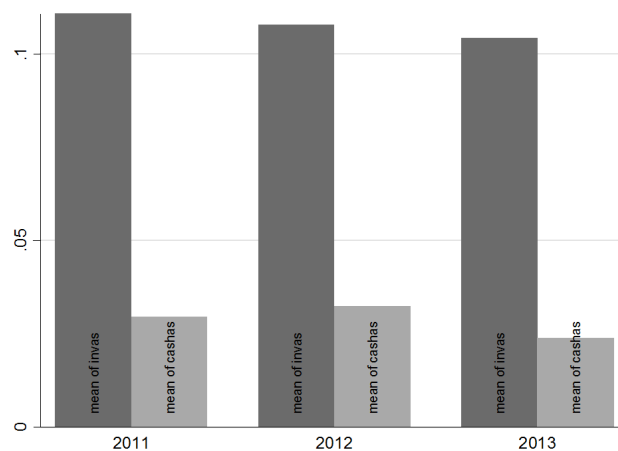
Source: author's calculations

Cash to total assets ratio–this ratio is calculated based on the same methodology as the previous ratio for inventory using vertical analysis. So, cash and its equivalents are divided by total assets. Figure 2 shows cash and its equivalents to assets for the period 2011-2013. As it can be noticed, selected firms on average have almost the same cash ratio for the analysed period. Obtained results show that firms with higher cash ratio are more able to convert sales into cash than counterparties.

Long term financing and total liabilities ratio–those two ratios explain how assets are financed. In other words, what percentage is long-term financing, or total debt on total assets? They both belong to the leverage ratios group. Firms finance their assets by both, short-term and long-term debt. On the other hand, assets can be financed by debt and (or) equity, and this issue is well known in financial management as the capital structure. On average, there is a decrease of total debt financing in 2013.

Converting sales into Cash – a cash flow statement is prepared because of an accrual versus cash accounting base problem. All sale revenues perhaps are not done on the cash basis. This means that a sale is recognized as an accounting transaction (record) on one date, and receiving money is done on another date. Due to this, the ratio net cash flows from operating activities / sales helps us to analyse how much denars from sales are converted into cash. Obtained results show that firms with higher leverage ratio are not able to convert sales into cash compared with counterparties. On the other hand, on average in 2013, selected firms have been more able to convert sales into cash.

Data and regression analyses

The Shapiro-Wilk W test for normality is used to check whether residuals are normally distributed. The results of the Shapiro-Wilk W test are presented in table 4. The p-value is 0.061. So, it is greater than 0.05, indicating that the null hypothesis cannot be rejected. In other words, it can be concluded that residuals are normally distributed.

Table 4: Shapiro-Wilk W Test for Normal Data

Variable	Obs	W	V	z	Prob>z
r	74	0.968	2.031	1.546	0.061

Source: author's calculations

Kernel density estimate is performed for 25 firms, and is presented on figure 3.

Figure 3: Kernel Density Estimate for 25 Firms
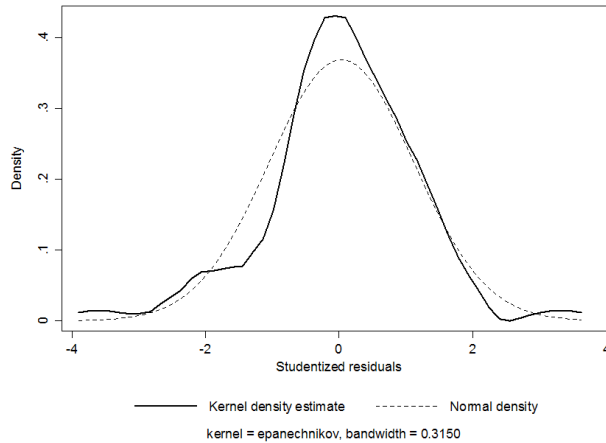
Source: author's calculations

Variance Inflation Factor (VIF) is used for as a measure of control for mulitcollinearity, results of which are in table 5. The results indicate that for all variables VIF is lower than 10, which means that multicollinearity is not a problem in this study.

Table 5: VIF for the Independent Variables

Variable	VIF	1/VIF
currasas	1.78	0.56
invas	1.51	0.66
liabas	1.42	0.70
ldebtas	1.34	0.75
cashas	1.19	0.84
coasales	1.18	0.85
profsales	1.17	0.86
Mean VIF	1.37	

Source: author's calculations

Moreover, in order to analyse whether the regression model is correctly specified, a model specification link test for single-equation models is used. The results of this test are in table 6. Since hatsq is not significant (t = -1.25), then it looks like that there is no specification error for this model in this study.

Table 6: A Model Specification Link Test for Single-equation Models

Source	SS	df	MS	Number of obs = 74		
Model	0.448	2	0.224	F (2, 71) = 34.77		
Residual	0.457	71	0.006	Prob > F = 0		
Total	0.905	73	0.012	R-squared = 0.495		
				Adj R-squared = 0.481		
				Root MSE = 0.080		
trtpas	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
hat	1.116	0.153	7.31	0.000	0.811	1.420
_hatsq	-1.710	1.372	-1.25	0.217	-4.446	1.026
_cons	0.008	0.012	0.69	0.492	-0.016	0.032

Source: author's calculations

Discussion of Results

This section discusses obtained results based on performed analyses. Based on the Spearman analysis (see table 7), significant positive relationships are found between the net trade credit and current assets, profitability and cash to total assets ratio. This implies that more profitable firms and with higher current assets and cash to total assets ratio have more trade receivables than payables. Probably profitable firms have generated internal funds and were more able to wait for their clients than counterparties.

Table 7: Spearman's Rank Correlation Coefficients

	trtpas	currasas	profsa~s	invas	cashas	ldebtas	liabas	coasales
trtpas	1.00							
currasas	0.52*	1.00						
prof-sales	0.23*	0.20	1.00					
invas	0.04	0.61*	-0.07	1.00				
cashas	0.31*	0.44*	0.37*	0.18	1.00			
ldebtas	-0.10	-0.15	-0.13	0.00	-0.17	1.00		
liabas	-0.07	0.09	-0.52*	0.26*	-0.22	0.37*	1.00	
coasales	-0.07	0.08	0.49*	-0.16	0.30*	0.04	-0.35*	1.00
(Obs = 74, * 0.05 Significance level)								

Source: author's calculations

Significant positive relationships are found between current assets, the inventory ratio, and the cash to total assets ratio. As firms increased investments on inventories, current assets are increased too. Also cash are current assets. Significant positive relationships

are found between profitability, cash ratio, and converting sales into cash. This implies that more profitable firms have a higher liquidity level and are more able to convert sales into cash than counterparties. On the other hand, profitability is significantly negatively associated with total debt financing. This implies that profitable firms have financed business activities more with capital than debt. A significant positive relationship is found between inventory ratio and total debt financing. A significant positive relationship is found between cash ratio and converting sales into cash. Firms with higher cash ratio are more able to convert sales into cash than counterparties. A significant positive relationship is found between long-term financing and total debt financing. As firms have increased long-term debt, total debt financing is increased too. A significant negative relationship is found between total debt financing and converting sales into cash. This result implies that firms with higher leverage ratio are less able to convert sales into cash compared with counterparties. Regression analyses are performed and results are presented in table 8. Both OLS regressions show that current assets to total assets ratio and inventory to total assets ratio are statistically significant determinants (0.05 significance level). R2, the number of observations, signs, and coefficients (b) remain same in both OLS regressions.

Table 8: Regression Results According OLS and OLS with vce Option

Variable	OLS	OLSVCE
currasas	0.48	0.48
	0.07	0.1
	6.75	4.57
profsales	0.01	0.01
	0.01	0
	0.79	2.16
invas	-0.33	-0.33
	0.12	0.13
	-2.75	-2.42
cashas	0.07	0.07
	0.27	0.3
	0.26	0.23
ldebtas	0.15	0.15
	0.1	0.12
	1.47	1.18
liabas	-0.17	-0.17
	0.05	0.09
	-3.41	-1.88

	-0.03	-0.03
coasales	0.02	0.01
	-1.88	-2.74
	-0.07	-0.07
_cons	0.03	0.04
	-2.36	-1.85
N	74	74
r2	0.48	0.48
Legend: b/se/t		

Source: author's calculations

Based on the results of the second regression model, the net trade credit is significantly negatively associated with inventory to total assets ratio and net cash flows from operating activities to sales. On the other hand, the net trade credit is significantly positively associated with current assets to total assets ratio and profitability.

Conclusions

The purpose of this paper was to analyse the net trade credit and its determinants for 25 non financial firms for the period 2011-2013. The paper has as its limitations the number of firms and the analysed period. Hence, the paper provides evidence which cannot be generalized to other firms. In this context, the paper can serve as a starting point for future studies in terms of domestic firms, at least viewed from the methodological side.

Significant relationships between the net trade credit and analysed determinants are found using Spearman and regression analyses. The net trade credit is significantly negatively associated with inventory to total assets ratio and net cash flows from operating activities to sales. On the other hand, the net trade credit is significantly positively associated with current assets to total assets ratio and profitability.

Selected firms for the selected period on average have provided more than obtained trade credit. Therefore, this implies that working capital needs are increased.

The study also revealed the following evidences:

- More profitable firms and with higher current assets and cash to total assets ratio have more trade receivables than payables;

- More profitable firms have a higher liquidity level and are more able to convert sales into cash than counterparties;

- Profitable firms have financed business activities more with capital than debt;

- Firms with higher cash ratio are more able to convert sales into cash than counterparties;

- Firms with higher leverage ratio are less able to convert sales into cash than counterparties.

Without a doubt this issue remains an open issue window for domestic firms. For future studies, it might be interesting to focus on the following aspects: Extend the analysed period and increase the number of firms in the sample, Add new independent and dependent variables, and Include financial crisis effects.

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Appendix: List of Analysed Firms

Firm	Firm code		
Alkaloid AD Skopje			
Beton AD Skopje			
EMO AD Ohrid			
Fersped AD Skopje			
Granit AD Skopje			
Hoteli Metropol Ohrid			
Internesnel Hotels AD Skopje			

Makedonijaturist AD Skopje			
Makosped AD Skopje			
Makoteks AD Skopje			
Makpetrol AD Skopje			
Makstil AD Skopje			
Replek AD Skopje			

The Effects of Foreign Direct Investments on Transition Economies: The Balkans Case

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Abstract: *The stabilized economic growth in the long-run lies ahead as an obstacle in the long road of development for many transition economies especially for those are in the Balkans. Some of the Balkan countries such as Croatia and Bulgaria have managed to get aboard to the European Union train. But for many others, the train has not arrived yet. Furthermore, many of those non-European Union member transition economies in the Balkans have to deal with an inheritance of a war economy experienced during early 90s. Today non-European Union member transition economies in the Balkans need to increase the capital flows to their countries for economic growth purposes. The literature on foreign direct investments suggest that there may be some positive effects on the economic growth of the host countries depending on many conditions - most commonly on absorptive capacities. However, are they really ready for this? Are the absorptive capacities in those countries at the extent in which enable them to extract benefits from foreign investments? The answer to this question is the key to truly understand the effects of foreign direct investments in those countries. Therefore, in this study, the effects of foreign direct investments on the economic growth of non-European Union member transition economies in the Balkans are investigated from the absorptive capacity perspective. This paper serves a role in comprehending the true dynamics of absorptive capacities measured through a new technique presented in this paper. The results confirm that current foreign direct investment flows to those non-European Union member Balkan countries are not able to work miracles given the absorptive capacities of the host countries.*

Emre M. Görgülü

Introduction

Following the painful 90s, stabilized economic growth becomes the predominant objective for most of the Balkans. In this direction, some of the Balkan countries such as Croatia and Bulgaria have managed to get aboard to the European Union (EU) train. But for many others, the train has not arrived yet. Moreover, being a transition economy in the Balkans creates additional burdens to these counties. Having experienced the harsh Bosnian War and the lagged effects of it, those countries are still struggling to find their way into the long road of development.

As an international political instrument Foreign Direct Investments (FDIs) are playing an increasingly important role in economic development. By means of FDIs, the host countries may be affected positively through externality effects and capital enhancement (Alfaro, Chanda, Kalemli-Ozcan, and Sayek, 2006; Sun, 2002). However, FDIs can also create adverse effects such as external-dependency and imbalances in local markets. The outcome on the host economies basically depends on the level of absorptive capacities in these countries[i]. Thus, the effects of FDIs in host countries with solid administrative, financial and economical infrastructures differ from the effects in countries lack such structures. These structural differences create a long range of effects on the host countries.

In this paper, the effects of FDIs on economic growth of transition economies in the Balkans are investigated through an absorptive capacity perspective. The distinction between EU member Balkan countries and non-EU member Balkan countries has been made in the paper with "transition" concept taken into account; since EU members would be expected to have a better absorptive capacity due to EU obligations has to be fulfilled in order to reach EU standards. Thus, this paper concentrates only on non-EU member transition economies in the Balkans[ii]. Accordingly, the FDIs in the host countries that have some level of absorptive capacities may have some effects that accelerate the growth, while, the FDIs in countries that lack such absorptive capacities, may not promote the growth. Moreover, there is a mutual relationship between absorptive capacities and FDIs. On one hand, absorptive capacities can stimulate the effects of FDIs to both positive and negative sides; on the other hand, FDI flows to a country are in line with the absorptive capacity of that country; as the capacity increases the possibility of increased FDI flows arises (Alfaro et al., 2004; Alfaro et al., 2006). Therefore, the absorptive capacities of the host countries are of vital importance when it comes down to FDIs. Through the absorptive capacity perspective the aim of this paper is to empirically reveal to what extent transition economies in the Balkans can utilize FDIs. Given the potential significance of FDIs on economic development, this paper not only offers an overall guideline on the matter for the transition economies in the Balkans but also presents a new technique to measure the absorptive capacities. Through the new technique employed to measure absorptive capacities, the study aims at contributing to the literature.

Following the introduction, the FDI movements in Balkans are handled in the second part. In the third part, a comprehensive reasoning for the concept of absorptive capacity and its ties with FDIs takes place along with the empirical analyses applied to the sample. Findings of the analysis are also presented in this part. In the final conclusion part, the results of the analyses have been studied and the paper has been concluded.

FDIs in the Balkans

The International Monetary Fund (IMF) listed transition economies in 2000 (International Monetary Fund, 2000). According to this list; Croatia, Bulgaria, Albania and Macedonia were listed as transition economies. Later, the World Bank added Bosnia Herzegovina and then Serbia and Montenegro as transition economies as well in 2002 (The World Bank, 2002). After Bulgaria's membership to EU in 2007, World Bank no longer considered her as a transition economy (Alam, Casero, Khan, and Udomsaph, 2008). Further, while the World Bank includes Kosovo to the list of transition economies in 2009 (The World Bank, 2010), she still remains as a partially recognized state due to ongoing territorial claim issues with Serbia (Rettman, 2013) [iii]. Moreover, even though, Croatia is still considered as a transition economy, its good economic performance starting from the 2000s and her membership to EU, singles her out from the rest of the group along with Bulgaria. Due to the fact that she is an EU member now, it is expected from her to have a better absorptive capacity needed to carry out EU integration. Therefore, for the purposes of this study, only Albania, Bosnia Herzegovina, Macedonia, Montenegro and Serbia fit in the group of non-EU member transition economies in the Balkans and are considered in the sample.

Following the dissolution of Eastern Bloc, the Balkans faces an era of turmoil and wars. In this period of turmoil in the Balkans[iv] economic stability was far beyond reach. Naturally, as a result of the socialist heritage and the era of wars and turmoil, foreign investments were not significant at the time. Total FDI inflows for the non-EU member transition countries in the Balkans; namely Albania, Bosnia Herzegovina, Montenegro, Serbia - Serbia and Montenegro at the time[v] - and Macedonia in the period of 1992-2001 was 3.82 billion US Dollars (United Nations Conference on Trade and Development, 2015). Whereas the total FDI outflows for the same group of countries in the same period was only 14.64 million US Dollars (United Nations Conference on Trade and Development, 2015).

After 2001, the region finally reaches peace and with the increasing global free movement of capital, FDI movements for these countries increased remarkably. For the period 2002-2013 FDI inflows in the region rose sharply to 51.69 billion US Dollars, while FDI outflows reached 2.97 billion US Dollars (United Nations Conference on Trade and Development, 2015). Since following 2001 the region could finally start to operate in a market manner, the period 2002-2013 was taken as the time frame for the analyses conducted in this paper.

According to the FDI movement data (United Nations Conference on Trade and Development, 2015) in the region; for the pre-2002 period Serbia and Montenegro was the biggest FDI recipient with a total of 1.52 billion US Dollars and largest FDI sender with nearly 14 million US Dollars in total. For the post-2002 period, despite Serbia and Montenegro cease to exist as a union at 2006, they still remain the largest FDI recipient country in the region with 15.6 billion US Dollars, such that they almost attract more foreign investment than the two countries combined for the period. As for the FDI outflows Serbia and Montenegro still top the list with a figure of 1.41 billion US Dollars. However, the Union owes this FDI movement success mainly to Serbia with her 12.9 billion US Dollars inflow and 924.6 million US Dollars outflow performances (United Nations Conference on Trade and Development, 2015). Below Figure-1 shows FDI inflows to the region for the entire 1992-2013 period, while Figure-2 presents FDI outflows from the region for the same period.

Figure 1. FDI Inflows to non-EU Member Transition Economies in the Balkans (millions)
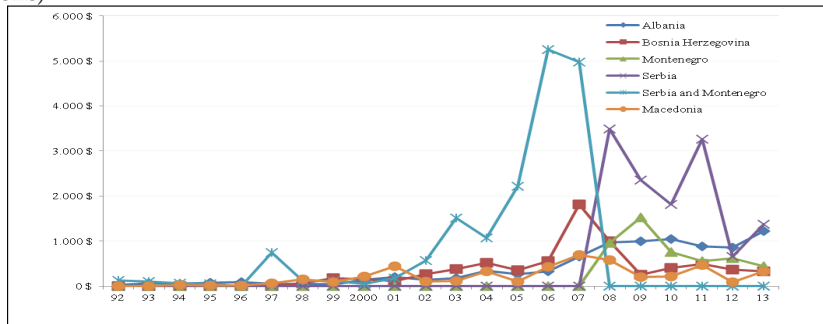
Source: United Nations Conference on Trade and Development (2015)

Figure 2. FDI Outflows from non-EU Member Transition Economies in the Balkans (millions)
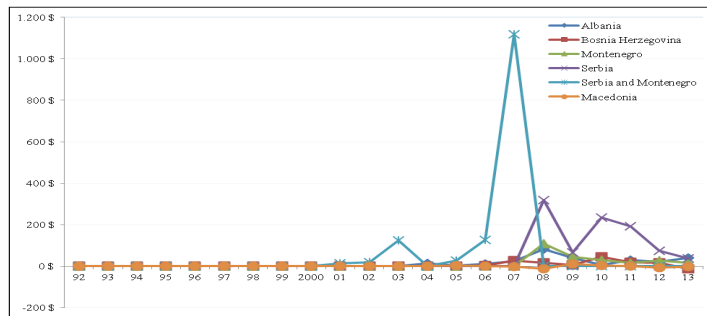
Source: United Nations Conference on Trade and Development (2015)

The pre-2002 period for the region has no significant FDI movement, and for the post-2002 period, it is worth concentrating on 2008-2013 period since Serbia and Montenegro started to have separate data from that date on and between these dates we can truly observe increased FDI movements. So, for the period 2008-2013 FDI movements in the region is summarized for inflows and outflows in Table 1 and Table 2 respectively. However, for the statistical significance purpose, we would need more observations. Therefore, given data availability constraints in the sample, the analyses are made for the period 2002-2013.

Table 1. FDI Inflows to non-EU Member Transition Economies in the Balkans (USD in Millions)

Country	Year					
	2008	2009	2010	2011	2012	2013
Albania	974	996	1051	876	855	1225
Bosnia and Herzegovina	1002	250	406	493	366	332
Montenegro	960	1527	760	558	620	447
Serbia	3492	2358	1813	3257	659	1377
Macedonia	586	201	212	468	93	334

Source: United Nations Conference on Trade and Development (2015)

Table 2. FDI Outflows from non-EU Member Transition Economies in the Balkans (USD in Millions)

Country	Year					
	2008	2009	2010	2011	2012	2013
Albania	81	39	6	30	23	40
Bosnia and Herzegovina	17	6	46	18	15	-13
Montenegro	108	46	29	17	27	17
Serbia	319	67	235	191	75	37
Macedonia	-14	11	2	0	-8	-2

Source: United Nations Conference on Trade and Development (2015)

According to the analyses conducted in this study, FDI effectiveness is measured through its effects on Gross Domestic Product (GDP) growth in the host countries. Therefore, in order to create an insight for the matter it would be helpful to compare the FDI inflows to countries in the sample with their GDP performances in the given period. In this direction FDI inflows and GDP performances of the countries in sample is given in Figure-3, Figure-4, Figure-5, Figure-6 and Figure-7 for Albania, Bosnia and Herzegovina, Montenegro, Serbia and Macedonia respectively. At the first glance, one can observe that all countries in the sample has been affected from the 2007-2008 crisis

and 2011 recession experienced by the globe (International Monetary Fund, 2014).

Figure 3. Albania FDI Inflows-GDP (USD in millions)
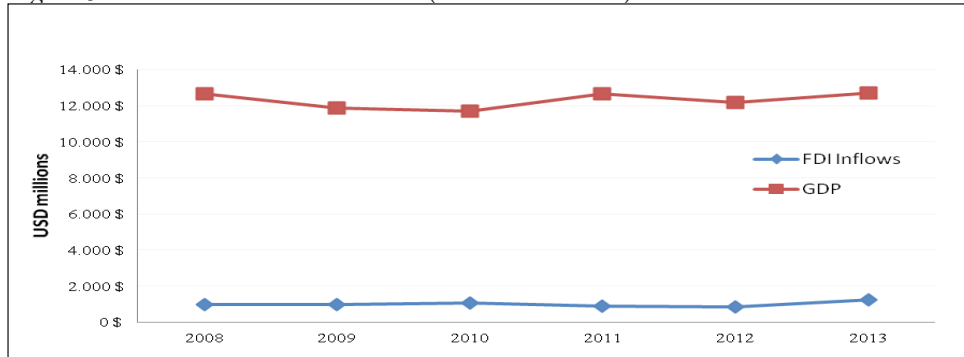
Source: International Monetary Fund (2014), United Nations Conference on Trade and Development (2015)

For the period 2008-2013 Albanian FDI inflows could only exceed 1 billion USD benchmark only in 2010 and in 2013. Her GDP on the other shows a steady movement around the 12 billion USD band. Even though the linear relationship between FDI inflows and GDP figures is not clearly visible at first sight, FDI inflow percentage in Albanian GDP is around 8 to 10 percent in the period (International Monetary Fund, 2014; United Nations Conference on Trade and Development, 2015).

Figure 4. Bosnia Herzegovina FDI Inflows-GDP (USD in millions)
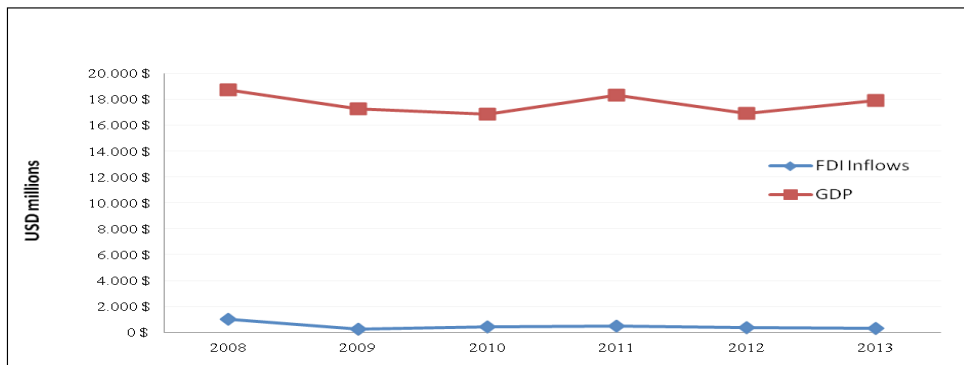
Source: International Monetary Fund (2014), United Nations Conference on Trade and Development (2015)

Bosnia and Herzegovinian FDI inflows saw a sharp decline following 2007-2008 global crises, and showing no signs of improvement as of 2013. However, Bosnia and Herzegovinian GDP performance seems to be stable around 17-18 billion USD band

and displaying little evidence for a linear relationship between FDI inflows and GDP numbers (International Monetary Fund, 2014; United Nations Conference on Trade and Development, 2015).

Figure 5. Montenegro FDI Inflows-GDP (USD in millions)
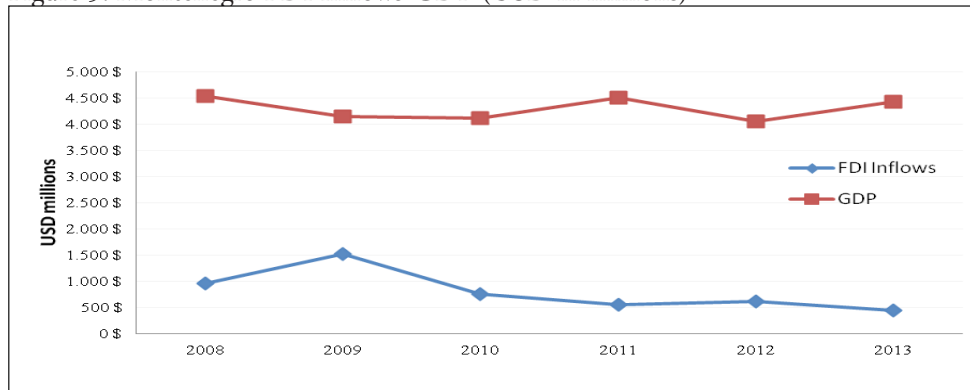
Source: International Monetary Fund (2014), United Nations Conference on Trade and Development (2015)

For Montenegro the only year FDI inflows was able to exceed 1 billion USD level was 2009. The GDP performance for Montenegro was around 4-4.5 billion USD, which is the main reason behind high FDI inflow percentage in GDP in Montenegro. Although the FDI inflow percentage in Montenegro's GDP is quite high, the linear relationship between them seems to be in opposite direction for many years in the period (International Monetary Fund, 2014; United Nations Conference on Trade and Development, 2015).

Figure 6. Serbia FDI Inflows-GDP (USD in millions)
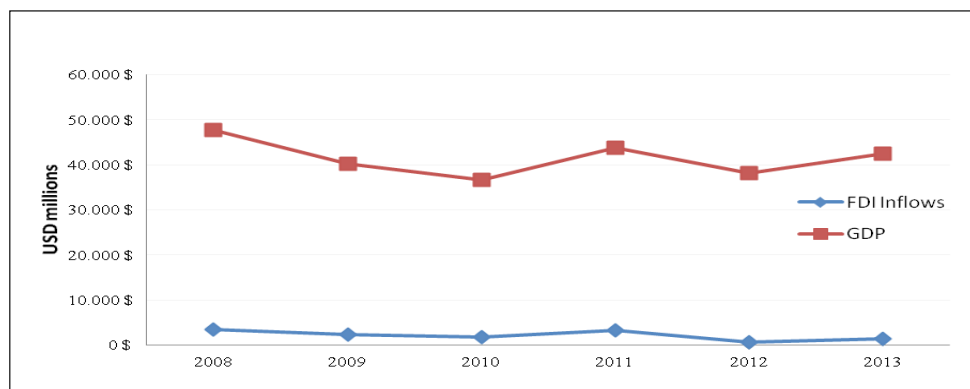
Source: International Monetary Fund (2014), United Nations Conference on Trade and Development (2015)

The linear relationship between FDI inflows and GDP figures for Serbia is more viable then the first three countries in the sample. At each year FDIs and GDP figures move in the same direction. However, it is observable that Serbian FDI inflows took serious hits along the way. While Serbian FDI inflows were around 3.5 billion USD in 2008, it saw nearly 1.4 billion USD in 2013. Serbia's latest GDP was around 42.5 billion USD in 2013 which was still roughly 5 billion USD short of Serbian GDP in 2008 (International Monetary Fund, 2014; United Nations Conference on Trade and Development, 2015).

Figure 7. Macedonia FDI Inflows-GDP (USD in millions)
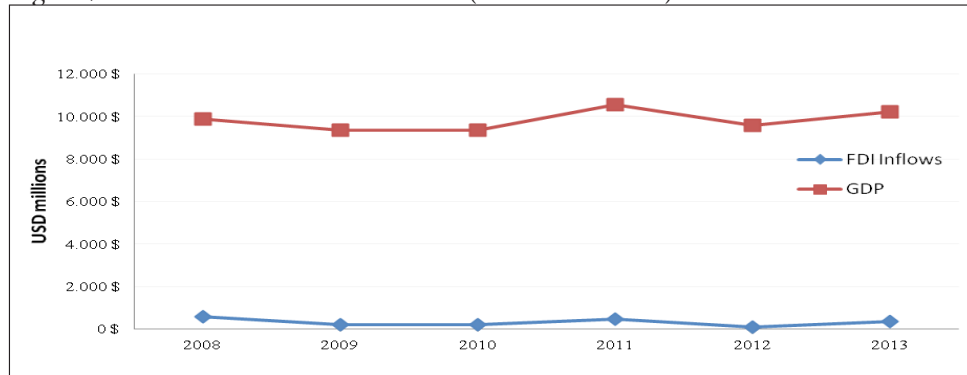
Source: International Monetary Fund (2014), United Nations Conference on Trade and Development (2015)

Despite the fact that Macedonia has the last place in the FDI attractiveness list of the sample, the relationship between FDI and GDP is most clearly observable in Macedonia among all countries in the group. Like Serbia, the two variables move in the same direction at each year for Macedonia. Macedonian FDI inflows were around 316 million USD on average for the period and her GDP was around 9.8 billion USD on average for the period (International Monetary Fund, 2014; United Nations Conference on Trade and Development, 2015).

Furthermore, FDI inflow percentage in GDP figures of the host countries is also an important indicator to show the relative magnitude of FDIs in those countries. FDI inflow percentages in GDP Figures for the 5 countries are given below in Figure-8 for the study period (United Nations Conference on Trade and Development, 2015).

Figure 8. FDI Percentage in GDP
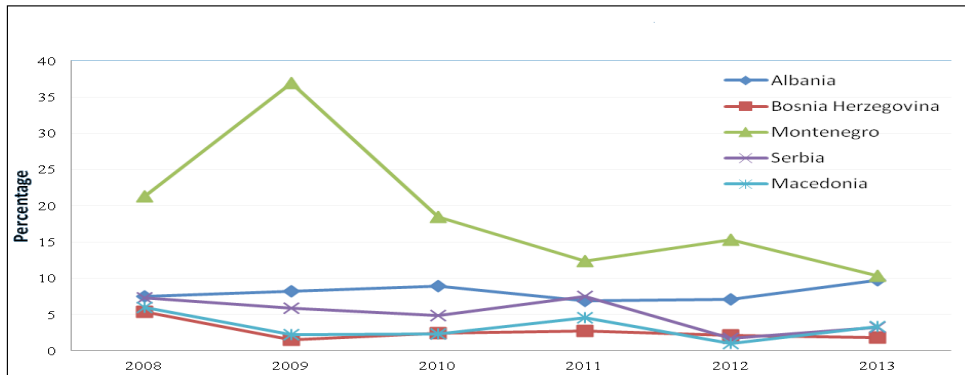
Source: United Nations Conference on Trade and Development (2015)

To what Extent can FDIs Promote Economic Growth in the Balkans?

Gorgulu and Akcay (2012) state that in the broadest sense, the absorptive capacity of a country is composed of the appropriate regulations and the quality of administrative and economical structure existing in that country. Countries that have sound administrative structure and orderly solid markets have high absorptive capacities and thus are able to benefit as much as possible from the FDIs. Countries that lack such sound administrative and financial structures however are not able to extract such positive effects from the FDIs (Alfaro et al., 2004; Alfaro et al., 2006).

In the FDI-absorptive capacities literature, absorptive capacities are measured in various ways. Blomstrom, Lipsey and Zejan (1994) focus on the technology gap as an absorptive capacity indicator and Li and Lui (2005) measured the technology gap as the ratio of the gap between US GDP and host country GDP relative to host country GDP. Lu and Lui also measured years of schooling as a proxy for absorptive capacity (Li and Lui, 2005) along with Borensztein, Gregorio and Lee (1998), thus aiming at revealing the role of human development in absorptive capacities. Financial development is also another strong indicator for absorptive capacities. Durham (2004) uses total stock market capital formation relative to GDP as a financial development measure of absorptive capacity. Credit market lending capacity to the private sector is another proxy for financial development in terms of absorptive capacity (Hermes and Lensink, 2003). Durham (2004) also uses several indexes covering regulation of business property rights and corruption to indicate institutional development as part of the absorptive capacity (Krogstrup and Matar, 2005).

In this study, absorptive capacities of the host countries are measured by a new method that is a combination of the well accepted techniques existent in the literature. Accordingly, in order to measure the absorptive capacities of the host countries first the technology gap has been found as did Li and Lui (2005) through a ratio of difference of GDPs among US -given their technological advancement- and host countries to

host country GDPs (International Monetary Fund, 2014). And since the technology gap would be affecting the growth performances in the host countries, the gap figures were multiplied by -1. Then for each country and for each year within the period an average of Human Development Index (United Nations Development Programme, 2015) values, gross capital formation values as percentage of GDP (The World Bank, 2015) and domestic credit to private sector values as percentage of GDP (The World Bank, 2015) were taken and subtracted from 1 to multiply with the gap values in order to assure that a high average would diminish the technology gap's negative effects on growth. Theoretically with a perfect score -average of 1, it is even possible to offset the technology gap's negative effects on growth - since the gap value would be multiplied by 0 in this case. Thus, as the absorptive capacity value gets closer to 0, host countries perform better because they would become more able to eliminate the effects of technology gap. By doing so, technology gap, human capital development and financial development aspects of absorptive capacity concept are all captured in the analyses.

Moreover, in this study a simple empirical regression model is employed and the analyses are conducted separately for each country in the sample. Accordingly the empirical model to be used in OLS regression is as follows:

$$Y_{it} - Y_{it-1} = \alpha + \theta(Y_{it-1}) + \beta(FDI_{it}) + \delta(AC_{it}) + \varepsilon_i \qquad (1)$$

In the empirical model, $Y_{it} - Y_{it-1}$ is specified as the dependent variable, where Y_{it} is the value of per capita GDP (International Monetary Fund, 2014) in current US Dollars. Using current dollars in the model enables inflation to be included in the model as part of economic growth and indirectly of financial development. Taking the differences in per capita GDP figures between consecutive years is to exhibit the growth in per capita GDP from year to year. Moreover, while Y_{it-1} indicates the value of per capita GDP of the previous year (International Monetary Fund, 2014), FDI_{it} represents annual per capita FDI inflows (United Nations Conference on Trade and Development, 2015), and AC_{it} refers to the absorptive capacities of the host countries where the measure is obtained through a series of calculations explained above (International Monetary Fund, 2014; United Nations Development Programme, 2015; The World Bank, 2015). The usage of per capita values is to measure the standard of living. Unlike per capita GDP, growth of GDP is not a measure for standard of living.

When the results of the applied analyses to the sample are taken into consideration, it is observed that all models exhibit statistical significance. Moreover, while the results fail to confirm growth enhancing effects of FDIs, they also confirm negative effects of previous years' per capita GDP for all countries in the sample.

According to the results of the analyses applied to Albania, it is revealed that Albanian per capita GDP growth performance is negatively affected by both previous years' per capita GDP and by the lack of a necessary absorptive capacity level in the country. Thus, due to the absence of a necessary absorptive capacity level, FDIs in Albania have no effect on economic growth and the low level of absorptive capacity in the country negatively affects economic growth in Albania as far as this study concerned.

In Bosnia and Herzegovina, the results cannot confirm the significance of absorptive capacity in the country at 95% confidence interval. However, at 90% confidence interval it is possible to say that the absorptive capacity level in Bosnia and Herzegovina negatively effects per capita GDP growth. Further, FDIs in Bosnia and Herzegovina have also failed to exhibit any growth promoting effects. Previous year's per capita GDP also negatively effects the economic growth in Bosnia and Herzegovina.

Like the first two countries, Macedonian economic growth also suffers from previous years' per capita GDP. Moreover, the results fail to confirm statistical significance for Macedonian absorptive capacity at 95% confidence interval but it is still possible to make some significant comments about the absorptive capacity at 90% confidence interval. Accordingly, it is observed that Macedonia lacks the necessary level of absorptive capacity, and due to this reason, FDIs in Macedonia have no significant effect on economic growth and the economic growth in Macedonia suffers from the level of absorptive capacity in the country.

In the analysis applied to Montenegro, is has been found out that every variable has a statistical significance. Like others, Montenegro is also negatively affected by previous years' per capita GDP. It has also been found that, there is a negative effect of the local absorptive capacity level in the country on economic growth, and lack of necessary level of absorptive capacity causes FDIs in Montenegro to have a negative effect on per capita economic growth.

The picture is not so much different for Serbia. The results reveal that, the absorptive capacity level in the country is far below the necessary level. That's why while the absorptive capacity in Serbia has a negative role on economic growth, FDIs have no significant effect. Like the rest of the sample Serbian economic growth suffers from previous years' per capita GDP as well.

Conclusion

Through careful evaluation of the results, it is now possible to have an idea about the FDI effects on economic growth from an absorptive capacity perspective. Accordingly for the non-EU member transition economies in the Balkans, for the 2002-2013 period, it is safe to say that they all lack the necessary level of absorptive capacity which would enable them to reap benefits of foreign investments. Given the economical and historical background of the region these results are actually quite normal and are expected. Especially, due to the shifted priorities in the turmoil and transition periods, attracting FDIs or improving infrastructures did not lose importance, therefore domestic –including government investments- nor foreign investments have been made in desired levels. Thus, in a dual way not much could be done in the name of economic development for those countries in the turmoil and transition periods.

Gorgulu and Akcay (2012) suggest, absorptive capacities in host countries below a certain level could even be harmful for economic growth and may undermine the growth enhancing effects of FDIs. While the former case is true for all countries in the

sample, the latter case is only true for Montenegro in this study. Therefore with a limited level of absorptive capacity, putting efforts to attract FDIs might not work for the best. The alternative policy should include rather absorptive capacity creating actions and less FDI attractive initiatives followed by increased domestic investments. Finally, the results confirm that current foreign direct investment flows to those countries are not able to work miracles given the absorptive capacities of the host countries.

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Appendix

Table 4: Summary of the Results (Albania)
Dependent Variable: GROWTH
Method: Least Squares
Sample: 2002 2013
Included observations: 12

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3355.801	686.4788	4.888426	0.0012
GDP_1	-0.696708	0.158056	-4.407982	0.0023
FDI	1.976197	1.094186	1.806089	0.1085
AC	1.475628	0.385895	3.823911	0.0051

R-squared	0.748208	Mean dependent var		269.9454
Adjusted R-squared	0.653786	S.D. dependent var		294.2793
S.E. of regression	173.1538	Akaike info criterion		13.40744
Sum squared resid	239857.9	Schwarz criterion		13.56907
Log likelihood	-76.44463	Hannan-Quinn criter.		13.34760
F-statistic	7.924086	Durbin-Watson stat		1.808639
Prob(F-statistic)	0.008837			

Table 5: Summary of the Results (Bosnia)
Dependent Variable: GROWTH
Method: Least Squares
Sample: 2002 2013; Included observations: 12

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2874.913	1400.197	2.053221	0.0741
GDP_1	-0.437312	0.178667	-2.447640	0.0401
FDI	0.998817	0.895088	1.115887	0.2969
AC	2.253342	1.261986	1.785552	0.0920

R-squared	0.717600	Mean dependent var		258.0870
Adjusted R-squared	0.611699	S.D. dependent var		380.4680
S.E. of regression	237.0839	Akaike info criterion		14.03591

Sum squared resid	449670.3	Schwarz criterion	14.19754
Log likelihood	-80.21544	Hannan-Quinn criter.	13.97606
F-statistic	6.776190	Durbin-Watson stat	2.552401
Prob(F-statistic)	0.013765		

Table 6: Summary of the Results (Macedonia)
Dependent Variable: GROWTH
Method: Least Squares
Sample: 2002 2013
Included observations: 12

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3566.408	1785.416	1.997522	0.0808
GDP_1	-0.552927	0.223725	-2.471461	0.0386
FDI	1.690506	1.024240	1.650497	0.1374
AC	1.442220	0.799290	1.804378	0.0988

R-squared	0.835806	Mean dependent var	268.9065
Adjusted R-squared	0.774233	S.D. dependent var	390.7980
S.E. of regression	185.6873	Akaike info criterion	13.54721
Sum squared resid	275838.1	Schwarz criterion	13.70884
Log likelihood	-77.28324	Hannan-Quinn criter.	13.48736
F-statistic	13.57430	Durbin-Watson stat	2.432775
Prob(F-statistic)	0.001667		

Table 7: Summary of the Results (Montenegro)
Dependent Variable: GROWTH
Method: Least Squares
Sample: 2002 2013
Included observations: 12

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7386.888	1118.284	6.605559	0.0002
GDP_1	-0.737282	0.108782	-6.777624	0.0001
FDI	-0.426353	0.160770	-2.651938	0.0292
AC	1.068460	0.177662	6.014011	0.0003

R-squared	0.855874	Mean dependent var		435.4529
Adjusted R-squared	0.801827	S.D. dependent var		696.3218
S.E. of regression	309.9791	Akaike info criterion		14.57209
Sum squared resid	768696.2	Schwarz criterion		14.73372
Log likelihood	-83.43253	Hannan-Quinn criter.		14.51224
F-statistic	15.83567	Durbin-Watson stat		2.135300
Prob(F-statistic)	0.000999			

Table 8: Summary of the Results (Serbia)
Dependent Variable: GROWTH
Method: Least Squares
Sample: 2002 2013
Included observations: 12

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5889.557	2353.646	2.502312	0.0368
GDP_1	-0.722952	0.211956	-3.410850	0.0092
FDI	0.826728	1.319589	0.626504	0.5484
AC	10.53483	4.846226	2.173821	0.0315

R-squared	0.733578	Mean dependent var		364.8333
Adjusted R-squared	0.633670	S.D. dependent var		739.0579
S.E. of regression	447.3163	Akaike info criterion		15.30561
Sum squared resid	1600735.	Schwarz criterion		15.46725
Log likelihood	-87.83366	Hannan-Quinn criter.		15.24577
F-statistic	7.342523	Durbin-Watson stat		1.525363
Prob(F-statistic)	0.010994			

[i] According to Gorgulu and Akcay (2012); in the most general sense, absorptive capacity is described as the ability of countries to absorb and utilize every kind of knowledge and innovation (Alfaro, Chanda, Kalemli-Ozcan, and Sayek FDIs have positive effects on the growth of the host countries in direct proportion to the quality of the financial markets of these countries. The absorptive capacities have an important role in the process of information acquisition in production through technological knowledge spillover effects from foreign investments (Gorgulu and Akcay, 2012).

[ii] Namely; Albania, Bosnia and Herzegovina, Montenegro, Serbia and Macedonia.

[iii] That is why United Nations Conference on Trade and Development (UNCTAD) (2015) has no FDI

data for Kosovo, but her data is included in that of Serbia's.

[iv] 1991-2001, The turmoil in the region first began with the Slovenian and Croatian Wars and followed by the Bosnian War, which ended in 1995. The turmoil then carried out by the Kosovo War in 1998-1999 and the insurgency in Macedonia in 2001.

[v] For the period of 1992-2006 Serbia and Montenegro was united as a union. Then starting from 2006, Serbia and Montenegro formed their own separate independent republics. The FDI data on UNCTAD (2015) covers Serbia and Montenegro as a union till 2007, and as separate republics starting from 2008. However, The World Bank (2015) and International Monetary Fund (2014) both use a proportional measure to cover the data from Serbia and Montenegro separately. Using a similar proportional measure FDI data was obtained in the paper for missing years.

Determinants of Foreign Direct Investment: An Empirical Analysis for Turkey

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Abstract: *This paper aims to investigate empirically the determinants of FDI for Turkey over the annual period of 1975-2012. Our main interest is to study how different reflecting inflows of FDI in Turkey are. This study examines time series data evidence concerning empirical relevance between FDI attraction and its determinative effects. As a definition, FDI is a direct investment into production or business in a country by an individual or company of another country, either by buying a company in the target country or by expanding operations of an existing business in that country. Unit root and Johansen cointegration tests are used in order to analyze the determinants of FDI for Turkey. Our econometric model expresses foreign direct investment (FDI), as a function of market size (GDP), openness (OPEN) calculated as Export + Import/ GDP, inflation rate (CPI), energy production (EP), labor productivity (LABOR). The major results show that there is a positive effect of GDP, OPEN, EP and LABOR on FDI. But CPI's effect on FDI is negative in the long run.*

Introduction

Economic development of a country depends on utilization of resources for increasing productive capacity. In many developing countries, utilization of resources is rendered impossible by the scarcity of domestic capital. One of these economic problems of developing countries is that they do not have enough national savings to finance their investments. They are in constant need of foreign capital in forms of both direct and indirect investments. Foreign direct investment (FDI) is a process whereby the residents of the source country attain ownership of assets with the intention to control the production, distribution and other activities of a firm in the host country (Khachoo and Khan,2012). Foreign direct investment (FDI) is a way of international loan, by which those countries that have better investment opportunities at the present borrow from those that have capital surplus.

FDI can be a crucial instrument to foster economic growth. FDI provides developing countries with the much needed capital for investments and enhances job creation, managerial skills and transfer of technology for less developed countries. Furthermore, FDI encourages technological development and also support the accumulation of physical capital.

FDI plays a significant role in the development of international trade, and it helps to establish direct, stable, and long-lasting links between economies. The Organization for Economic Co-operation and Development (OECD) states that; FDI can serve as an important vehicle for local enterprise development, strengthening the competitiveness of both the recipient and investor (Groh and Wich, 2012). For example, Turkey in particular is pursuing further political and monetary integration with Europe. In that case maintaining a government effectiveness that is conducive to foreign investment and increases comparative advantage is integral to its integrationist aspirations.

The significance of foreign direct investment (FDI) flows is well documented in literature for both the developing and developed countries. Foreign Direct Investment (FDI) inflows to developing countries have been substantially increasing and, compared to other capital flows, have remained the largest component of net resource flows to developing countries. FDI is a key element in international economic integration. FDI creates direct, stable and long-lasting links between economies. As a definition FDI is a direct investment into production or business in a country by an individual or company of another country, either by buying a company in the target country or by expanding operations of an existing business in that country. It encourages the transfer of technology and know-how between countries, and allows the host economy to promote its products more widely in international markets (Todaro, 1994).

The role of foreign direct investment in the development of Turkish economy cannot be over emphasized. Foreign direct investment provides capital for investment; it enhances job creation and managerial skills, and possibly technology transfer.

We shall present our analysis with a brief history of the Turkish economy. Today, Turkey is one of the most attractive investment destinations for foreign investors. It benefits from a unique strategic location; a young, dynamic and skilled workforce, and a stable political and economic environment. Turkey received foreign investment inflows of only US$18m 33 years ago when it started to host foreign investors. Now, the cumulative value of foreign investments has surged to US$138.3b. While the aggregate volume of foreign investment inflows totalled only US$14.6b during the 80-year period from the establishment of the Turkish Republic to 2003, this figure rose to US$123.7b during the last decade. In other words, Turkey attracted 8.5 times more foreign inward investment over the last decade than it did in the previous 80 years. Turkey now plays a significant role in the global economy and world trade, standing out as a promising emerging market alongside Brazil, Russia, India and China. This status is underpinned by its robust local market and young population. Despite the global economic crisis and the political and social issues that have afflicted neighbouring regions, Turkey exported more goods in 2012 than ever before. Total exports valued at US$152.6b were supplied to 241 countries and regions worldwide. The well-trained and loyal workforce played a notable role in achieving this success. Turkey offers another layer of opportunity by serving as a frontier to other regions.

Figure 1 shows the total amount of FDI inflows to Turkey in US Dollar at current prices and current exchange rates in millions. FDI flows to Turkey have been increased largely after 2004. FDI flows into Turkey fell in 2009 due to the global crisis similar to most developed and developing countries. After then FDI started to increase again.

Figure 1. FDI Inflows to Turkey (US dollars in millions)
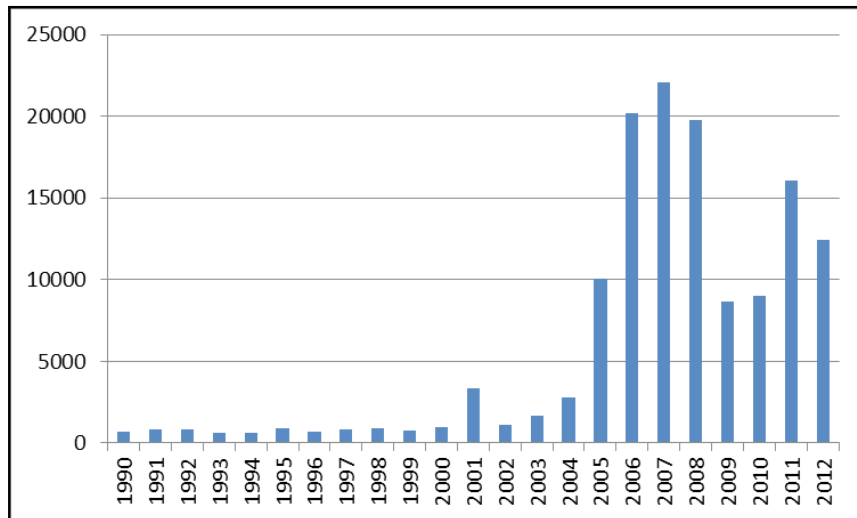
Source: Central Bank of the Republic of Turkey, own construction

Table 1. FDI Inflow to Turkey by Year (USD million)

	2010	2011	2012	2013	2014
FDI Total (Net)	9,099	16,176	13,282	12,457	12,530
Equity Investments (Net)	6,221	14,146	10,126	9,298	8,445
Inflows	6,256	16,137	10,759	9,866	8,699
Liquidation Outflows	35	1,991	633	568	254
Intra -company Loans*	384	17	520	110	-236
Real Estate (Net)	2,494	2,013	2,636	3,049	4,321

*Loans of companies with foreign capital are given by foreign partners (www.tcmb.gov.tr)

Source: Central Bank of the Republic of Turkey (TCMB), Electronic Data Delivery System, Outstanding External Debt and Balance Of Payments Statistics

According to the UNCTAD 2014 World Investment Report, Turkey has become the largest recipient of FDI in West Asia, and is among the fifteen most promising investors for 2014-2016. The country has adopted a series of legislative reforms to facilitate the reception of foreign investment, such as the creation of Investment Support and Promotion Agency of Turkey (ISPAT), a showcase effort undertaken to attract foreign operators. FDI inflows improved in light of the development of public-private partnerships for major infrastructure projects, the measures to streamline administrative procedures and strengthened intellectual property protection, the end of FDI screening and the structural reforms carried out with a view to the future accession into the EU. In 2014, Turkey announced a major national infrastructure development plan that should attract major foreign investment. In 2014, the joint venture of Koc Holding (Turkey) and Fiat (Italy) invested USD 300 million in developing automobile production. Also, a number of Chinese companies have invested up to USD 385 million in the electricity distribution company OEDAS. Finally, a Japanese group has invested USD 500 million in a steelworks plant in collaboration with a Turkish company. The countries of the European Union, the Gulf States and the United States are among the main investors in Turkey. The business climate deteriorated in 2014 according to the Doing Business report of the World Bank, the country losing 4 places (55th out of 189 countries). However, FDI amounted to USD 12.5 billion in 2014, an increase on 2013 (Central Bank of the Republic of Turkey, 2014).

There exists vast literature on determinants and effects of FDI. The issue has increased in importance due to strong globalization processes. Many developed and developing countries try to attract FDI to support their economic growth and development. Dunning's eclectic paradigm (1993) was initiating the investigation of the locational advantages of the host countries e.g., income levels, market size, skills, infrastructure, political and macroeconomic stability that determines cross-country pattern of FDI.

The determinants of FDI have been analyzed in the literature in many studies. Numerous theoretical and empirical studies (Agarwal, 1980; Brainard, 1993;1997; Gastanaga et. al., 1998; Ekholm, 1998; Zhang and Markusen, 1999; Barros and

Cabral, 2001; Chakrabarti, 2001; Moosa, 2002) on the determinants of FDI lead us to select a set of explanatory variables that are widely used and found to be significant determinants of FDI. For example Markusen and Maskus (1999), Love and Lage-Hidalgo (2000), Lipsey (2000), Lim (2001), and Moosa (2002), Asiedu (2006), Cleeve (2008), Mhlanga et al. (2010), Vijayakumar et al. (2010), Wang and Swain (1995), Liu (1997), Dees (1998) and Cheng and Kwan (1999) highlight how the domestic market size can relate to the location of FDI.

Mainardi (1992) emphasizes the level of importance and growth prospectus of the real per capita GDP in taking investment decisions in a region. Lunn (1980), Schneider and Frey (1985), Culem (1988), Cheng and Gastanaga (2001) and Cleeve (2008), Mohammed and Sidiropoulos (2010) discuss the positive effects of GDP growth rate proxy of market growth. To foreign investors who operate in industries characterized by relatively large economies of scale, the importance of the market size and its growth is magnified. This is because they can exploit scale economies only after the market attains a certain threshold size. The most widely used measures of market size are GDP, GDP/capita and growth in GDP. The coefficients are usually positive.

One of the determinants of FDI is labour cost. Labour cost is one of the major components of the cost function, it is mentioned that high nominal wage, other things being equal, deters FDI. This is true for labour-intensive production sectors. Therefore, conventionally, the expected sign for this variable is negative. The studies that find no significant or a negative relationship of wage and FDI are: Goldsbrough (1979), Saunders (1982), Kravis and Lipsey (1982), Flamm (1984), Wheeler and Mody, (1990), Sader (1993), Lucas (1993), Tsai (1994), Wang and Swain (1995), Barrell and Pain (1996), Cheng and Kwan (1999) and Botric and Skuflic (2006) sign that lower wages attract FDI positively. Nonetheless, there are other researchers who have found out that higher wages do not always deter FDI in all industries and have shown a positive relationship between labour costs and FDI (Moore, 1993; and Love and Lave-Hidalgo, 2000). Because higher wages indicate higher productivity, hi-tech research oriented industries in which the quality of labour matters, prefer high-quality labour to cheap labour with low productivity. Coughlin and Segev (2000) and Cheng and Gastanaga (2001), by the OLS method, indicate that labour productivities and rate of capable labours have positive impact on FDI.

Recently, a few researchers have also studied the impact of specific policy variables on FDI in host countries. One of these policy variables is openness of trade. Gastanaga, Nugent, and Pashamova (1998) and Asiedu (2002) focus on policy reforms in developing countries as determinants of foreign direct investment inflows. They find corporate tax rates and degree of openness to foreign direct investment to be significant determinants of FDI. Kravis and Lipsey (1982), Culem (1988), Edwards (1990), Sun (2002), Kuo and Huang (2003), Asiedu (2006), Cleeve (2008), Mhlanga et al. (2010) find significant positive effects on FDI also. Schmitz and Bieri (1972) and Wheeler and Mody find insignificant effects of openness on FDI.

For foreign investors, economic stability of home country is very important. The economic stability conditions affect the profitability of investment projects. Therefore, foreign investors seek countries which have economic stability. One of the economic stability proxies is inflation rate. Low inflation policies are often offered to multinationals as an incentive to attract FDI inflows. Empirical studies (Schneider and Frey, 1985; Asiedu, 2006; Mohammed and Sidiropoulos, 2010) indicated a negative relationship between inflation and FDI.

Likewise the effect of infrastructure on FDI flows is a fairly well-studied topic although the direction and magnitude of influence is generally positive. Biswas (2002) claimed that quality of infrastructure should increase FDI into the host country. He used phone lines per 1000 inhabitants for proxy of infrastructure. Similarly, Vijayakumar et al. (2010) also acknowledge that infrastructure index effects FDI positively.

Looking at the fundamental determinants, Markusen (2002) argues that there are two factors that turn out to be crucial for the existence of horizontal FDI: the size of the local markets and the marginal production cost in the case of producing directly in the host market. The first factor is evident: firms invest abroad to serve the local host market. Therefore, the size of the local demand (known also as market size or market potential) will be a determinant for the firm's investment decision. The second factor, the level of local production costs, will determine whether the firm produces locally to sell locally or it supplies the host market by exporting its home-based production.

A large number of studies have been conducted to identify the determinants of FDI but no consensus view has emerged in the sense that there is now idely accepted set of explanatory variables that can be regarded as the "true" determinants of FDI. Chakrabarti (2001) attributes the lack of consensus to "the wide differences in perspectives, methodologies, sample-selection and analytical tools".

Research on FDI has been one of the most crucial areas of international economics. Although there is sizeable research on the determinants of FDI, empirical studies on FDI in developing countries such as Turkey are relatively scarce.

This study is important because Turkey had experienced declining and fluctuating foreign investment inflows. Besides, Turkey alone cannot provide all the funds needed to invest in various sectors of the economy. The objective of this study, therefore, is to identify the long run relationship between FDI and some macroeconomic variables. To accomplish this purpose, in this work we have reviewed empirical evidence on the relationship between FDI and other economic variables. This study has modelled FDI with macroeconomic variables in Turkey. The objective of this paper has been to focus solely on the relationship between FDI inflows and macroeconomic variables for Turkey. Cointegration technique, proposed by Engle and Granger (1987) and extended by Johansen (1988), has been applied to evaluate the long-run hypothesis that our variables are cointegrated. The basic idea is that individual time series wander considerably but economic forces tend to make these series stationary. Given the basic economic model, FDI has been hypothesized to be cointegrated with the economic growth, openness, inflation and electricity consumption.

Finally, we employed cointegration approach to determine the long-run factors contributing to FDI in Turkey. It is important to use this approach in our cointegration test as, during the sample period, the Turkish economy has been subject to serious economic developments.

This paper is organized as follows: Section 2 begins by illustrating the inherently multivariate nature of cointegration analysis: several variables must be involved, and this determines the form of the statistical tools required. Section 3 explains econometric methodology. Section 4 presents empirical result. Section 5 concludes.

Model Specification and Data

The determinants of FDI have been analyzed in the literature in many studies using different models. In order to investigate empirically, the determinants of FDI for Turkey following empirical models were used:

$$FDI_t = \beta_0 + \beta_1 GDP_t + \beta_2 OPEN_t + \beta_3 CPI_t + \beta_4 EP_t + u_t \qquad (1)$$

$$FDI_t = \beta_0 + \beta_1 GDP_t + \beta_2 OPEN_t + \beta_3 CPI_t + \beta_4 LABOR_t + u_t \qquad (2)$$

where t denotes time, and the variables are defined as:

- FDI denotes the net foreign direct investments in flows as % of GDP,
- GDP is gross domestic product (US$) (proxy of market size) ,
- OPEN is openness index (total trade -export+ import / GDP),
- CPI is consumer price index (annual % - proxy of inflation-as an indicator of macro economic instability)
- EP is electricity production (kWh-proxy of availability of infrastructures)
- LABOR is labour productivity (real output divided by total labour input)

The data obtained from the World Development Indicators is in yearly format and spans a period of 1975-2012 except labour productivity data. This data has been taken from the OECD online database. The time span allows us to use 38 observations for our time series analysis. E Views 8 is used for all estimations. All data are expressed in real terms.

As a first step, we estimate a VAR system for Turkey. We use the Schwarz' Information Criteria statistics to choose the lag-length. As a general check of our specification we always checked whether the residuals follow a normal distribution, and whether there is any heteroscedasticity or serial correlation. We moved to the cointegration test only after the residuals were homoscedastic and normally distributed. As for the form of the cointegration vector, we preferred to assume that our data is difference stationary and there is no linear deterministic trend in our data.

Methodology

By bridging the gap between domestic savings and investment and bringing the latest technology and management know-how from developed countries, foreign direct investment (FDI) can play an important role in achieving rapid economic growth in developing countries (Mottaleb and Kalirajan, 2010). To shed light on the potential drivers of FDI to Turkey, we perform cointegration methods. Before modelling the data, we consider its basic stationary properties. The preliminary step of our analysis is to check the time series variables are stationary or non-stationary. Most of the time series data generally have trend, cycle, and/or seasonality. By removing these deterministic patterns, the remaining series must be stationary. Therefore, a test of the null hypothesis of non-stationarity is conducted via the well-known Dickey-Fuller procedure. Stationarity in a time series implies to a condition where the series has a constant mean and constant variance. This implies that the mean and variance of stationary time series do not vary over time. We first study the stationarity property of the time-series variables used in the study.

The first step in statistical testing the non-stationarity of time series data is to test for random walk. Testing this means to find out whether the variables contain unit root. This is also called the Unit Roots Test.

As discussed earlier using the non-stationery series in estimating relations may give spurious results. In case the first difference is stationary (has no unit root) then the series is described having integration of order 1 and is denoted I(1). If two time series are integrated of order or I(1), it is well known that the correlation coefficient between them will tend towards plus or minus unity, whether an economic relationship between them exists or not. One important property of variables having I(1) property is that their linear combination can be I(0). This means the linear combination non-stationary series of I(1) can be stationary. These variables are described as cointegrated variables.

A necessary condition for testing for a long-run relationship between variables is that these variables are I(1), i.e., stationary in first differences. We, therefore, use the classical unit root tests, namely, the Augmented Dickey-Fuller (ADF) test (Dickey and Fuller, 1981; Said and Dickey, 1984). ADF test is based on the null hypothesis that a unit root exists in the time series.

The null hypothesis is that the variables in question contain unit root and the alternative hypothesis is that the variables are trend stationary. The ADF statistics suggests that all variables are I (1).

To determine whether a long-run relationship exists foreign direct investment, economic growth, openness, inflation rate and electricity production are considered. We must not only test whether both variables are integrated of the same order, but we need to find evidence for a cointegration. Here we apply the JJ (1990) procedure to test for the presence of a cointegration.

Once it is established that series are I(1), we can proceed to test for a long-run relationship between the series. If such a relationship exists, series are cointegrated. To achieve this, we start out with the vector auto regression approach of Johansen (1988) and Johansen and Juselius (1990).

In the JJ method, two tests are used to determine the number of cointegrating vectors (*r*): the trace test and the maximum eigenvalue test. In the trace test, the null hypothesis is that the number of cointegrating vectors is less than or equal to *r*, where *r* is 0, 1, or 2. In each case, the null hypothesis is tested against a general alternative. In the maximum eigenvalue test, the null hypothesis r = 0 is tested against the alternative that r = 1, r = 1 against the alternative r = 2, etc.

Empirical Results

We first perform unit root tests in levels and first differences in order to determine univariate properties of the series used in this study. We, therefore, use the classical unit root tests, namely, the Augmented Dickey-Fuller (ADF) test. The ADF test is based on the null hypothesis that a unit root exists in the time series.

The null hypothesis is H0: $\varphi = 0$ and the alternative hypothesis is H1: $\varphi \neq 0$. First order integrated series can present stationary linear combinations (I(0)). In these cases, we say variables are cointegrated. It means there is a long-run equilibrium linking the series, generating a kind of coordinated movement over time.

In the light of econometric setting presented in the previous section, the empirical results are discussed in this section. The analysis is started by the test of the stationarity properties of the data series. This is the prime requirement for cointegration causality test. The results are presented in Table 1. It is evident from the table that the calculated ADF statistics are less than their critical values in all cases, suggesting that the variables are not level stationary.

The results indicate that for Turkey, all the variables are non-stationary in their levels but stationary in their first differences. This means that we can proceed with the Johansen cointegration tests for these countries.

However, they are stationary in their first differences. The values in brackets indicate the lag structure in ADF. The Schwarz's Information Criterion (SIC) was used to determine the number of lags for the cointegration tests. These results indicate that the cointegrating technique has to be applied in order to analyse the long-run relationship between these variables. Johansen and Juselius (JJ) (1990) cointegrating method is utilized for this purpose.

Table 2. Unit Root Test Results

| Series | Level | | First Difference | |
| | τ_μ | | τ_μ | |
	τ_τ	τ_μ	τ_τ	τ_μ
FDI	-0.548250 (0)	2.915183 (0)	-5.352229 (5)*	-3.912278 (0)*
GDP	-1.170291 (0)	1.763019 (0)	-5.987356 (0)*	-5.330377 (0)*
OPEN	-2.763083 (0)	-1.052409 (0)	-5.417465 (0)*	-5.497118 (0)*
CPI	-2.390373 (0)	-1.973490 (0)	-7.225054 (0)*	-7.080614 (0)*
LABOR	-2.441679 (6)	-2.449072 (6)	-7.004778 (1)*	-7.127342 (1)*
EP	-2.301159 (0)	0.545275 (0)	-6.302344 (0)*	-6.109945 (0)*

Source: Author's own calculations.

Note: The t statistics refer to the ADF tests. The subscripts µ and τ indicates the models that allow for a drift term and both a drift and a deterministic trend, respectively. Asterisk (*), shows significance at 5% level. Figures in parentheses indicate the lag length. The critical values are obtained from MacKinnon (1991) for the ADF test. ADF test examines the null hypothesis of a unit root against the stationary alternative.

The Johansen cointegration test identified cointegrating relationship between FDI inflows and explanatory variables. To find which variables adjust to the long run cointegrating relations, we focus on cointegration in the Vector Autoregressive model (VAR). The VAR model will provide a feasible empirical system for the analysis of our integrated economic time series.

Before undertaking cointegration tests, let us first specify the relevant order of lags (p) of the vector autoregression (VAR) model. The Schwarz's information criterion (SIC) is used to determine the optimal lag length. The SIC criterion yield a VAR (3) for two models.

Having confirmed the existence of unit roots for all the data series, the next step is to check possibility of long run equilibrium relationship between them. The cointegration test is applied for the same at the individual level as well as panel level. The Johansen's maximum likelihood test has been applied. The estimated results of Johansen's test are reported in Table 2. The results from the trace and max-eigenvalue test are reported in the tables below together with the normalized cointegration vector:

Table 3. Johansen-Juselius Maximum Likelihood Cointegration Tests

Model I: $FDI_t = \beta_0 + \beta_1 GDP_t + \beta_2 OPEN_t + \beta_3 CPI_t + \beta_4 E_t + u_t$

Trace Test				Maximum Eigenvalue Test			
Null	Alternative	Statistic	95 % Critical Value	Null	Alternative	Statistic	95 % Critical Value
r = 0	r ≥ 1	136.02	69.81	r = 0	r = 1	53.05	33.87
r ≤ 1	r ≥ 2	82.96	47.85	r ≤ 1	r = 2	40.41	27.58
r ≤ 2	r ≥ 3	42.55	29.79	r ≤ 2	r = 3	24.90	21.13
r ≤ 3	r ≥ 4	17.65	15.49	r ≤ 3	r = 4	17.63	14.26
r ≤ 4	r ≥ 5	0.012	3.84	r ≤ 4	r=5	0.01	3.84

Source: Author's own calculations.

Model II: $FDI_t = \beta_0 + \beta_1 GDP_t + \beta_2 OPEN_t + \beta_3 CPI_t + \beta_4 LABOR_t + u_t$

Trace Test				Maximum Eigenvalue Test			
Null	Alternative	Statistic	95 % Critical Value	Null	Alternative	Statistic	95 % Critical Value
r = 0	r ≥ 1	176.0855	69.81889	r = 0	r = 1	82.56708	33.87687
r ≤ 1	r ≥ 2	93.51844	47.85613	r ≤ 1	r = 2	47.27528	27.58434
r ≤ 2	r ≥ 3	46.24316	29.79707	r ≤ 2	r = 3	26.15473	21.13162
r ≤ 3	r ≥ 4	20.08843	15.49471	r ≤ 3	r = 4	18.41811	14.26460
r ≤ 4	r ≥ 5	1.670316	3.841466	r ≤ 4	r=5	1.670316	3.841466

Source: Author's own calculations.

Notes: We have employed the Schwarz's information criterion (SIC), in the determination of lag length in the VAR model.

The cointegration tests confirm our initial hypothesis regarding the long-run relationship between FDI and other variables. For the first model, the implementation of the JJ procedure indicates that there is a long-run equilibrium relationship among

FDI, GDP, OPEN, CPI and EP. Also there is a long-run equilibrium for the model two.

Table 4. Estimates of Long-Run Cointegrating Vectors

FDI	GDP	OPEN	CPI	EP
1.000	732,5	8.66E-10	-73,96	0,265
	(243,1)	(1,6E-09)	(33,8)	(0,57)

FDI	GDP	OPEN	CPI	LABOR
1.000	624.19	1.30E-09	-45.68	5.74
	(128.36)	(6.9E-10)	(26.12)	(20.92)

Source: Author's own calculations.

Note: Numbers in parentheses are standard errors.

Estimates of long-run cointegrating vectors are given in Table 8. Our econometric estimates of FDI functions for Turkey suggest that GDP as a proxy of market size related to location of FDI and most effective determinants in model one and two. This means that foreign investors prefer big market size because of scale economies. There is a positive relationship between openness and FDI but this is a small relationship in case of Turkey. There is a negative relationship between FDI and CPI. For foreign investors, home country's economic stability is important. As CPI is the used proxy of economic stability, results of models are as expected. Energy production is used as a proxy of infrastructure and we found that EP affects FDI positively. Labour productivity is related to FDI positively. High labour productivity means low labour cost. Low labour cost attracts FDI for labour-intensive production sectors. Labour productivities and rate of capable labours have positive impact on FDI.

Conclusion

During the past ten years we have seen a tremendous growth of foreign direct investment. Further economic development of Turkey depends to a large extent on continuous FDI and policy-making that will facilitate inward investment. The modelling strategy adopted in this study involves two steps:

- determining the order of integration of the variables by employing unit-root tests;

- if the variables are integrated in the same order, we apply the Johansen – Juselius(1990, 1992, 1994) maximum likelihood method of cointegration 3 to obtain the number of cointegrating vector(s).

The long-run relationship between FDI, GDP, OPEN, CPI, EP and LABOR is tested

by conducting cointegration test over the period 1975 to 2012.In the first place, the intention of the study is to examine the long-run linear relationship between FDI and explanatory variables. The empirical results at the first phase proved that none of the series is stationary and has to be differenced in order to convert the series into stationary. All these series are statistically significant at first difference order and are integrated in the same order. The next test of cointegration established that the FDI inflows are said to have long run linear relationship with GDP, openness, consumer price index, electricity production and labour productivity. Based on the cointegration analysis, stability of these macroeconomic variables will expectedly attract more FDI into Turkey for sustainable economic growth. The above-findings have important policy implications. Firstly, since the market size of the host country has significant effect on FDI, there is need for continuous increase and growth of the nation's Gross Domestic Product. Secondly, the major results show that there is a positive effect of market size, openness, energy production and labour productivity on FDI. But CPI as a proxy of market stability affects FDI negatively in the long run. At the same time, we provide evidence that is complementary to Açıkalın, Gülve Yaşar (2006), as well as Düzgün (2007) in one important respect.

These empirical findings have important key policy implications for Turkish economy. FDI inflows of Turkey can be used to predict the decisions of foreign residents who want to invest in this host economy in the long run with these empirical findings. The scope of this study could be much broader in terms of analyzing the effect of differences in FDI inflows, combined market size, openness, consumer price index, electricity production and labour productivity. This would perhaps give a much broader and clear picture of the determinants of FDI inflows to Turkey.

There are many other questions that we should take into consideration in further development of this study. However, it is worth mentioning that the determinants of the FDI and effects on growth in the cointegration framework seem to offer new suggestions for future research.

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Priorities for Corporate Social Responsibility Reporting: Evidence from Listed Turkish Companies in Istanbul Stock Exchange

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Abstract: *This study is based on "stakeholder theory" in order to explain the concept of corporate social responsibility. To examine the social responsibility areas of business organizations, "The Pyramid of Corporate Social Responsibility" model developed by Carroll (1991) was used in this study. According to this model, entire range of business responsibilities can be considered in four groups: economic, legal, ethical and philanthropic. Within the framework of Carroll's corporate social responsibility (CSR) Pyramid, the aim of this study is to illustrate priorities in Corporate Social Responsibility Report of the leading companies in Turkey. In this context, 48 companies from Borsa Istanbul (BIST) Corporate Governance Index were selected as the sample of the study. Qualitative research approach was used in the study. The data obtained from the annual reports, sustainability reports and corporate governance compliance reports of these 48 companies were subjected to content analysis. According to the findings, economic and legal responsibilities were found to have priority for shareholders, customers and employees stakeholder groups in terms of corporate social responsibility levels. While philanthropic responsibility was found to have priority for community stakeholder group, economic responsibility is important for suppliers stakeholder group. Legal responsibility, on the other hand, is important for environment stakeholder group. In general, economic and legal responsibilities have priorities in all stakeholder groups other than community stakeholder group.*

Melek Çetinkaya, Veysel Ağca, Hatice Özutku

Introduction

An early definition of Corporate Social Responsibility (CSR) by European Commission was "a concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis" (Commission of the European Communities, 2001: 3). The Commission modified this definition in 2011 as "the responsibility of enterprises for their impacts on society". In order to fulfil corporate social responsibility, business organizations must have a process that integrates social, environmental, ethical and human rights, and consumer expectations into their business operations and core strategy to get close relationships with social partners (Commission of the European Communities, 2011: 6). According to this definition, it is clear that business organizations have more duties than the official expectations, such as investing in human capital and the environment.

Global environmental problems such as climate change, vanishing natural resources and pollution have made corporate social responsibility an important agenda of business world (Harrison and Freeman, 1999; Dincer and Dincer, 2007). The definition and content of CSR change in different contexts. A company should take its stakeholders' needs into consideration when planning its CSR programmes. Since CSR will always have a location-based nature, a company should understand the priorities of local stakeholders (Welford, Chan and Man, 2007: 52).

Environmental concerns of the consumers and the increasing interest in CSR since the 1970's brought CSR into the discussion of the academic and business world (Harrison and Freeman, 1999; Dincer and Dincer, 2007). Although the term 'corporate social responsibility' is still widely used, terms such as corporate citizenship, business ethics, stakeholder management and sustainability offer competing, complementary and overlapping concepts to cover the field (Carroll and Shabana, 2010: 86).

The purpose of this study is to analyse the nature of CSR. A descriptive analysis based on CSR Pyramid developed by Carroll was used for the Turkish context. The CSR Pyramid which can be labeled as to be the most well known model for corporate social responsibility emphasize the importance of economic, legal, ethical and philanthropic responsibilities with its four levels. None the less, analysis of CSR in Turkey may provide an opportunity to examine the relevance of CSR Pyramid priorities in Turkish context to the conventional American ordering when Carroll's basic four part model is taken into consideration.

Corporate Social Responsibility and Organizational Stakeholders

The content and definition of CSR has always been a most debated subject (Dahlsrud, 2008: 2; Moir, 2001: 19). As a result of these debates, different perspectives flourished in the field of CSR. Among these perspectives on CSR, Ozuem et al. (2014: 400) put forward some theoretical perspectives as agency theory, the stakeholder theory, the stewardship theory, a resource-based view of the firm, the institutional theory and the strategic leadership theory.

The history of CSR goes a long way back. The modern era of CSR is dated back to 1950s by Carroll (1999: 268). Although the attempts to define CSR flourished during the 1960s and especially in 1970s, the definitions of CSR became more specific while different approaches on corporate social responsiveness and corporate social performance (CSP) began to flourish. However, the 1980s saw fewer new definitions, more empirical research, and an increase on alternative themes such as corporate social performance, stakeholder theory and business ethics theory. In the 1990s, CSR continued to serve on the same basis but it was transformed through alternative thematic frameworks such as stakeholder theory, business ethics theory, CSP, and corporate citizenship. The analysis of definitions showed that these concepts were appealing to the same dimensions of CSR (Dahlsrud, 2008: 4). Grouping the phrases which refer to the same dimensions gave out five dimensions, namely as the environmental dimension (The natural environment), the social dimension (The relationship between business and society), the economic dimension (Socio-economic or financial aspects, describing CSR in terms of business operations), the stakeholder dimension (Stakeholders or stakeholder groups) and the voluntariness dimension (Actions not prescribed by law).

Acting responsibly is important for any firm doing business. Two theories of CSR offer definitions for responsibility. According to the definition based on shareholder theory managers should make decisions that maximize the wealth of their firms' stockholders. On the other hand, the definition based on stakeholder theory argues that rather than maximizing the prosperity of their owners, firms have duties towards the society. Ultimately, this debate on the definition of responsibility changed its direction towards deciding the amount a firm should spend for acting responsibly (Wu, 2014: 286).

The concepts of corporate citizenship, corporate sustainability, stakeholder management, environmental management, business ethics and corporate social performance are studied under CSR. Carroll defines social responsibility as the entire range of obligations a business has towards the society in terms of the economic, legal, ethical, and discretionary categories of business performance (1979: 497). According to this definition, there are four dimensions of CSR namely as economic, legal, ethical and discretionary (philanthropic) responsibilities. Although these four constituent parts of CSR reflect the viewpoints related to earlier definitions, it represents the social responsibilities of businesses in more details. Thus Carroll's definition has been the most widely accepted one among a vast number of definitions in the literature of CSR (Visser, 2005: 33).

Carroll presents economic, legal, ethical and philanthropic dimensions of CSR on the model of "The Pyramid of Corporate Social Responsibility" and argues that not only economic and legal responsibility dimensions have been a part of CSR but all four responsibility dimensions have always existed to some extent while ethical and philanthropic functions have taken a significant position just in recent years (Carroll, 1991).

The pyramid of corporate social responsibility is presented in Figure 1. As can be seen, economic responsibilities component is the foundation block of the other three components. Obeying the laws, or playing by the rules, is the second most important dimension because the law is society's codification of acceptable and unacceptable behavior. Ethical responsibilities lies on the next level and covers being just and fair, discern what is right or wrong in order to avoid doing harm or to protect the stakeholders which are the employees, consumers, the environment, and others. Ultimately, philanthropic responsibilities focusing on being a good corporate citizen lie at the top of the CSR pyramid. These benevolent activities include contributing financial and human resources to the community and improving the quality of life. No CSR pyramid is perfect without one of these four components. They cannot be separated from one other but here and elsewhere, they are taken into consideration individually in order to discuss their specific nature. Moreover, as Carroll argues (1991: 42), "a consideration of the separate components helps the manager see that the different types of obligations are in a constant but dynamic tension with one another".

Figure 1. The Pyramid of Corporate Social Responsibility
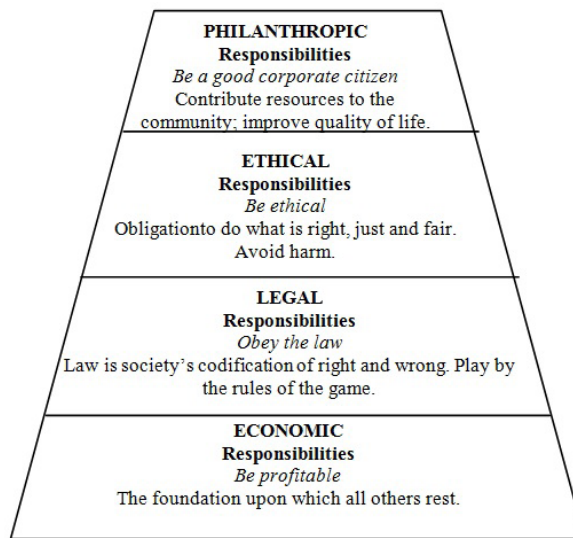
Source: Carroll, A. (1991), "The Pyramid of Corporate Social Responsibility: Toward the Moral Management of Organizational Stakeholders", Business Horizons.

According to recent literature on CSR, it is important to have a dialogue with stakeholders in order to protect the interests of stakeholders and to have conformity between the stakeholders and schemes of sustainable development and business strategy. In their study, Romolini et al. (2014: 67) argue that stakeholders, in turn, are less influenced by an entity's financial performance alone and more influenced by their perception that sustainability is critical to an entity's financial performance and to fulfilling the

implicit contract between the entity and society. In this study, theoretical perspectives of stakeholders have been taken into consideration. According to a stakeholder-oriented perspective, organizations exist within networks of stakeholders and face potentially conflicting demands from these stakeholders and have to adapt stakeholders' demands into the core policies of CSR. In his study on CSR, Dahlsrud (2008: 4) argues that the stakeholder dimension covers "interaction with their stakeholders", "how organizations interact with their employees, suppliers, customers and communities" and "treating the stakeholders of the firm".

First proposed by Freeman in 1984, stakeholder theory focuses on the strategic management of organizations in the late twentieth century. Numerous studies in literature, especially those of Clarkson (1995), Donaldson and Preston (1995), Mitchell et al. (1997) helped the theory to flourish and develop (Mainardes et al., 2012: 1862). Although they may offer different definitions and interpretations, all these studies, in their core, follow the definition of Freeman (1984) and reflect the same principle to a greater or lesser extent: the company should take into consideration the needs, interests and influences of people and groups, who either impact on or may be impacted by its policies and operations. According to Freeman's (1984) definition, individuals or groups may influence or be influenced by the scope of organizational objectives. Within this concept, a person, an informal group, an organization or an institution may all be stakeholders (Mainardes et al., 2011: 228).

Moir (2001: 19) argues that the stakeholder theory can be used as a basis to analyse those groups to whom the firm should be responsible. A literature review reveals various proposals for classifying stakeholders by their respective level of importance (Clarkson, 1995: 106; Donaldson and Preston, 1995: 68; Mainardes et al., 2012: 1865; Ozuem et al., 2014: 400; Trebeck, 2008: 352).

Stakeholders are important for companies in some sense because they have an influence on company performance. For this reason, companies try to respond to their stakeholders' demands in economic, formal or political frames. Stakeholders may have different levels of priorities for companies at different times but according to literature, there is some stability in the pattern of priority of stakeholders. Also, the stage of business and expectations of businesses may be different in different countries although they may be in the same field. Moreover different orientations can be observed in corporate environments of different countries. Pinkston and Carroll (1994: 165), who studied the conditions of markets in England, France, Germany, Japan, Sweden, Switzerland and the US, argue that stakeholders have different levels of importance in different countries. For example, while the focus is on economic responsibilities to owners in England, the focus shifts to company-employee relations in France and Germany, and to nurturing the business-community relationships in Japan. Naturally, because of the differences in these business relationships, stakeholder priorities can also be different. Thus, the stakeholder groups studied in the samples appeared to be prioritized in the same order while communities and government stakeholders ranked lower than the other threestakeholder groups of employees, consumers, and owners (Pinkston and Carroll, 1994: 161).

The terms of "stakeholder" and "social responsibility" have close relationships in terms of corporate social responsibility. The connection between these two terms derives from the vague content of the term "social" and the concept of "stakeholder" denotes to social or societal responsibilities of a company (Carroll, 1991: 43). Ozuem et al. (2014: 400) argue that according to stakeholder-oriented perception, organizations exist within networks of stakeholders and they aim to meet potentially conflicting demands of these stakeholders in terms of CSR objectives and policies. The duty of the management of a stakeholder oriented business is difficult because the managers have to make a settlement between their objectives and the expectations and demands of the stakeholders. While doing this, they have to meet the demands of main stakeholders in the first place and the remaining groups later. Although it is not always possible to satisfy all the parties at the same time, it is important for a company to protect its long-term interests. Carroll (1991: 43) assumes that the functions of stakeholder management are to describe, understand, analyse, and finally to manage. Carroll poses five questions to understand stakeholder management:

1. Who are our stakeholders?

2. What are their stakes?

3. What opportunities and challenges are presented by our stakeholders?

4. What corporate social responsibilities (economic, legal, ethical, and philanthropic) do we have to our stakeholders?

5. What strategies, actions, or decisions should we take to best deal with these responsibilities?

These questions can be discussed in details but attention must be given to what kind of responsibilities does a company have towards its stakeholders (Carroll, 1991: 43). A conceptional framework of stakeholder/responsibility matrix on this topic is presented in Figure 2.

Figure 2. Stakeholder/Responsibility Matrix

Types of CSR Stakeholders	Economic	Legal	Ethical	Philanthropic
Owners				
Customers				
Employees				
Community				
Competitors				
Suppliers				
Social Activist Groups				

Public at Large				
Others				

Source: Carroll, 1991: 44

By looking and working on this matrix, a manager can decide on how to act in different types of corporate social responsibility environments by taking different stakeholder groups into consideration. For each cell, the manager can gather analytical data and use them "for developing priorities and making both long-term and short-term decisions involving multiple stakeholders' interests" (Carroll, 1991: 44).

However, Pinkston and Carroll (1994) made a little alteration on this classification regarding the stakeholder groups in one of later studies. In their study on international businesses in different countries, Pinkston and Carroll (1994: 161) renamed stakeholder groups as owners, consumers, employees, communities and government. They argued that the perceived relative importance of the organizations' stakeholder groups will differ across firms by countries-of-origin.

Purpose and Importance of the Research

Most of the research on Carroll's (1991) CSR Pyramid has been in an American context. Nevertheless, several of the empirical studies already discussed suggest that culture may have an important influence on perceived CSR priorities (Visser, 2005). Within the framework of Carroll's CSR Pyramid (1991), this study aims to find out CSR priorities of companies listed in the Corporate Governance Index of Borsa Istanbul (BIST) which apply corporate management principles. In order to realize this aim, economic, legal, ethical and philanthropic responsibilities are placed on stakeholder/responsibility matrix based on Carroll's Corporate Social Responsibility Pyramid and the distribution of stakeholder groups according to their responsibility fields is investigated. It has been observed that no previous study in the literature of the field has attempted to place these four responsibilities on stakeholder/responsibility matrix. From this perspective, it can be said that this study is of great importance with its pioneering aspects.

Methodology of the Research

The research in this study was carried out using the qualitative research method. Extreme case sampling (Patton, 2002) was carried out by selecting Turkish companies with the best corporate social responsibility performance. A similar criterion for selecting companies was used by previous studies in order to analyze CSR (Collison et al., 2008; Lankoski, 2008; Romolini et al., 2014). The sample of the research is composed of 48 companies, which trade in Borsa Istanbul (BIST) and listed in Corporate Governance Index. BIST Corporate Governance Index (XKURY) is an index which includes the companies that apply Corporate Governance Principles[i]. Corporate Governance Principles in Turkey are constituted by Capital Markets Board by taking primarily the "OECD Corporate Governance Principles" of 1999 into consideration. Corporate Governance Principles are made up of four parts: (1) Shareholders, (2) Public Disclosure and Transparency, (3) Stakeholders, (4) Board of Directors. An important portion of corporate governance

principles are about the responsibilities of companies towards stakeholders[ii]. For this reason, sampling for the study has been chosen from companies within Corporate Governence Index which lists companies with high corporate social responsibility performance. In the attainment of data, "Annual Reports", "Sustainability Reports", and "Corporate Governance Compliance Reports", which are presented as "public domain" information in the websites of the so-called companies, were taken as a basis. Content analysis method was used in the analysis of the data.

Content analysis necessitates the information in the content of a text (or report) to be coded within the framework of pre-described categories, as quantitatively and qualitatively (Guthrie and Abeysekera, 2006: 117). With this method, percentage distribution of the information presented in a report (or a text) is measured, by being classified (coded) according to categories (Loberet et al., 1997: 59). Quantitative measurements obtained as a result of coding can be used as data in other kinds of analyses (Hackston and Milne, 1996: 84). For information related to corporate social responsibility which will be coded in content analysis, categories need to be formed and corporate social responsibility information types which will be included in these categories need to be determined. Carroll's (1991) study was taken into consideration for defining the social responsibility areas in the content analysis. Business practices defined by Spiller (2000) were taken into consideration in order to identify the business practices related to the expectations of stakeholder groups.

Content Analysis Process

In order to determine the categories and classifications of corporate social responsibility information types according to these categories, which will be used in the execution of this research and application of content analysis technique, literature review was completed and the following basic and sub categories were formed based on the information and categories in the studies of Carroll (1991) and Spiller (2000). Moreover, studies of Carroll (1991), Pinkston and Carroll (1994), Clarkson (1995), Donaldson and Preston (1995) and Trebeck (2008) were considered for the identification of stakeholder groups. Accordingly, stakeholder groups were taken into account as shareholders, consumers, employees, communities, suppliers, governments and others.

Social Responsibility Areas of Business Organizations

To examine the social responsibility areas of business organizations, "The Pyramid of Corporate Social Responsibility" model developed by Carroll (1991) was used in this study. According to this model, entire range of business responsibilities can be considered in four groups: economic, legal, ethical and philanthropic (Figure 3).

Figure 3. Economic, Legal, Ethical and Philanthropic Responsibilities

Economic Components (Responsibilities)	Legal Components (Responsibilities)
1. It is important to perform in a manner consistent with maximizing earnings per share.	1. It is important to perform in a manner consistent with the expectations of government and law.
2. It is important to be committed to being as profitable as possible.	2. It is important to comply with various federal, state and local regulations.
3. It is important to maintain a strong competitive position.	3. It is important to be a law-abiding corporate citizen.
4. It is important to maintain a high level of operating efficiency.	4. It is important that a successful firm be defined as one that fulfils its legal obligations.
5. It is important that a successful firm be defined as one that is consistently profitable.	5. It is important to provide goods and services that at least meet minimal legal requirements.
Ethical Components (Responsibilities)	Philanthropic Components (Responsibilities)
1. It is important to perform in a manner consistent with expectations of societal mores and ethical norms.	1. It is important to perform in a manner consistent with the philanthropic and charitable expectations of society.
2. It is important to recognize and respect new or evolving ethical/moral norms adopted by society.	2. It is important to assist the fine and performing arts.
3. It is important to prevent ethical norms from being compromised in order to achieve corporate goals.	3. It is important that managers and employees participate in voluntary and charitable activities within their local communities.
4. It is important that good corporate citizenship be defined as doing what is expected morally or ethically.	4. It is important to provide assistance to private and public educational institutions.
5. It is important to recognize that corporate integrity and ethical behavior go beyond mere compliance with laws and regulations.	5. It is important to assist voluntarily projects that enhance a community's "quality of life".

Source: Carroll (1991)

Business Practices Related to the Expectations of Stakeholder Groups

In order to determine the expectations of stakeholder groups within the context of corporate social responsibility in content analysis, the study of Spiller (2000) was taken into consideration. This study of Spiller (2000), which defines important business practices regarding each important stakeholder group, is one of the most detailed studies conducted about stakeholder groups' expectations as part of corporate social

responsibility practices. Spiller (2000) specified stakeholder groups that constitute primary priority for a business and claimed that organizational practices, which appear in accordance with the expectations of these groups, can be used in determining the corporate social responsibility performance of a business. This study has been beneficial for many researches about corporate social responsibility practices.

To guide implementation, Spiller (2000: 153-154) has identified ten key business practices for each of the six main stakeholder groups: community; environment; employees; customers; suppliers, and shareholders (Figure 4). The list of 60 practices summarised below is neither exhaustive, nor uncontroversial. However, it does provide a starting point, a menu from which companies can choose, preferably in conjunction with their stakeholders, the areas on which to focus.

Figure 4. Key Business Practices for Each of the Six Main Stakeholder Groups

1. Community	**2. Environment**
1.1. Generous financial donations	2.1. Environmental policies, organization and management
1.2. Innovative giving	2.2. Materials policy of reduction, reuse and recycling
1.3. Support for education and job training programmes	2.3. Monitoring, minimising and taking responsibility for releases to the environment
1.4. Direct involvement in community projects and affairs	2.4. Waste management
1.5. Community volunteer programmes	2.5. Energy conservation
1.6. Support for the local community	2.6. Effective emergency response
1.7. Campaigning for environmental and social change	2.7. Public dialogue and disclosure
1.8. An employee-led approach to philanthropy	2.8. Product stewardship
1.9. Efficient and effective community activity	2.9. Environmental requirements for suppliers
1.10. Disclosure of environmental and social performance	2.10. Environmental audits
3. Employees	**4. Customers**
3.1. Fair remuneration	4.1. Industry-leading quality programme
3.2. Effective communication	4.2. Value for money
3.3. Learning and development opportunities	4.3. Truthful promotion
3.4. Fulfilling work	4.4. Full product disclosure
3.5. A healthy and safe work environment	4.5. Leadership in research and development
3.6. Equal employment opportunities	4.6. Minimal packaging
3.7. Job security	4.7. Rapid and respectful responses to customer comments, complaints and concerns
3.8. Competent leadership	4.8. Customer dialogue
3.9. Community spirit	4.9. Safe products
3.10. Social mission integration	4.10. Environmentally and socially responsible production and product composition

5. Suppliers	6. Shareholders
5.1. Develop and maintain long-term purchasing relationships	6.1. Good rate of long-term return to shareholders
5.2. Clear expectations	6.2. Disseminate comprehensive and clear information
5.3. Pay fair prices and bills according to terms agreed upon	6.3. Encourage staff ownership of shares
5.4. Fair and competent handling of conflicts and disputes	6.4. Develop and build relationships with shareholders
5.5. Reliable anticipated purchasing requirements	6.5. Clear dividend policy and payment of appropriate dividends
5.6. Encouragement to provide innovative suggestions	6.6. Corporate governance issues are well managed
5.7. Assist suppliers to improve their environmental and social performance	6.7. Access to company's directors and senior managers
5.8. Utilise local suppliers	6.8. Annual report and accounts provide a comprehensive picture of the company's overall performance
5.9. Sourcing from minority-owned suppliers	6.9. Clear long-term business strategy
5.10. Inclusion of an environmental and social element in the selection of suppliers	6.10. Open communication with the financial community

Source: Spiller, 2000: 153-154.

Stakeholder/Responsibility Matrix

Business practices devoted to meet the expectations of stakeholder groups for corporate social responsibility areas defined by Carroll and which responsibilities become prominent in which stakeholder groups were defined in the content analysis, based on the Stakeholder/Responsibility Matrix of Carroll (1991). None the less, besides Carroll's (1991) study, stakeholder groups to be considered in the matrix were identified by considering Pinkston and Carroll (1994), Clarkson (1995), Donaldson and Preston (1995), Spiller (2000) and Trebeck's (2008) classifications. According to this, stakeholder groups were taken into consideration as shareholders, consumers, employees, communities, suppliers and others. As a result of the assessment done by the authors of the study, business practices related to the expectations of the stakeholder groups (Spiller, 2000) were placed in economic, legal, ethical and philanthropic areas in the stakeholder/responsibility matrix. By this way, a framework was formed in order to evaluate the findings obtained from the content analysis.

Figure 5: Stakeholder/Responsibility Matrix

Types of CSR Stakeholders	Economic	Legal	Ethical	Philanthropic
Shareholders				
Customers				
Employees				

Community				
Suppliers				
Others				

Findings of the Research and Evaluation of Findings

The data attained from the content analysis was analysed with the help of SPSS 20.0 Windows program. How often and at what level the information about corporate social responsibility took place in the related report was determined as number and percentage, and emerging frequency tables were interpreted. During the process of putting data into codes, "1" was used for coding the practices present in the categories considered in the content analysis and "2" was used for coding the practices which are not present in the businesses. Additionally, in terms of sector information, service sector was coded as "1" and manufacturing sector was coded as "2". 27 of the businesses taking place in the sample operate in service sector, while 21 of them operate in manufacturing sector.

Frequency and percentage values belonging to business practices about the expectations of stakeholder groups are presented in Figure 6. Hereunder, business practices falling within shareholders groups are seen to be over 90%. Businesses perform their legal responsibilities against their shareholders to a large extent. Of the practices in economic area, "Open communication with the financial Community" is seen to be over 65% and others are seen to be over 83%. Economic practices of companies as "Clear long-term business strategy" and "Clear dividend policy and payment of appropriate dividends" oriented to shareholders stakeholder group ate at 90% level.

Among the economic practices taking place in customers stakeholder group, "Customer dialogue" is seen to be at level 87.5%, "Environmentally and socially responsible production and product composition" is seen to be at level 83% and "safe products" is seen to be at level 79%. Businesses perform their responsibilities against their customers in the economic area. Of their responsibilities in legal area, "Truthful promotion" is at level 67% while "Minimal packaging" is at the level of 33%. The fact that this practice is used only in manufacturing businesses should be considered in minimal packaging radio to be low. Ethically, "Rapid and respectful responses to customer comments, complaints and concerns" is at level 79% and "Value for Money" is at level 44%. It is observed that businesses do not stress on the "Money" concept much, which is directed to customers stakeholder group.

Of the practices falling within employees stakeholder group, economically "Learning and development opportunities" was emphasized as 96% and legally "A healthy and safe work environment" was emphasized as 94%. In the ethical responsibility area, "Fulfilling work" and "Competent leadership" were mentioned at 60%, "Community spirit" at 75%, and "Fair remuneration" and "Equal employment opportunities" were mentioned over 83%. It is regarded that practices in employees stakeholder group were given a quite high importance.

Business practices in community stakeholder group are seen to be at 35% in the economic area with "Disclosure of environmental and social performance" at 35% and at 73% in the ethical area of "Innovative giving". In the philanthropic area, the practice that has the highest level is "Direct involvement in community projects and affairs" with 88% and the practice that has the lowest level is "An employee-led approach to philanthropy" with 48%. It can be stated that businesses act sensitive about philanthropic practices in community stakeholder group.

Businesses do not seem to give much place to information related to suppliers stakeholder group. The most emphasized practice in economic area is "Encouragement to provide innovative suggestions" with a level of 48%. The most emphasized practice in ethical area is "Inclusion of an environmental and social element in the selection of suppliers" with a level of 40%, and the most emphasized practice in philanthropic area is "Assist suppliers to improve their environmental and social performance" with a level of 40%. Other practices seem to be even lower than this level.

Practices under the title of Environment were encountered mostly in the stakeholder group named as Others. The most mentioned practice in economic practices area is "Environmental policies, organization and management" with a level of 83%. "Environmental requirements for suppliers" is seen to be at level 37% and "Environmental audits" is seen to be at level 35%. The practice in legal area is "Public dialogue and disclosure" at a level of 60%.

Whether a difference exists between expectations of stakeholder groups and related business practices from the point of sectors of the businesses taking place in the research was analysed via t-test. As a result of the analysis, business practices falling within stakeholder groups did not show a significant difference between service sector and manufacturing sector.

Figure 6. Stakeholder/Responsibility Matrix in Turkey Sample

CSR Stakeholders	Economic	Frq.	%	Legal	Frq.	%	Ethical	Frq.	%	Philanthropic	Frq.	%
Shareholder	1. Good rate of long-term return to shareholders	40	83.3	1. Disseminate comprehensive and clear information	43	89.6						
	2. Clear dividend policy and payment of appropriate dividends	43	89.6	2. Corporate governance issues are well managed and access to company's directors and senior managers	46	95.8						
	3. Clear long-term business strategy	44	91.7	3. Annual report and accounts provide comprehensive picture of the company's overall performance	47	97.9						
	4. Open communication with the financial Community	31	64.6									
Mean			82.3			94.4						
Customers	1. Industry-leading quality programme	33	68.8	1. Truthful promotion	32	66.7	1. Value for Money	21	43.8			
	2. Customer dialogue	42	87.5	2. Minimal packaging	16	33.3	2. Rapid and respectful responses to customer comments, complaints and concerns	38	79.2			
	3. Safe products	38	79.2									
	4. Environmentally and socially responsible production and product composition	40	83.3									
Mean			79.7			50.0			61.5			
Employees	1. Learning and development opportunities	46	95.8	1. A healthy and safe work environment	45	93.8	1. Fair remuneration	40	83.3			
							2. Effective communication	42	87.5			
							3. Fulfilling work	31	64.6			
							4. Equal employment opportunities	41	85.4			
							5. Competent leadership	29	60.4			
							6. Community spirit	36	75			
Mean			95.8			93.8			76.0			
Community	1. Efficient and effective community activity	34	70.8				1. Innovative giving	35	72.9	1. Generous financial donations	32	66.7
	2. Disclosure of environmental and social performance	17	35.4							2. Support for education and job training programmes	40	83.3
										3. Direct involvement in community projects and affairs	42	87.5
										4. Campaigning for environmental and social change	36	75
										5. Support for the local community	38	79.2
										6. An employee-led approach to philanthropy	23	47.9
Mean			70.8						72.9			73.2
Suppliers	1. Develop and maintain long-term purchasing relationships	20	41.7				1. Utilise local suppliers	16	33.3	1. Assist suppliers to improve their environmental and social performance	19	39.6
	2. Clear expectations	17	35.4				2. Sourcing from minority-owned suppliers	7	14.6			
	3. Pay fair prices and bills according to terms agreed upon	20	41.7				3. Inclusion of an environmental and social element in the selection of suppliers	19	39.6			
	4. Fair and competent handling of conflicts and disputes	17	35.4									
	5. Encouragement to provide innovative suggestions	23	47.9									
Mean			53.1						29.1			39.6
Others (Environment)	1. Environmental policies, organization and management	40	83.3	1. Public dialogue and disclosure	29	60.4						
	2. Materials policy of reduction, reuse and recycling	25	52.1									
	3. Waste management	30	62.5									
	4. Energy conservation	36	75									
	5. Product stewardship	36	75									
	6. Environmental requirements for suppliers	18	37.5									
	7. Environmental audits	17	35.4									
Mean			40.4			60.4						
Mean			60.1			60.4						39.6

According to findings obtained from this research, economic and legal responsibilities were determined to have priority in shareholders, customers and employees stakeholder groups in terms of corporate social responsibility levels. Philanthropic responsibility was determined to be primary in community stakeholder group, economic responsibility was seen to be primary in suppliers stakeholder group, and legal responsibility was seen to be primary in environment stakeholder group. In general, economic and legal responsibilities were observed to have priority in all stakeholder groups, except community stakeholder group. Findings obtained reveal that corporate social responsibility practices of businesses taking place in Turkey research sample are wide enough to include stakeholder groups, other than suppliers.

In Turkey, companies traditionally perform corporate social responsibility practices for long years within the framework of philanthropy. As a matter of fact, many businesses materialize their politics in this direction through various projects, such as awarding scholarships to students, sponsoring sports and art activities. Although social responsibility programs do not improve in private sector as fast as in the world, they have a different status lately. Non-governmental organizations, which developed quickly especially in 1990s, lead the supports of companies in social areas, in which education projects comes first on a more substantial ground with sustainability. On the other hand, especially in previous years, many companies head towards professional support for social responsibility programs. Non-governmental organizations enable the support given to social-oriented projects in private sector to increase quickly. Non-governmental organizations, which work with a transparent administrative mentality and responsibility mission, establish a ground for the creation of social projects with the leading companies of private sector. Social responsibility projects, which are realised through a co-operation with non-governmental organizations, are seen to be executed in areas such as education, sports, health, elderly, children and environment. Besides this, several consultancy institutions are seen to function with the purpose of supporting businesses in identifying social responsibility projects and in the process of putting them into practice (Akgeyik, 2007: 82).

As the obtained findings are compared to the findings of prior studies in different countries, similar results were attained in some aspects, while different ones were obtained in others. For instance, in their study which includes England, France, Germany, Japan, Sweden, Switzerland and the US, Pinkston and Carroll (1994) put forward that the importance given to stakeholders differed according to countries. England has been shown to emphasize economic responsibilities to owners in its business community. France, on the other hand, has been understood to focus on company employee relations, as has Germany. The Japanese environment has appeared to nurture the business-community relationships. Since these relationships can be noticeably different in any given business environment, the stakeholder priorities were expected to be different for the sample organizations.

One of the conspicuous findings of the study is the lack of corporate social responsibility practices regarding the suppliers stakeholder group. A similar situation exists in the findings of the studies that were conducted in other countries. For example, several

empirical studies in Europe, North America and Asia have investigated how firms work with CSR-related issues in their supply chains. Most of these studies are not only confined to large multinational corporations, but also include SMEs. According to the results attained, despite many companies' efforts to engage in CSR-related activities in their supply chains, there is often a gap between the ethical standards expressed and the actual conditions at the suppliers (Andersen and Larsen, 2009: 78). In today's competitive business environment, it has become imperative for firms to find ways to work collaboratively with suppliers. Moreover, it has been shown that firm-supplier cooperation and partnership can help all supply-chain members to increase performance. Additionally, ethical behavior in the firm-supplier relationship will generate trust and better communication – attributes which can result in greater competitiveness and wealth creation (Gonzalez et al., 2013: 373).

Conclusion

This study is based on "stakeholder theory" to explain the concept of corporate social responsibility levels in Turkey. To examine the social responsibility areas of business organizations, "The Pyramid of Corporate Social Responsibility" model developed by Carroll (1991) was used in this study. According to this model, entire range of business responsibilities can be considered in four groups: economic, legal, ethical and philanthropic. Within the framework of Carroll's corporate social responsibility (CSR) Pyramid, the aim of this study is to illustrate priorities (highlight issues and areas) in Corporate Social Responsibility of the leading companies in Turkey. In this context, 48 companies were selected as the sample of the study in the Borsa Istanbul (BIST) Corporate Governance Index. The research was carried out using the qualitative research method. In the attainment of data, "Annual Reports", "Sustainability Reports", and "Corporate Governance Compliance Reports", which are "public domain" information published in the websites of the so-called companies, were taken as a basis. Content analysis method was used in the analysis of the data.

According to the findings of this study, economic and legal responsibilities were determined to have priority in shareholders, customers and employees stakeholder groups in terms of corporate social responsibility levels. Among the companies which fall into the scope the study, responsibilities outstanding in the field of economic responsibilities for shareholders are: "Good rate of long-term return to shareholders", "Clear dividend policy and payment of appropriate dividends", "Clear long-term business strategy", "Open communication with the financial Community". The important topics for shareholders in terms of legal responsibilities are: "Disseminate comprehensive and clear information", "Corporate governance issues are well managed and access to company's directors and senior managers", "Annual report and accounts provide a comprehensive picture of the company's overall performance". For customers stakeholder group, social responsibility topics on economic level are: "Industry-leading quality programme", "Customer dialogue", "Safe products", "Environmentally and socially responsible production and product composition". Legal responsibilities which are important for customer stakeholder group are: "Truthful promotion" and "Minimal

packaging". While the economic responsibilities which stand out for employees stakeholder group are "Learning and development opportunities", legal responbilities which are important for the same group are "A healthy and safe work environment".

Corporate social responsibility practices reflecting ethical and philanthropic responsibility understanding were not seen to take place in shareholders stakeholder group. Philanthropic responsibility mentality was seen not to fall within customers and employees stakeholder groups. In community stakeholder group, on the other hand, it is conspicuous that most of the corporate social responsibility practices are performed within the context of philanthropic responsibility understanding and ethical and economic mentalities remain in the background. It has been realised that social responsibility practices taking place in suppliers stakeholder group are not common, and current social responsibility practices reflect economic responsibility. On the other hand, in the environment stakeholder group, legal responsibility was identified to be primary. In general, economic and legal responsibilities were seen to have priority in all stakeholder groups, except the community stakeholder group. The findings obtained reveal that corporate social responsibilities of large companies in the research sample of Turkey are wide enough to include all stakeholder groups other than suppliers, and economic and legal responsibilities have priority in the corporate social responsibility understanding. As a result, many companies embrace a CSR program as a way to promote socially responsible actions and policies, and effectively respond to stakeholder demands.

According to stakeholder theory, companies can achieve more positive results by paying more attention to corporate social responsibility programs. Stakeholder theory suggests that organizational survival and success is contingent on satisfying both its economic (e.g. profit maximization) and non-economic (e.g. corporate social performance) objectives by meeting the needs of the company's various stakeholders. The stakeholder management concept serves to ensure that organizations recognise, analyse and examine the individual and group characteristics that influence or are influenced by organizational behaviours and actions.

Future studies may include analyses of which stakeholder groups must be paid more attention in the value creation process of organizations within the context of stakeholder theory, what the contributions the stakeholders provide are and what the possible risks related to stakeholders are, expectations of stakeholders and how processes that will meet these expectations will be developed.

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Banking Crises of the 1990s and 2000s in Developed Countries: How similar are they?

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Abstract: *The objective of this study is, on one hand, to determine whether the banking crises occurring in advanced economies in the 1990s and 2000s share the same roots, and on the other hand, whether aggregated accounting indicators are good predictors of crises in these economies. By means of the multivariate logit model, we have identified banking crises indicators for a set of 16 developed countries for the periods 1990-2006 and 2007-2012. Our results show the existence of certain similarities between the crises of the 1990s and 2000s, namely: a private credit boom and a deterioration of banks' balance sheets. In addition, we have tested the robustness of our results through the use of Bayesian averaging models. Our results have allowed us to confirm, in general, the robustness of the estimation results derived from the multivariate logit approach.*

Introduction

The global financial system experienced a serious crisis in July 2007. This crisis, initially affecting the American housing market, gradually spread to the entire global financial system. The crisis not only caused the default of some of the world's largest banking institutions, but was also at the root of a worldwide financial crisis comparable to that of the Great Depression of 1929.

The 2007-2008 banking crises have been the subject of numerous controversies as to their similarities and differences to past banking crises. Some claim that the recent crises are different in every aspect. They are chiefly due to a global savings glut and the absence of shadow banking system regulation (Adrian and Shin, 2009). Others maintain that the recent episodes of banking distress are not so different from the previous ones and that the latter show remarkable similarities to the former. According to Claessens and al. (2010b), these similarities are: First, the price of real and financial assets rising considerably in a number of countries before the crisis, notably in the United States and Europe. These prices reached 60% before the start of the crisis, which strongly recalls the price spike observed during major financial crises of the '90s, notably the Japanese crisis of 1997 (Caballero, 2010). A second similarity is the occurrence, in a number of major economies, of credit booms before the crisis, estimated at over 150% of GDP (Claessens and al., 2010b). Third, international financial integration facilitated large capital inflows, which contributed to the acceleration of GDP growth and massive credit growth, which in turn led to a strong fluctuation of global demand and a strong deterioration of current bank balances during the period preceding the crisis (Cardarelli and al., 2010). Fourth, the inadequacy of the regulation and prudential supervision framework (Bair, 2009).

In light of these findings, the goal of this study is twofold. First, to determine if the banking crises of the 2000s have shared causes with the crises of the 90s, and second, to determine if aggregated accounting indicators are robust banking crisis indicators.

Thus, in this study we propose first to identify banking crisis indicators by means of a limited dependent logit approach for a cross-sectional view of advanced economies during the period preceding the 2007-2008 banking crises, namely 1990-2006, and the period 2007-2012. Second, we propose to test the robustness of the results derived from the multivariate logit approach, by means of Bayesian statistics (BMA). Indeed, according to Cuaresma and Slacik (2009) and Babecký and al. (2012), the BMA approach has the advantage of reviewing different model combinations and of weighting them according to their adjustments in the model.

This paper will be organized as follows: The first section being an introduction, in the second section we briefly present a review of the literature on banking crisis indicators. In the third section, we present our methodology, namely: our country sample and our main data sources, our endogenous and exogenous variables, and our two econometric approaches. In the fourth section, we present a brief descriptive analysis of our data. We describe and discuss in the fifth section our empirical results. The last section is the conclusion.

Financial Crisis Indicators: Review of the Literature

Banking crises are not limited to the 21st century. Indeed, during the past four decades, the global economy was marked by an increase in banking crises. According to Reinhart and Rogoff (2013), banking crises represent a threat to equal opportunity amongst emergent and advanced economies: most countries have had at least one banking crisis during the period of 1945-2008.

The reoccurrence of these crises, their magnitudes and their surprising and unpredictable character, and the financial costs associated with these episodes explain the research communities' interest in these events. They all attempt to define and to identify the risks and vulnerability factors of the banking sector in order to avoid the triggering of new crises, or to find adequate methods for the management and the prevention of this phenomenon before it reaches a catastrophic scale.

The first approaches, used for the detection of turbulence episodes, were based on country risk rating systems (Hawkins and Klau, 2000).Since the seventies, new techniques have been emerging, based on identifying early warning financial crisis indicators. The most commonly used methods for panel data limited dependent probit/logit models. The goal of this approach is to test the statistical significance of different indicators in determining the occurrence probability of a financial crisis across a cross-section of countries (Frankel and Saravelos, 2012).

The indicators commonly used in the empirical literature are: macroeconomic indicators, financial indicators, external indicators, and institutional and structural indicators. The pioneering work done in this field of research is that of Demirguc-Kunt and Detragiache (1998b, 2005), Hardy and Pazarbaşioğlu (1999) and Eichengreen and Arteta (2002). The results of their research suggest that a weak macroeconomic and financial environment marked by small GDP growth, a high increase in real interest rates, excessive credit growth, and strong inflation significantly increase the probability of the occurrence of banking crises at the international level. Recently, Frankel and Saravelos (2012) have conducted a vast review of the literature including over 80 works. The results of this investigation are reported in Figure 1.

Figure 1. Leading Indicators Deemed Relevant Financial Crises in more than 80 Works
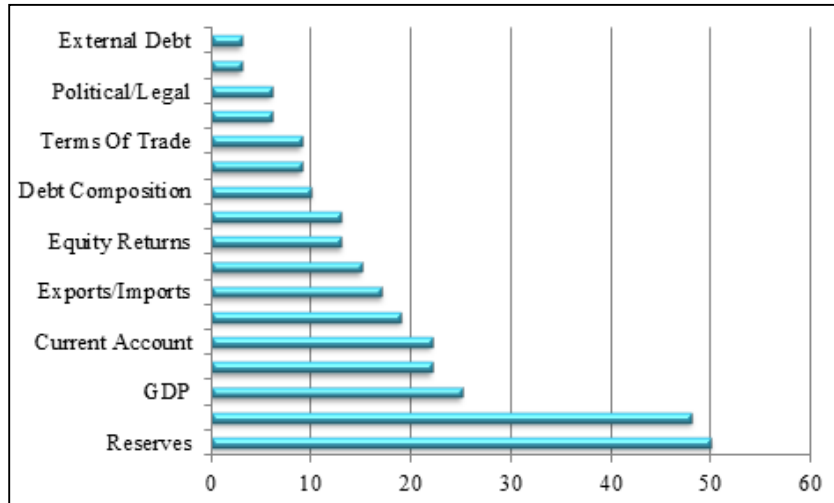
From this figure, we see that the indicators that are most frequently statistically significant are the real exchange rate, foreign exchange reserves, credit growth, GDP, and the measurement of international trade. Nonetheless, the balance of payments, the terms of trade, contagion and institutional variables, capital flow variables, and the various measures of external debt do not seem to be robust early warning indicators of financial crises.

Furthermore, few empirical works have tested the relevance of microeconomic indicators linked to the individual situation of banks in the growth of banking distress probability. These indicators generally reflect the health and solidity of banking institutions and are grouped into five groups forming the acronym CAMEL (CAMEL refers to the five main components of the real situation of a banking institution, namely: Capital Adequacy, Asset quality, Management, Earnings and Liquidity). In addition, CAMEL is a tool allowing for the detection of potential risks that could lead to bank failures and, by extension, banking crises. Muhammad (2009) argues that the strength of these factors determines the global solidity of the bank.

The works of Gonzalez-Hermosillo and al. (1997), Männasoo and Mayes (2009) and Barrell and al. (2010) allowed the isolation of several conventional bank strength measures, derived from CAMEL, considered relevant to the detection of potential risks that could lead to serious problems in the banking sector, notably: (i) the ratio of capital to total assets; (ii) the ratio of non-performing loans or loan-loss provisions to total loans; (iii) the ratio of costs to revenue; (iv) the ratios of return on equity (ROE) and return on assets (ROA); (v) and the ratio of deposits to total assets, etc.

Methodology

Sample and Data Sources

This study considers a sample of 15 advanced countries and covers the period of 1990-2012. Our data is mainly extracted from the following databases: The World Development Indicators (WDI) of the World Bank, the International Financial Statistics (IFS) of the International Monetary Fund (IMF), Bankscope and the work of Laeven and Valencia (2013).

Overview of Study Variables

Definition and Construction of the Endogenous Bank Crisis Variable

A key element in our study is the construction of the binary banking crisis variable for our sample of countries. We have therefore identified and dated the episodes of financial distress during the 1990-2012 period, referring mainly to the list of Laeven and Valencia (2013).

According to them, a banking crisis is considered systemic if the following two conditions are met: "(1) significant signs of financial distress in the banking system and/or bank liquidations; and (2) significant banking policy intervention measures in response to significant losses in the banking system.

Political interventions in the banking sector are considered important if at least three out of six measures have been used: "(1) extensive liquidity support; (2) significant bank restructuring costs; (3) significant bank nationalization; (4) the setting up of important safeguards; (5) significant asset purchases; (6) freeze on deposits and declaration of bank holidays." (P. 228).

Table 1 gives the dates of banking distress episodes identified by this method for each country in our sample.

Table 1. Sample of Countries and Dates of Banking Crisis

Countries	Dates of the Banking crises
Germany	2008-2011
Austria	2008-2011
Belgium	2008-2011
Korea	1997-1998
Denmark	2008-2011
United-States	2007-2011
Finland	1991-1995
Greece	2008-2011

Ireland	2008-2011
Italy	2008-2011
Japan	1997-2001
Netherlands	2008-2011
United Kingdom	2007-2011
Spain	2008-2011
Sweden	1991-1995 ; 2008-2011*

Notes: * non-systemic banking crisis
Source: Laeven and Valencia (2013, p. 254-256)

Thus let be the dummy variable for banking crises that takes on a unit value the first year when a banking distress episode is identified in a country i, and a null value otherwise. Indeed, to the extent to which banking distress episodes occur an average of once per four years, Demirguc-Kunt and Detragiache (1998b) thus suggest to keep only the first year of a given crisis.

$$BCI_{it} = \begin{cases} = 1 & if\ crisis \\ = 0 & if\ not \end{cases} \qquad (1)$$

Exogenous Banking Crisis Variables

The choice of exogenous variables comes both from the empirical literature and data availability.

We have grouped our explanatory variables in four distinct categories, namely:

The macroeconomic variables, which are: the stock returns of key market indices adjusted by the dividends (*returns*), the growth of gross domestic product (*gdpg$_t$*), real exchange-rate change (*vtcr$_t$*), and the real exchange rate (*rir$_t$*).

Financial variables, which are: private credit (*privcredit$_t$*), the ratio of credit to bank deposits (*ratiocreditdeposit$_t$*), and the ratio of deposits to the money supply M2 (*ratiodepositm2$_t$*).

The aggregated accounting variables (The aggregation and weighting depend on the size of the bank balance sheets for each country in our sample), which are: the ratio of cost to bank revenue (*ratiocostrevenu$_t$*), the ratio of capital to total bank assets (*ratiocapital$_t$*), and the ratio of return on equity (*roe$_t$*).

As well as the external variables, which are: opening up to international trade (*opness$_t$*), the ratio of external debt to GDP (*exterdebt$_t$*), the ratio of money supply M2 to international exchange reserves (*m2res$_t$*), and the flow of foreign direct invest mean to GDP (*dfi$_t$*).

In Table 2, we have presented various financial crisis indicators covered in this study with the sign of the theoretical link expected between each variable and the occurrence probability of a banking crisis and the source of collected data.

Table 2. Sources and Data Descriptions

Categories	Indicators	Descriptions	Sources	Expected Signs
Macroeconomic variables	$return_s$	Returns on equity indices	Bloomberg	-
	$gdpg_t$	Growth pf the gross domestic production	IFS	-
	ver_t	Change in real exchange rate	IFS	+
	rir_t	Real interest rate	IFS	+

Categories	Indicators	Descriptions	Sources	Expected Signs
Financial variables	$privcredit_t$	Growth of the credit to the private sector	WDI	+
	$ratiocredideposit_t$	Ratio of bank lending to bank deposits	IFS	+
	$ratiodepositm2_t$	Ratio of bank deposits to the money supply M2		-
Accounting variables	$ratiocapital_t$	Ratio of capital to total assets	Bankscope	-
	$roet$	Financial profitability ratio	Bankscope	-
	$ratiocostrevenue_t$	Cost to earnings bank ratio	Bankscope	+
External variables	$exterdebt_t$	Ratio of external debt to GDP	IFS	+
	$opness_t$	Trade openness measured by the sum of exports and imports to GDP	WDI	-
	$m2res_t$	Money supply M2 to International exchange reserves	WDI	+
	dfi_t	Foreign direct investment portfolio as a percentage of GDP	WDI	+

Source: Authors' own work

Furthermore, several indicators, such as, for example, the variables reflecting bank asset quality, the budgetary deficit, the current account deficit, and institution quality and judicial system quality, have not been kept in this study because of data unavailability.

Econometric Approaches

The purpose of this study is to determine, on one hand, if the banking crises of 2007-2008 in advanced economies share the same origin as the crisis episodes of the 90s, and, on the other hand, to determine whether aggregated accounting indicators are robust banking crisis indicators in these economies.

To do this, we propose, first, to identify banking crisis indicators by means of a limited dependent variable logit approach. Second, we propose to test the robustness of results derived from this approach by means of Bayesian statistics (BMA).

In the following, we propose to present briefly these two methods.

Limited Dependent Variable Logit Models

Limited dependent variable logit models were introduced by Eichengreen and al. (1994) and Frankel and Rose (1996). Unlike the "signals" approach, the logit/probit limited dependent variable models provide an explanatory probability simultaneously for the group of explanatory variables in question. Similarly, these models allow one to take into account the marginal contribution of each variable to crisis event genesis. In addition, the empirical literature validates the relevance of these models in the identification of financial crises in the case of panel data (Davis and Karim, 2008).

The model is as follows:

$$y_{it} = X'_{it}\beta + \varepsilon_{it} \qquad (2)$$

Where i=1,…, N and t=1,…, T

The explanatory variable is a binary variable that has a value of 1 during crises and 0 otherwise; is the vector of N coefficients relative to explanatory variables to estimate; is the matrix of explanatory variables; and is the residual matrix. identically and independently distributed and follows the logistic distribution.

The Cumulative distribution function is given by:

$$Prob\ (y_{it} = 1|X'_{it}) = F(X'_{it}\beta) \qquad (3)$$

The likelihood function associated with this model is written as follows:

$$L = \prod_{t=1}^{T} \prod_{i=1}^{N} Prob\,(y_{it} = 1|X'_{it}) \tag{4}$$

$$L = \prod_{t=1}^{T} \prod_{i=1}^{N} F(X'_{it}\beta)\,y_{it}\,[1 - F(X'_{it}\beta)]\,(1 - y_{it}) \tag{5}$$

The logarithm associated with the likelihood function is written as follows:

$$\log L = \sum_{i=1}^{T} \sum_{i=1}^{N} \{y_{it}\,log[F(X'_{it}\beta)] + (1 - y_{it})\,log[1 - F(X'_{it}\beta)]\} \tag{6}$$

The occurrence probability of the crisis is a function that is obtained by the maximum likelihood method.

Formally, the crisis probability is as follows:

$$Prob\,(y_{it} = 1|X'_{it}) = \frac{e^{X'_{it}\beta}}{1 + e^{X'_{it}\beta}} \tag{7}$$

Bayesian Model Averaging

Bayesian Model Averaging (BMA) has the advantage that it takes into account different model combinations, weighting them according to their adjustments in the model. In addition, the BMA approach provides for each variable an estimate of their coefficients as weighted averages of all models included in the model-space (If we have k variables, the model space will consist of 2^k models) . Thus, the weighting coefficients correspond to the posterior probability of inclusion in each model in the model-space.

The only existing works using this approach in the domain of early warning financial crisis indicators are those by Cuaresma and Slacik (2009), Babecký and al. (2012), Boudebbous and Chichti (2013) and Feldkirche (2014).

We use the BMA approach to identify banking crisis indicators in a list of potential k indicators. We consider the following linear regression model:

$$Y = \alpha_\gamma + X_\gamma \beta_\gamma + f_\gamma + \varepsilon \tag{8}$$

Where is a binary financial crisis variable; is the constant; is a coefficient vector;   refers to a subset of all the relevant and available explanatory variables, namely, potential early warning indicators X the fixed effects component; and is the white noise error term.

The number K of potential explanatory variables gives 2^K potential models. The indicator γ is used to refer to a specific model among the 2^K models. Thus, an average is then calculated from the information originating from the model, by using the *a posteriori* probabilities of the model implemented by the Bayes Theorem:

$$p(M_\gamma|y,X) \propto p(y|M_\gamma,X)\,p\,(M_\gamma) \qquad (9)$$

With is the *posterior* probability of the model, which is proportional to the marginal likelihood of the model . It facilitates the dating of the model's *a priori* probability

The robustness of a variable in the explanation of the dependent variable can be expressed by the probability that a given variable will be included in the regression. It is assimilated to the posterior inclusion probability (PIP), which is calculated as follows:

$$PIP = p(\beta_\gamma \neq 0|y) = \sum p(M_\gamma|y) \qquad (10)$$

Only variables with a PIP greater than or equal to 0.5 are considered robust determinants of the dependent variable.

Descriptive Analysis of the Data

Our sample has 15 countries. Our choice was, on one hand, due to data availability and, on the other, to the fact that these countries have had serious banking crises during the past decades.

We use the panel data with annual frequencies relating to the periods 1990-2006 and 2007-2012.

Figure 2 provides a few stylized facts on the banking crises of our sample. We conclude that during the 90s, the frequency of these crises was relatively low, with a maximum of 4 crisis episodes. However, the 2000s were characterized by a higher frequency of banking crises, with a maximum of 16 crisis episodes.

Figure 2. Frequency of Financial Crises in Advanced Economies over the Period 1990-2012
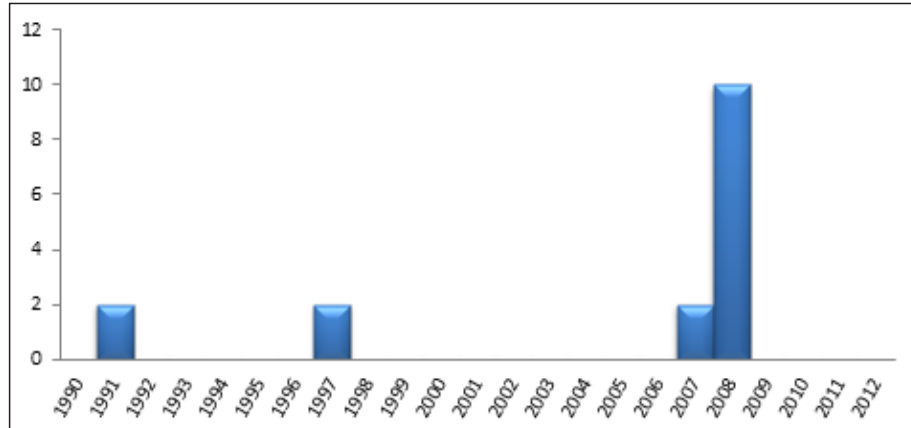
Source: Authors' calculations

In Table 3 are descriptive statistics of the study's set of variables. The analysis of descriptive statistics reveals that for the two periods of the study, certain explanatory variables such as: the market index returns , the exchange rate variation, (), private credit (), the ratio of credit to bank deposits (), the ratio of deposits to the M2 money supply (), the ratio of return on equity (), the ratio of costs to bank revenue (), opening to international trade (), the ratio of external debts to GDP () and the ratio of the M2 money supply to international exchange reserves () on the considered period show very significant fluctuations in comparison to other variables. Furthermore, the number of observations varies from one variable to another because of data unavailability.

Table 3. Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Period 1990-2006					
BCI_t	255	0.0156863	0.124503	0	1
$Returns_t$	236	6.282372	23.5557	-50.4519	183.365
$gdpg_t$	244	2.079508	2.134638	-7.52457	8.71127
rir_t	245	1.707938	2.321738	-5.46483	10.5684
ver_t	235	0.2941392	12.52485	-18.3922	107.034
$privcredit_t$	252	140.4538	79.90097	48.1827	497.532
$ratiocreditdeposit_t$	224	121.7227	48.81322	50.5599	305.278
$ratiodepositm2$	175	77.38498	15.84425	38.1715	104.132
$ratiocapital_t$	194	5.925373	2.115559	1	17
roe_t	182	7.593985	13.54288	-2	19

ratiocostrevenu$_t$	188	63.37078	18.55205	12.004	79.056
m2res$_t$	250	28.01272	52.41858	3.54092	630.376
exterdebt$_t$	255	62.84706	31.94798	9	164
opness$_t$	255	71.86413	37.42231	15.924	183.624
dfi$_t$	242	3.055958	4.71857	-5.89528	26.6532

Period 2007-2012					
BCI$_t$	90	0.4888889	0.502677	0	1
Returns$_t$	76	3.050686	23.7773	-67.5697	183.365
gdpg$_t$	90	1.511482	2.616534	-8.97498	8.71127
rir$_t$	68	1.380545	2.252967	-5.46483	10.5684
ver$_t$	90	0.7454545	12.56793	-18.3922	107.0336
privcredit$_t$	90	139.8145	62.4631	48.1827	346.21
ratiocreditdeposit$_t$	64	124.2889	50.35807	47.2884	313.334
ratiodepositm2	70	74.30398	16.55875	38.1715	104.132
ratiocapital$_t$	71	5.941463	2.035587	1	17
roe$_t$	75	5.519231	25.38191	-4	19
ratiocostrevenu$_t$	74	61.52309	16.13664	12.004	85.254
m2res$_t$	90	35.09396	67.12172	2.61948	656.961
exterdebt$_t$	72	64.26606	33.69485	9	189
opness$_t$	88	76.88712	39.75442	15.924	192.407
dfi$_t$	89	3.33932	5.461651	-6.71487	36.4308

Note: Mean, Std. Dev, Max and Min, respectively denote the average, standard deviation, maximum and minimum.

Source: Authors' own work

We have used Pearson's correlation test to detect if there are collinearity problems. The results of these tests are presented in Table 4. Simultaneously, we have included in our regressions all the variables because all the coefficients are less than 50% for the two periods of the study.

Table 4. Correlation Matrices

a. Period 1990-2006							
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1)	1						
(2)	0.4408*	1					
(3)	0.1093	0.0461	1				
(4)	0.1029	-0.0899	0.0177	1			
(5)	-0.1872*	-0.2714*	-0.2547*	-0.0081	1		
(6)	-0.0563	-0.0227	-0.0742	0.1053	-0.0801	1	
(7)	0.0569	0.0144	0.2123*	0.018	0.1098	-0.4110*	1
(8)	0.0668	0.0508	-0.0627	-0.0693	-0.0741	-0.068	0.0796
(9)	0.1447*	0.3914*	-0.0073	-0.0196	-0.0986	0.0468	-0.1506*
(10)	-0.0379	-0.0556	0.4153*	0.1154	0.0029	-0.1229	0.1914*
(11)	-0.0726	-0.0891	-0.2183*	-0.0333	0.2314*	0.1612*	-0.2899*
(12)	0.0165	-0.1769*	-0.0051	-0.0162	0.2112*	-0.4661*	0.3404*
(13)	0.0174	0.0043	-0.2948*	0.0115	-0.1959*	0.2928*	-0.4796*
(14)	-0.0109	0.0575	-0.2293*	0.0439	-0.0598	0.1555*	-0.2211*

Variables	(8)	(9)	(10)	(11)	(13)	(14)	(15)
(8)	1						
(9)	0.1039	1					
(10)	-0.2583*	-0.1667*	1				
(11)	-0.0672	0.0047	-0.3029*	1			
(12)	-0.0182	-0.1495*	0.1746*	-0.1440*	1		
(13)	-0.3886*	-0.0111	-0.2706*	0.2253*	-0.1044	1	
(14)	-0.1816*	-0.0085	-0.2410*	0.3240*	-0.1133*	0.4605*	1
b. Period 2007-2012							
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1)	1						
(2)	0.2846*	1					
(3)	0.0407	-0.0928	1				
(4)	0.2220*	-0.078	0.0722	1			
(5)	-0.0955	-0.3159*	-0.0928	0.0276	1		
(6)	-0.0315	0.036	-0.1176	0.0663	-0.0879	1	
(7)	-0.0118	-0.0286	0.2693*	0.1183	0.2086*	-0.3870*	1

(8)	0.0249	0.1266	-0.0282	-0.0566	-0.0107	-0.0103	0.0732
(9)	0.0897	0.2839*	-0.1236	0.101	-0.0255	0.2810*	-0.2233*
(10)	-0.0102	-0.1479	0.4554*	0.1429	0.094	-0.1538	0.2502*
(11)	0.0464	0.022	-0.2306*	-0.0285	0.1409*	0.048	-0.2848*
(12)	0.1098	-0.1566*	0.0674	0.0307	0.1017	-0.4570*	0.2848*
(13)	0.0864	0.1051	-0.3401*	-0.0358	-0.2637*	0.2227*	-0.4417*
(14)	0.0819	0.1321*	-0.3082*	0.0677	-0.1238	0.1600*	-0.2706*
Variables	(8)	(9)	(10)	(11)	(13)	(14)	(15)
(8)	1						
(9)	0.0579	1					
(10)	-0.2221*	-0.4460*	1				
(11)	-0.0356	0.2037*	-0.2059*	1			
(12)	-0.1034	-0.1138	0.1880*	-0.1383	* 1.0000		
(13)	-0.3437*	0.1446	-0.3210*	0.0977	-0.0333	1	
(14)	-0.1063	0.1011	-0.2132*	0.215	* -0.1388*	0.4721*	1

Notes:(1):*returns$_t$*; (2): *gdpg$_t$*; (3): *rir$_t$*; (4): *ver$_t$*; (5): *privcredit$_t$*; (6): *ratiocreditdeposit$_t$*; (7): *ratiodepsiotm2*; (8): *ratiocapital$_t$*; (9): *roe$_t$*; (10): *ratiocostrevenu$_t$*; (11): *m2res$_t$*; (12): *exterdebt$_t$*; (13): *opness$_t$*; (14): *dfi$_t$*; and (*) means that the coefficients of correlations are significant at the threshold of 5%.

Source: Authors' own work

Empirical Results and Discussion

We remember that the objective of this study is to determine, on one hand, whether the banking crises occurring in advanced economies in 2007 and 2008 have shared roots with past crisis episodes, and, on the other hand, to test the contribution of aggregated accounting indicators in explaining these crises.

We have identified, first, by means of multivariate logit models for a set of developed countries during the periods 1990-2006 and 2007-2012, the early warning banking crisis indicators.

Our estimation approach is as follows: First, in model (a) we have included only macroeconomic indicators. Then, in model (b) we have simultaneously integrated our macroeconomic and financial indicators. Finally, in model (c) we have introduced at the same time our macroeconomic, financial, and external indicators. Second, we have reestimated models (b) and (c) by introducing aggregated accounting indicators, namely models (d) and (e).

Model (a): Macroeconomics indicators

$$BCI_{it} = \beta_1 return_{it} + \beta_2 gdpg_{it} + \beta_3 rir_{it} + \beta_4 ver_{it} + \varepsilon_{it} \qquad (11)$$

Model (b): Macroeconomics and financial indicators

$$BCI_{it} = \beta_1 return_{it} + \beta_2 gdpg_{it} + \beta_3 rir_{it} + \beta_4 ver_{it} + \beta_5 privcredit_{it} + \beta_6 creditdeposit_{it} + \beta_7 depositm2_{it} + \varepsilon_{it}$$

(12)

Model (c): Macroeconomics, financial and external indicators

$$BCI_{it} = \beta_1 return_{it} + \beta_2 gdpg_{it} + \beta_3 rir_{it} + \beta_4 ver_{it} + \beta_5 privcredit_{it} + \beta_6 creditdeposit_{it} + \beta_7 depositm2_{it} + \beta_8 m2res_{it} + \beta_9 exterdebt_{it} + \beta_{10} opness_{it} + \beta_{11} dfi_t + \varepsilon_{it}$$

(13)

Model (d): Macroeconomics, Financial and accounting indicators

$$BCI_{it} = \beta_1 return_{it} + \beta_2 gdpg_{it} + \beta_3 rir_{it} + \beta_4 ver_{it} + \beta_5 creditpriv_{it} + \beta_6 creditdeposit_{it} + \beta_7 depositm2_{it} + \beta_{12} ratiocapital_{it} + \beta_{13} roe_{it} + \beta_{14} ratiocostrevenu_{it} + \varepsilon_{it}$$

(14)

Model (e): Macroeconomics, financial, accounting and external indicators

$$BCI_{it} = \beta_1 return_{it} + \beta_2 gdpg_{it} + \beta_3 rir_{it} + \beta_4 ver_{it} + \beta_5 creditpriv_{it} + \beta_6 creditdeposit_{it} + \beta_7 depositm2_{it} + \beta_{12} ratiocapital_{it} + \beta_{13} roe_{it} + \beta_{14} ratiocoutaurevenu_{it} + \beta_8 m2res_{it} + \beta_9 exterdebt_{it} + \beta_{10} opness_{it} + \beta_{11} dfi_{it} + \varepsilon_{it}$$

(15)

In the first place, we have estimated the set of these models on the two considered periods by means of fixed effects and random effects methods. In the second place, we have used the Hausman test to choose between these two methods. The results of this test validate the relevance of the fixed effects estimation method, since the chi-square probability of the Hausman test is significant at 1%.

The estimation results of models (16) and (17) are given in Tables 5 and 6, respectively. Model (16) concerns the estimation results of the period 1990-2006, while model (17) focuses on estimation results of the period 2007-2012.

Finally, we have evaluated the predictive quality of our set of models. The choice of a critical threshold, namely the critical probability above which the supervisor emits an alert, is inspired by the work of Kaminsky and Reinhart (1999). These authors suggest the use of a critical threshold that minimizes the noise-to-signal ratio, unlike Demirguc-Kunt and Detragiache (2005), who suggest the use of the sample crisis frequency.

The results of the test show that model (16.e) has a greater predictive power than models (16.a), (16.b), (16.c), and (16.d). Indeed, model (16.e) emits fewer false alarms than the other models (namely 37.14 %) and also has a lower noise-to-signal ratio (namely, 0.44). Thus, the specification that brings together the macroeconomic, financial, accountable, and external indicators seems to be the one best suited for the period 1990-2006.

Similarly, the results of this test show that model (17.d) has a better predictive power than models (17.a), (17.b), (17.c), and (17.e). Indeed, model (17.c) emits more accurate alarms (namely 69.00 %) and also has a lower noise-to-signal ratio (namely 0.71). This suggests that a specification that takes into account macroeconomic, financial and accounting indicators would appear to be the most appropriate for the period 1990-2012.

The estimation results of model (16.e) suggest that economic downturn characterized by a growth of real GDP and real interest rates and appreciation of the real exchange rate are robust banking crisis indicators at 1%. This supports the work of Borio and al. (2010) who argue that the banking crises from the 90s in the Nordic countries can be considered twin episodes because they were all found to correspond with simultaneous exchange rate crises. Indeed, in 1992, fears of devaluation of the Swedish krona and the Finnish markka triggered various speculative attacks against these currencies. To deal with these attacks and to defend their respective currencies, these countries significantly raised their interest rates, by more than 60% in Sweden and 15% in Finland, which significantly increased the fragility of the banking sector and the recession (Borio and al., 2010).

Similarly, the estimation results of model (17.e) suggest that a private credit boom, a decrease in the capital ratio and the growth of the ratio of costs to bank revenue are good indicators of banking crises. This suggests that the erosion of banking capital and the growth of banking charges are precursors of banking crises, which is in agreement with the work of Hays and al. (2009), Männasoo and Mayes (2009) and Barrell and al. (2010).

Table 5. Estimation Results of Logit Models of Banking Crises over the Period 1990-2006

Model (16) : Dependent Variable					
Variables	Model (a)	Model (b)	Model (c)	Model (d)	Model (e)
Returns_t	-2.05** (-0.029840)	0.45 (0.048122)	0.33 (0.036936)	1.41 (0.062829)	1.41 (0.050549)
gdpg_t	-2.48** (-0.622514)	-1.65* (-0.532871)	-1.74* (-0.647875)	-1.67* (-0.546290)	-2.96*** (-0.45918)
rir_t	3.46*** (0.092888)	2.79** (0.086240)	2.82*** (0.142907)	2.55** (0.274048)	3.06 *** (0.336072)
ver_t	1.14 (0.010512)	1.20 (0.028499)	0.41 (0.037164)	0.49 (0.048735)	2.31** (0.068359)
privcredit_t		2.82*** (0.072654)	1.93* (0.065686)	1.65* (0.110718)	1.90* (0.087406)

ratiocreditde-posit$_t$		-2.41**	-1.52	-0.20	1.34
		(-0.007815)	(-0.004154)	(-0.003208)	(0.003546)
ratiodepositm2		-3.43***	-2.93***	-1.79*	-0.78
		(-0.280375)	(-0.47593)	(-0.328627)	(-0.530227)
ratiocapital$_t$				-0.85	-1.98*
				(-0.592645)	(-0.603392)
roe$_t$				-0.96	0.33
				(-0.05384)	(0.047863)
ratiocostrevenu$_t$				1.75*	2.64***
				(0.177059)	(0.153894)
m2res$_t$			0.77		-2.07**
			(0.02900)		(-0.02951)
exterdebt$_t$			1.09		-0.18
			(0.005670)		(-0.009407)
opness$_t$			2.34**		2.33**
			(0.228135)		(0.165604)
dfi$_t$			-0.23		1.13
			(-0.137445)		(0.125702)
Number of crises	3	3	3	3	3
Observation	158	120	116	104	98
Log-likelihood	-38.99	-26.19	-20.05	-11.01	-9.78
LR chi2	29.10	49.98	60.88	45.07	37.76
chi2 of Hausman test	12.10	19.32	27.85	28.65	33.24
Effect	Fixe	Fixe	Fixe	Fixe	Fixe
Threshold Classification of 20 %					
% correct predictions	57.14	66.67	73.13	78.50	86.79
% crises correctly predicted	55.94	64.08	69.61	77.38	84.34
% flase alerts	72.41	60.66	53.45	50.00	37.14
Ratio Noise/signal	1.29	0.95	0.77	0.65	0.44

Notes: Ratio noise / signal =% false alarms compared to the % of correct crises ; t-statistic significant at the threshold of (***) 1%, (**) 5% and (*) 10%; () Coefficients.

Source: Authors' own work

Table 6. Estimation Results of Logit Models of Banking Crises over the Period 2007-2012

Model (17) : Dependent Variable					
Variables	Model (a)	Model (b)	Model (c)	Model (d)	Model (e)
$returns_t$	-3.05***	-2.18**	1.81*	1.65*	1.83*
	(-0.029013)	(-0.030984)	(0.029756)	(0.043033)	(0.064246)
$gdpg_t$	-2.61***	-0.50	-3.72***	-0.35	-0.70
	(-0.197041)	(-0.162857)	(-0.168214)	(-0.173729)	(-0.189329)
rir_t	0.82	2.38**	2.91***	0.64	-2.23**
	(0.072584)	(0.123538)	(0.288707)	(0.213353)	(-0.18926)
ver_t	2.77	2.63***	1.49	0.81	2.20**
	(0.048038)	(0.069458)	(0.049240)	(0.052523)	(0.063600)
$privcredit_t$		4.23***	2.89***	2.77***	2.21**
		(0.062747)	(0.078891)	(0.136620)	(0.153550)
$ratiocreditdeposit_t$		2.30**	2.35**	0.15	0.05
		(0.002265)	(0.003617)	(0.00610)	(0.003404)
$ratiodepositm2$		-4.28***	-4.92***	-2.70***	-2.06**
		(-0.163423)	(-0.326412)	(-0.402322)	(-0.47472)
$ratiocapital_t$				-1.73*	-1.92*
				(-0.773069)	(-0.817551)
roe_t				-1.78*	-2.19**
				(-0.098542)	(-0.087473)
$ratiocostrevenu_t$				2.15**	1.87*
				(0.108559)	(0.112308)
$m2res_t$			0.83		0.11
			(0.019715)		(0.015443)

exterdebt$_t$			3.21*** (0.004038)		0.29 (0.007143)
opness$_t$			3.75*** (0.206525)		-1.63 (-0.126561)
df$_t$			-1.88* (-0.147975)		-0.33 (-0.092384)
Number of crises	3	16	16	16	16
Observation	158	186	183	145	138
Log-likelihood	-38.99	-47.80	-37.62	-17.91	-15.38
LR chi2	29.10	75.89	97.50	76.39	78.60
chi2 of Hausman test	12.10	26.85	38.72	42.58	41.75
Effect	Fixe	Fixe	Fixe	Fixe	Fixe
Threshold Classification of 20 %					
% correct predictions	48.30	46.67	60.64	72.66	70.80
% crises correctly predicted	38.46	60.00	50.76	69.00	62.37
% flase alerts	69.36	58.12	58.04	49.21	47.30
Ratio Noise/signal	1.80	0.97	1.14	0.71	0.76

Notes: Ratio noise / signal =% false alarms compared to the % of correct crises ; t-statistic significant at the threshold of (***) 1%, (**) 5% and (*) 10%; () Coefficients.

Source: Authors' own work

Furthermore, the estimation results of model (16.e) show that a drop in the ratio of the money supply to foreign reserves and a higher degree of openness to international trade are good indicators of banking crises. These results contradict the theoretical and empirical literature, notably the work of Caprio and Klingebiel (1996) who show that the majority of countries that were affected by the banking crises suffered declines in their international trading of at least 10%, and a growth in the money-supply-to-foreign-reserve ratio.

The estimation results of model (17.d) show that the growth of market returns is that only macroeconomic variable that is a good predictor of banking crises at 10%. This contradicts the work of Kaminsky and Reinhart (1999), which shows that the period preceding financial crises is generally characterized by fluctuations in equity prices of about 40% compared to those recorded during non-crisis periods. However, these results corroborate those of Caballero (2010) and Claessens and al. (2010b) who found

that asset prices in the United States and other advanced countries grew by over 30% before the 2008 crisis to reach a threshold of over 60% just before the onset of the crisis.

Similarly, the estimation results of model (17.d) show that significant bank credit growth and a decrease in the deposit-to-M2-money-supply ratio are robust banking crisis indicators. Indeed, these results are broadly consistent with the work of Davis and Karim (2008) who argue that, working for profit maximization, the banks would lower their requirements for credit granting, offering risky loans to clients who are not necessarily creditworthy. In consequence, with interest rates growing, many borrowers would find themselves unable to meet their obligations. A significant percentage of loans would therefore become doubtful accounts, deteriorating the banks' balance sheets, which in turn would cause investors to lose confidence in the banking system. As a result, a bank-run will follow.

In addition, the estimation results of model (17.d) suggest that a higher ratio of costs to bank revenue, a decrease in the ratio of capital to total bank assets, and a smaller ratio of financial result to equity costs are robust banking crisis result indicators. These results are significantly compatible with the work of Männasoo and Mayes (2009) and Barrell and al. (2008).

In summary, as our results show, it seems that the only points shared between the banking crises of 2008 and those of the 90s in advanced countries are: private credit boom and the deterioration of bank balance quality measured by the decrease of the capital ratio, and the growth of the cost-benefit ratio.

Furthermore, unlike past crises, neither slowed economic activity, nor external shocks seem to have contributed to triggering the 2000s banking crises. Indeed, these crises seem to have been caused by the overvaluation of financial asset prices that had reached dizzyingly high levels.

Our results also validate the relevance of aggregated accounting indicators in the onset of banking crises in advanced economies. Indeed, the insufficiency of net equity leads to an increase in banking institutions' exposure to various sources of risk, such as, for example, credit risk, market risk, and operational risk, which reduces their ability to deal with shocks affecting their balance sheets (Gonzalez-Hermosillo and al., 1997 and Barrell and al., 2008). Similarly, the growth of banking costs relative to operating revenue reflects the ineffectiveness of the operational procedures used by bank directors and, more generally, the inefficient management of banking institutions. This can lead to deterioration of the institutions' profitability (Hays and al., 2009). However, the decrease in the financial profitability ratio, measured by the relation between the financial income and equity, does not seem to be a relevant indicator in cases of past crises. The decline of this ratio is generally a precursor to solvency problems (Grier, 2007).

We have tested, secondly, the robustness of the estimation results of multivariate logit

models for the two periods under consideration in this study by means of Bayesian model averaging (BMA).

Indeed, BMA has the advantage of taking into account different model combinations, weighting them according to their adjustments in the model. In addition, the BMA approach allows the estimation of each variable's coefficients as weighted averages of the group of models included in the model space. Thus, if we have 14 variables, the model space will consist of 2^{14} models, meaning 16 384 models. The weighting coefficients correspond to the posterior inclusion probability in each model in the model space.

The estimation results of model (18) more specifically the posterior inclusion probabilities (PIP), the expected posterior parameter values, the conditional posterior sign as well as the posterior variance parameters, are given in Tables 7 and 8. The estimation results of model 18.a that correspond to the 1990-2006 period are given in Table 7. According to table 7, the estimation results of the BMA model are broadly consistent with the results of model (16.e) by the multivariate logit approach (Table 5).

Table 7. Estimation Results of BMA Models of Banking Crises over the Period 1990-2006 (Model 18.b)

Variables	PIP	Post Mean	Post SD	Cond.Pos.Sign
$gdpg_t$	0.9999999	-0.13353645	0.02089559	0
rir_t	0.9999724	0.15534119	0.0269798	1
$opness_t$	0.8992601	0.0159717	0.00849031	1
$privcredit_t$	0.8288625	0.10632599	0.07031128	0.9999322
$ratiocapital_t$	0.8215073	-0.15760263	0.10689843	0.00000031
ver_t	0.6635472	0.02450355	0.02557618	1
$m2res_t$	0.6123305	0.03553483	0.04380036	1
$ratiocostrevenu_t$	0.5005264	0.16522002	0.25460909	1
$ratiocreditdeposit_t$	0.4758206	-0.0023855	0.00419197	0.00015362
$return_t$	0.4744605	-0.02688313	0.05047469	0.01499962
$ratiodepositm2$	0.4728869	-0.42110641	0.71890055	0.01872499
$exterdebt_t$	0.4341035	0.0042335	0.00830433	0.99952015
dfi_t	0.3947972	0.09860624	0.29774734	0.93293309
roe_t	0.375888	0.01361733	0.08101365	0.8047804

Note: PIP, Post Mean, Cond.Pos.Sign denote subsequently inclusion probability, a posteriori average, a posteriori variance and conditional posterior sign.

Source: Authors' own work

Similarly, the estimation results of model 18.b, which cover the 1990-2006 period are given in Table 8. According to table 8, the estimation results of the BMA model are broadly consistent with the results of model (17.d) by the multivariate logit approach

(Table 6). In contrast, contrary to the estimation results of the logit approach, which suggest the non-robustness of real interest rate growth as a banking crisis indicator, the estimation results of the BMA model confirm the relevance of this indicator. Furthermore, for most of the models in the BMA model space, the ratio of credit to banking deposits is significantly positive, unlike the results of the logit model.

Table 8. Estimation Results of the BMA Models of Banking Crises over the Period 2007-2012 (Model 18.b

Variables	PIP	Post Mean	Post SD	Cond.Pos.Sign
ratiocostrevenu$_t$	1	0.17269815	0.02548505	1
ratiodepositm2	1	-0.30048066	0.04172048	0
privcredit$_t$	0.963872	0.09407296	0.03701112	1
roe$_t$	0.9478391	-0.04140546	0.0178719	0
return$_t$	0.9076954	0.03398578	0.01724719	1
ratiocapital$_t$	0.7594058	-0.18177464	0.14174879	0
rir$_t$	0.6213379	0.11407877	0.11885064	0.99985226
ver$_t$	0.4711599	0.01748926	0.02687917	1
m2res$_t$	0.4499	0.02694111	0.04367449	0.98589573
opness$_t$	0.3439876	-0.01128604	0.01347132	0.03099666
gdpg$_t$	0.3426264	-0.09407158	0.26462416	0.00288535
ratiocreditdeposit$_t$	0.3085081	-0.00381585	0.01715114	0.04506733
exterdebt$_t$	0.3025314	0.00124951	0.00903262	0.8971883
dfi$_t$	0.299575	-0.08117392	1.66181598	0.27757243

Note: PIP, Post Mean, Cond.Pos.Sign denote subsequently inclusion probability, a posterior average, a posterior variance and conditional sign-post.

Source: Authors' own work

We may, in consequence, conclude that the results of the BMA approach, for the two studied periods, are broadly consistent with those obtained by the multivariate logit approach. Indeed, most of the indicators identified as good predictors of banking crises have preserved their sign and significance by means of the BMA approach. We can thus confirm the robustness of the estimation results of the multivariate logit approach. We can also conclude that the BMA approach is robust and can be used as an alternative to limited dependent variable models (logit) as an early warning system for banking crises.

Conclusion

This work provides a new perspective on banking crises by, on one hand, determining if the 2006-2007 banking crises in advanced economies have shared roots with the crises of the 90s, and, on the other hand, testing the relevance of aggregated accounting indicators in explaining these crises.

To this end, we have, first, identified banking crises indicators by means of a logit limited dependent variable approach on a cross-section of advanced economies during the period 1990-2006, which precedes the onset of the banking crises of 2007-2008, and during the period 2007-2012. Our results suggest the presence of certain similarities between the banking crises of 2007-2008 and the crises occurring in advanced economies in the 90s, which are: private credit boom and the deterioration of bank balance sheet strength, measured by a decrease in the capital ratio and a rise in the cost-benefit ratio. Furthermore, neither slowing down of economic activity nor external shocks seems to have contributed to triggering the banking crises of the 2000s, unlike past episodes of crises. Our results also validate the relevance of aggregated accounting indicators in the onset of banking crises in advanced economies.

Second, we have tested the robustness of results derived from the multivariate logit approach through Bayesian model averaging (BMA). In effect, the BMA approach has the advantage of taking into account model uncertainty by considering different model combinations, weighting them according to their adjustments in the model (Crespo Cuaresma and Slacik, 2009; and Babecký and al., 2012).

The results of the BMA approach have allowed confirmation of the robustness of the multivariate logit approach's estimation results, because most of the indicators identified as good predictors of banking crises by the logit approach have preserved their sign and significance through the BMA approach. We can also conclude that the BMA approach is robust and can be used as an alternative to limited dependent variable models (logit) as an early warning system for banking crises.

This study is not exhaustive. A possible extension of this research could be to test the predictive powers of the identified banking crisis indicators beyond our sample.

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Empirical Linkages between Trading Volume and Stock Markets Shocks: When Sentiments Drive Investors' Behavior

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Abstract: *In this paper, we examine the impact of investor psychological state on their trading volume for the US stock market using a VECM model for the period from July 1987 to May 2014. We propose alternative specifications for investors' sentiment considering their optimistic and pessimistic states. We find that during pessimistic periods, investors' are extensively alerted. In optimistic and normal periods, they are less attentive.*

Introduction

The relation between stock price changes and trading volume has received great attention in the field of finance over the past two decades. Among others, Hou and Li (2014), Dhaoui (2013) Dhaoui and Khraief (2014), Chen (2012), Campbell et al. (1993), Chuang et al. (2009), Griffin et al. (2007), Karpoff (1987), Lee and Rui (2002), McMillan (2007) Al-Jafari and Tliti (2013) have focused on the nature of connections between trading volume and stock returns. However, even the importance of empirical findings, there is no consensus on empirical results of these studies, which show different causality directions. The diversity of nexus can be attributed to the fact that these studies have been conducted for different countries, and focused on different periods, and variables as well as they used different econometric methodologies. As discussed in Karpoff (1987), evidence on the return-volume relationship not only enhances the knowledge on the financial market structure, but also provides information to discriminate between competing theoretical models (Chen, 2012). In the same line, Campbell et al. (1993) document that the return-volume relation helps solve the identification problem for testing different models.

In this vein, it is generally believed that trading volume is positively associated with stock returns. However, empirical findings failed in several cases to confirm this though. For instance, an early empirical study by Granger and Morgenstern (1963) failed to find a correlation between the absolute value of daily price changes and the daily volume for the New York Stock Exchange (NYSE) over the period 1939-1961. Subsequent studies have found, however, more evidence of a positive correlation (Crouch, 1970; Epps and Epps, 1976).

During the last two decades, the focus has moved to examine what factors drive the trading volume-stock return relationship? In the real economy, investors react to the change in stock returns by increasing or decreasing their trading volume. What factors drive their trading behavior is a substantial question to explore. In this framework, studies have started to examine the trading volume – stock prices relation by asking questions such as, "do investors increase their trading when expecting a rise in stock price", or "does change in stock prices induce changes in investor's psychological state leading to high/less trading".

Although the few numbers of researches set in this framework, several explanations are proposed in previous studies. The investor sentiment has, however, attached the attention of researchers as a substantial component that can explain the evolution of economies and the market components summarized in trading volume and stock prices and returns. In this vein, "*there is now significant body of evidence from psychology and brain science that agents experience cognitive problems in understanding the world in which they live; they find it hard to process the information they face and to make sense of it. As a result, they use simple behavioral and informational rules. In a complex economic world agents do develop strong differences in beliefs about how the economy functions*" (De Grauwe and Kaltwasser, 2007). The sentiment is, thus, proposed as one of the factors that could seriously affect their trading strategies.

This paper seeks to investigate the role of investor sentiments and opinions summarized in optimistic and pessimistic beliefs about the future evolution of the stock market in determining their levels of trading. We propose new proxies to these psychological states of mind and develop a VECM model to supervise the long-term equilibrium and the short-term adjustment of trading volume to the change in the investor psychological state.

Using data for US stock market over the period 1991 to 2014, we find that investors trading volume is determined by their pessimistic state. Optimism and pessimism shocks exert asymmetrical impact on the investors' behavior. Over the pessimistic period, pessimistic sentiment drives the stock market. The optimistic state is without impact. In normal economic cycles, sentiments are without significant impact.

The remainder of this article is arranged as follows. In section 2, we present the literature overview on the sensitivity of stock market components to the investor's psychological state. The section 3 presents the methodology of the study. Subsequent sections describe the data, the variables' specifications and the econometric approach. The final section gives the policy implications and conclusions.

Literature Review

Beliefs and sentiments as part of the irrational world are important forces not only in everyday life, but also in the economic and financial field. There is convincing evidence in literature that investors are prone to exogenous sentiment waves, a fact that challenges the rationality hypothesis. Researchers in behavioral finance have provided a considerable impetus towards the psychological state of investors in making decisions (Barberis et al., 1998; Baker and Wurgler, 2007; Huisman et al., 2012). In this line, Baker and Wurgler (2007) argued that investors' sentiment predictive content regarding the future evolution of stock markets may act as an invaluable tool for the investors in developing successful trading strategies.

Generally, sentiments refer to the state of mind of the investors. They represent in terms of Baker and Stein (2004) the investors' propensity to speculate or investors' optimism/pessimism about a stock. Investor sentiment can be defined as investors' misevaluation on an asset (Baker and Stein, 2004) or also the component of investors' expectations about returns that are not justified by fundamentals (Lee et al., 1991). From a psychological viewpoint investors' trading behavior is not undertaken in isolation, they would be influenced by their emotions, feelings and psychological state at that point in time. In a positive state, investors become more optimistic, which decreases their attentiveness. They are, consequently, more likely to stick to their normal trading levels. In negative state they become, however, more alerted react by decreasing abnormally their trading levels.

In this vein, several studies recognized, however, the important role of investor sentiment in driving stock markets. For instance, Kim et al. (2014) examine the sensitivity of the relationship between disagreement among investors and future stock market returns

to the influences of the investor sentiment. They find that the degree of investor sentiment exerts significant influences on the relationship between disagreement and future stock market returns. Their results show also that the influence significantly varies with the sentiment periods. Higher disagreement, among investors' opinions, predicts significantly lower future stock market returns during high-sentiment periods. During low-sentiment periods findings show no significant effect.

Kim and Kim (2014) examined whether investor sentiment forecasts stock returns, volatility and trading volume. They used extensive data on 91 firms spanning the period from January 2005 till December 2010. Their findings show in intertemporal and cross-sectional regression analysis, no evidence that investor sentiment has predictive power for future stock returns either at the individual firm or at the aggregate level. They find, however, that prior stock price performance positively affects investor sentiment. On volatility and trading volume, results show also non significant impacts. For Brown and Cliff (2005) investor sentiment does not predict short-term market returns at weekly and monthly intervals, but it predicts long-term market returns at the next two to three years.

Investors trading behavior is driven to a large extent by expectations about the current and future state of the returns. Changes in expectations, therefore, directly impact their trading behavior. An expected increase and decrease in returns, for instance, will influence the agents' psychological state and induce them to adjust their levels of trading and investment decisions. Investor sentiment describes waves of optimism and pessimism (Baker and Wurgler, 2006). It represents the "*expectations of market participants relative to a norm: a bullish (bearish) investor expects returns to be above (below) average, whatever average may be" (*Brown and Cliff, 2004).

It is reported that optimism leads to a higher level of trading whereas pessimism is associated to a lower or even an absence of trading. The stock market reflects optimistic and pessimistic opinions. When investors become more optimistic, i.e., when they expect for good events, trading volume levels rise. Oppositely, when they become more pessimistic, i.e., when they expect for bad events, they decrease their trading levels. Excessive optimism leads to an increase in trading volume since optimistic investors over-evaluate the future stock returns. Optimistic investors tend to systematically overestimate the probability that good things will happen to them and, at the same time, to underestimate the probability that bad things will happen (Weinstein, 1980). They overestimate the precision of their knowledge and their judgment skills and react by making aggressive decisions, which increase significantly their trading volume (buy or sell). In opposition, the more pessimistic investors estimate a negative evolution of returns and decrease or postpone their trading. When results go against the former (the latter) forecasts a state of shock occurs and affect their sentiments and feelings that we can define as an optimism shock (pessimism shock). "Optimism and pessimism shocks" refer to changes in expectations due to a perceived change in fundamentals which eventually does not materialize.

The role of undue optimism and pessimism for investors' behavior fluctuations has long been recognized by economists in the past. Keynes (1936, p. 154), for example, wrote about "animal spirits" influencing reality and creating waves of optimism and pessimism. He documented that the "*market is subject to waves of optimistic and pessimistic sentiment, which are unreasoning and yet in a sense legitimate where no solid basis exists for a sound calculation*". He added that about all of investors' decisions break with the foundation of rationality, and attributed the dysfunction of the economy to psychological components and non rational behavior. In this line, he argued that, "*most, probably, of our decisions to do something positive, the full consequences of which will be drawn out over many days to come, can only be taken as the results of animal spirits* [...] *and not at the outcome of a weighted average of quantitative benefits multiplied by quantitative probabilities*" (Keynes, 1936).

This challenge was being confirmed more recently when Akerlof and Shiller (2009) recognized the important role of investors' human psychologies in determining their investment behaviors. They have explained the way the economy works in terms of human psychology impacts. In the same framework, several authors such as Akerlof and Yellen (1985) argued that deviations from rationality do really matter, which confirms the significant dependence of investors' behavior to their psychological state.

King (2009) agreed with Akerlof and Shiller (2009) about the substantial role played the "animal spirits" behavior of investors in determining their investment strategies. He argued that an important part of economic fluctuations can be due to behavior biases. Moreover, many studies such as those of Azariadis (1981) and Woodford (1988) consider that thesefluctuationscan occureven in the situationwhere fundamentalconditions remain unchanged through the time. They attribute them, however, to the random wave of investors' beliefs often related to the optimistic and pessimistic state of thinking,.

Optimistic and pessimistic states of investors induce over and under-reactions in trading, respectively. For Ciccone (2003), investor sentiments and behaviors determine a substantial part of the stock market. Optimistic and pessimistic beliefs influence the extensively both the stock prices and trading volume and are reflected in them. Optimistic investors in the sense of Haruvy, et al. (1999) are "*those who tend to choose the strategy which can potentially give them the highest payoff*". These authors define optimistic investors as "*those who are motivated by worst-case scenarios and hence tend to choose a secure action*". According to Weinstein (1980, 1986, and 1989) and Otten (1989), optimistic investors overestimate the probability that positive events may happen to them than to others and similarly underestimate the probability that negative events may occur for them than for others. By extension, pessimistic investors attribute more probability of occurrence to negative events and less probability to positive events to which they are exposed. Accordingly, both optimistic and pessimistic investors adjust their trading strategies. The first react by trading aggressively, while the latter decrease (or postpone) their trading. In terms of trading strategies, Chen (2013) concludes that optimistic agents trade aggressively while pessimistic ones trade conservatively. These trading strategies are due to the fact that the optimistic investors (pessimistic investors)

tend to systematically overestimate (underestimate) the probability that good events will happen to them and, oppositely, underestimate (overestimate) the probability that bad things will happen. This can be understood in the sense that optimistic and pessimistic investors attribute dispersed probabilities to the risk perception.

Specifically, optimistic investors' underestimate their exposure to risk and exaggerate their reaction since they expect only positive results and neglect the failure. In this vein, Shu (2010) argued that optimistic investors are less patient than those who are more pessimistic and react aggressively by underestimating their exposure to risk. Oppositely, the more pessimistic investors display a high-level of risk aversion. They become more and more receding when they make a decision like an investment in risky assets which leads to a decrease in trading volume.

Chuang et al. (2010) use weekly data during the period between January 1990 and December 2004 to supervise the change in investor sentiments in Taiwan Stock Market. They find that the change in trading volume can be used as a proxy for investor sentiments. They argued that a positive deviation of trading volume implies that investor sentiment jumps to become more optimistic and vice-versa.

In the French stock market framework, Rousseau et al. (2008) argued that pessimistic investors decrease their trading volume and avoid risky assets to prevent a loss. Psychological literature assimilates the pessimism to a statement of impotence or to an absurdity of human existence. In other side, the author's find that optimistic investors increase their trading volume and invest more in risky assets waiting for more performance in the future. As more risk adverse agents, pessimistic investors decrease or postpone their trading when they realize negative results. However, they maintain the same trading level once obtain abnormal profits. Optimistic investors trade aggressively after abnormal gain. They maintain normal trading when negative results are realized.

Carver, Scheier and Segerstrom (2010) suggest that optimism and pessimism sentiments focus on expectancies for the future and the way that the investors confront problems. The authors find that optimistic investor faces adversity differently than pessimistic one. They presume that optimistic investor uses more adaptive ways and "commit" himself to cope with the worst scenarios. In contrast to optimism, pessimism refers to fear, doubt and stress. Then, pessimistic investor tends to be hesitant and doubtful in the face of different challenges. Generally, the optimistic person assigns a low probability to the bad events that arrive to disturb his life. He assigns, in return, a high probability to the good events. The pessimistic person over-weights the probability of bad event and underestimates the probability of good events.

For Ali and Gurun (2009), individual behavior depends on both their psychological state and the characteristics of the period during which they are used to act. The authors echoed the view that optimism decreases the attentiveness of investors. To surmise, individuals are more alert during pessimistic periods and less attentive at optimistic times. In the same line, Chung et al. (2012, p. 219) suggest that "*when the*

economy is in expansion, investor optimism grow as reflected by the increase in sentiment. In contrast, investor sentiment tends to decrease when the economy is in contraction". As argued by Brown and Cliff (2005), when investor sentiment increases with the market price, the build-up of optimism leads to an extended period of market overvaluation. In contrast, investor's growing pessimistic beliefs in bad times may result in assets being underpriced.

Data and Methodology

In this section we initially describe the sample period and the variables. Then we analyze the time series properties of the relevant variables by means of conducting unit root and cointegration tests. Finally, we review previous specifications of investor sentiment indicators and we propose an alternative specification for optimism and pessimism shocks that we use in the empirical analysis.

Data

We use weekly data to analyze the impact of the stock market fluctuations on trading volume for the period 1987:07-2014:05. The starting date of the sample period is determined by the availability of weekly data on trading volume. The whole sample includes 1401 time series observations. We collect the data on the stock price index (P_t) and trading volume (V_t) from the Yahoo Finance pages. Following previous empirical studies on stock returns and trading volume, we include the following variables in the analysis: stock market returns, trading volume, investor sentiment indicators expressed in terms of optimism and pessimism. That is, we collect the following time series data.

- Stock prices. In this paper, we use the stock market returns expressed in percentages defined as the first logarithmic difference of the stock prices multiplied by 100: . This measure is already used by Chen (2012).

- Trading volume. The trading volume measures the volume of transaction. This variable is expressed in natural logarithm.

- The Market Trend (MT) expresses Bullish and bearish evolution of the stock market. Following previous studies the market trend is defined as the difference between the closing prices and the x-days lowest prices divided by the difference between the x-days highest prices and the x-days lowest prices. Based on the Schwarz Information Criterion (SC) lag length criteria we choose x=3 days. That is, the market trend is expressed following this relation:

$$MT = \frac{Closing\ Prices_t - Lowest\ Prices_{t,t-3}}{Highest\ Prices_{t,t-3} - Lowest\ Prices_{t,t-3}}.$$

Investors' sentiment specifications

Previous studies used two types of sentiment indicators that differ for daily and weekly returns due to data availability. The first family of indicators consists of the OEX put-call trading volume ratio, the OEX put-call open interest ratio and the NYSE ARMS index. The second family of indicators is compiled from surveys by the American Association for Individual Investors (AAII) and Investor Intelligence (II). These indicators are used for investigating individual stocks. Since we use aggregate stock market data, we propose alternative specifications for investors' sentiment, allowing supervising their optimistic and pessimistic expectation shocks. We define "optimism shocks" as an event that occurs when an investor expects the bullish market trend and react therefore expecting realizing a positive return however their expectations does not materialize. Similarly, a "pessimism shocks" occurs when investors expect a bearish market trend and react anticipating a decrease in returns and therefore reduce their trading volume (hold or postpone), however results indicate positive reaction of returns and investors miss consequently an opportunity.

In this paper, and taking into account that investors' levels of trading are driven by their psychological state and that the disparity between forecasts and results determines the sentiment shock we propose the following approach to specify the optimism and pessimism shocks. We start by presenting preliminary specifications describing the analysis strategy of investors to finish by presenting new proxies for optimism and pessimism shocks.

- Percentage changes in Stock market prices. This variable is defined as the first difference of stock market prices reported to the market price at time t-1 and is computed as $\Delta P_t = (P_t - P_{t-1}) / P_{t-1}$) x 100, where P_t is the Stock market price at time t. Stock market return variation allows to supervise both stock market returns increases and stock market returns decreases. The changes in stock market returns give a substantial illustration of the stock market specific shocks. The specific shock includes positive and negative shocks.

- Positive specific shock. This variable only considers increases in stock market returns, that is . This relation specifies the positive stock market specific shock.

- Negative specific shock. This variable only considers decreases in stock market returns, that is . This relation specifies the negative stock market specific shock.

The expectation of stock market returns increases and decreases and the expected market trend drive the investors' behavior expressed in terms of their trading intensity. Investors increase (decrease) their trading volume when expecting a bullish (bearish) market trend and positive (negative) changes in stock prices. If results go against their expectations the investors support an optimism (pessimism) shock since the loss they realize are due to unrealistic expectation and are not determined by the intrinsic unfavorable evolution of supply and demand orders (supply-demand law).

Thus, based on their expectations of the market trend and the evolution of the stock market returns (increases and decreases) investors express optimistic and/or pessimistic feelings and modify their trading volume accordingly. The analysis of the changes in expected market trend and the aggregate stock market returns allows distinguishing between the two types of shocks affecting investors' sentiment: optimism and pessimism shocks. The optimism shocks (OS_t) specification is described as follows:

$$OS_t = \Delta P_t, \quad if \quad sign(\Delta P_t) \neq sign(\Delta MT_t) \tag{1}$$

and   0 ,   otherwise
and pessimism shocks (PS_t) is,

$$PS_t = \Delta P_t, \quad if \quad sign(\Delta P_t) = sign(\Delta MT_t) \tag{2}$$

and   0 ,   otherwise

where ΔP_t and MT are the growth rate of stock market prices and the market trend, respectively, at the time t. that is, a stock market price change is defined as an optimism shock if the sign of the stock market price variation is different from the sign of the market trend variation, while it is identified as a pessimism shock if these signs are equal. For example, a stock market price increase (decrease) together with a market trend increase (decrease) will be identified as a pessimism shock, while a stock price increase (decrease) associated with a market trend decrease (increase) will be identified as an optimism shock. Figure 1 shows the temporal evolution of trading volume, stock prices (specific shock) and optimism and pessimism shocks and justifies the new specification we propose in this paper. For example, we observe that the increase in trading volume in Mars 2000 corresponds to significant specific shock price (global shock in prices), optimism shock and pessimism shock, together. For the period spanning the end of 2000 to recent date we observe that while optimism shocks remain nonsignificant, the stock price and pessimism shocks indicator follow a similar path and determine the trading volume evolution. Since pessimism shocks describe the investors' expectation of negative evolution of stock markets in terms of prices and returns, and the last selected period corresponds to a series of financial scandals and recessions, this evolution observed in Fig. 1 provides a real illustration of the investors' behavior following their optimistic and pessimistic expectation of the stock market evolution.

Figure 1. Temporal Evolution of Trading Volume, Specific Shocks, Optimism Shocks and Pessimism Shocks
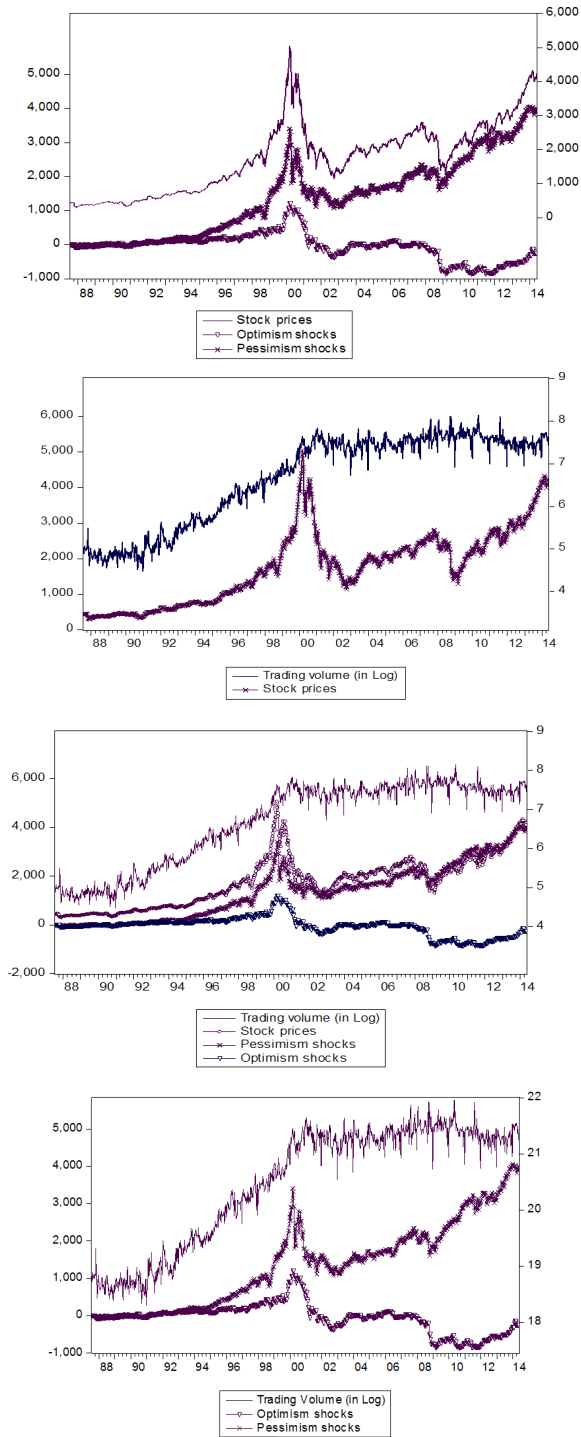
We observe also a break point in the first half of the year 2000 characterized by tremendous bull followed by a period of high fluctuation of prices and trading volume. The sentiment indicators move extensively over the period 2000 to now with a strong degradation in optimistic state and at fast speed.

Table 1 contains summary statistics of our selected variables. Results display excess kurtosis (with the exception of the trading volume), negative skewness. As regards to the standard deviation we notice a quite small standard deviation for the stock return and the trading volume, which indicates that these variables are close together. Oppositely for the sentiment shock indicators (optimism and pessimism), we notice a large standard deviation which indicates that these variables are more spread out.

Table 1. Descriptive Statistics

	Stock Return	Trading volume	Optimism shock	Pessimism shock
Mean	0.163660	20.48683	-0.138087	2.856517
Median	0.350174	21.08096	0.000000	0.000000
Maximum	17.37695	21.96302	201.9800	608.2700
Minimum	-29.17528	18.29180	-297.8800	-1,125.160
Std. Dev.	3.129302	1.060491	27.84315	68.70475
Skewness	-1.137603	-0.637576	-2.306248	-3.133827
Kurtosis	12.43302	1.836465	32.06180	64.23620
Jarque-Bera	5,492.580	173.9472	50,544.76	221,192.0
Probability	0.000000	0.000000	0.000000	0.000000
Observations	1,400	1,401	1,401	1,401

Note: this table shows summary statistics. Column 1 reports the results for the stock returns, column 2 reports the results for the trading volume (in log), column 3 and 4 report the results for optimism and pessimism shock indicators.

Results and discussion

Traditionally, correlation coefficients are used as the main analytical tool for describing the relations among a group of variables. However, under certain conditions using cointegration instead of correlation may have important advantages, because cointegration allows us to find and identify possible common trends, if they exist (Baxa, 2007). Before running cointegration tests we are used to run unit root tests to identify if the series are cointegrated and if yes to determine the order of cointegration. Unit root tests are conducted to investigate whether the selected series are stationary. The results of the Augmented Dickey Fuller, (ADF) test, the Phillips-Perron (pp) test

and the Kwiatkowski, Phillips, Schmidt, and Shin (KPSSS) tests are reported in Table 2. Results of the unit root tests confirm the presence of a unit root in level for each selected series. The hypothesis of the presence of a unit root is rejected in the first difference. All selected series are, consequently, cointegrated in order one I(1).

Table 2. Unit Root Tests (variables: Stock price, Trading volume, Bias of Optimism, Bias of pessimism)

Variable	ADF	PP	KPSS
In level			
Stock Price	-2.029854	-1.993181	0.248917***
Trading Volume	-2.570678	-1.059624	0.575137***
Optimism shock	-1.700311	-1.883497	0.651798***
Pessimism Shock	-2.466497	-2.483773	0.231078***
1ˢᵗ Difference			
Stock Price	-38.54587***	-38.54504***	0.069230
Trading Volume	-17.58161***	-114.3456***	0.062912
Optimism shock	-35.23835***	-35.39480***	0.089760
Pessimism Shock	-44.83261***	-45.84355***	0.048352

*Note: ADF, PP and KPSS are Augmented Dickey Fuller, Phillips-Perron and Kwiatkowski, Phillips, Schmidt, and Shin test statistics, respectively. In ADF and PP, the null hypothesis is that the series has a unit root. In KPSS the null hypothesis is that the series is stationary. *** denotes 1% significance level. Lags in ADF test are chosen by Schwarz Information Criterion (SC). For all Unit Root tests, the test equation includes trend and intercept.*

Once the order of integration of each variable is established, we then evaluate whether the variables under consideration are cointegrated. According to Engle and Granger (1987), a linear combination of two or more nonstationary series having a same integrating order may be stationary. If such a stationary linear combination exists, the series is considered to be cointegrated and long-run equilibrium relationships exist. Cointegration implies that causality exists between the two variables, but it does not indicate the direction of the causal relationship. The Johansen cointegration test based on the autoregressive representation discussed by Johansen (1988) and Johansen and Juselius (1990) constitutes the most commonly used method. The results for the Johansen and Juselius cointegration tests are reported in Table 3.

Results in Table 3 show that there are cointegration vectors. The Table includes the ranks given in the first line, the number of cointegration vectors in line 2 and eigenvalues and trace statistics. The critical value is mentioned using asterisks.

Table 3. Johansen and Joelius Cointegration Tests (variables Trading volume, Stock Market Returns, Supply shocks, Demand shocks)

	r = 0		r ≤ 1		r ≤ 2		r ≤ 3	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Trace statistic	353.2420***	376.5302***	22.99796	45.15492**	5.713970	19.09174	0.087136	5.626271
Max-Eigen stat	330.2440***	331.3753***	17.28399	26.06318**	6.626834	13.46547	0.087136	5.626271

*Note: (1) model with an intercept. (2) model with an intercept and a linear trend. R: number of cointegration vectors. *, ** and *** denote rejection of the null hypothesis at the 10%, 5% and 1% levels of significance, respectively. In column 2 (r=0) we test the null hypothesis of no cointegration against the alternative of cointegration. In column 3 we test the null hypothesis of 0 or 1 cointegrating vector against the alternative of r=2. The lag length in all the tests has been selected according to the Schwarz Information Criterion (SC).*

The null hypothesis is that the number of cointegrating relationships is equal to r, which is given in the "maximum rank" observed in the first line of the Table 4. The alternative is that there are more than r cointegrating relationships. We reject the null if the trace statistic is greater than the critical value. We start by testing H_0: r=0. If this null hypothesis is rejected, we repeat for H_0: r=1. The process continues for r=2, r =3, etc. The process stops when a test is not rejected. In our case, results from cointegration tests with an intercept and a linear trend show that we can reject H_0: r=0 since the trace statistics are greater than the critical values. Results show also the rejection of the H_0: r=1 based on the cointegration tests with an intercept and a linear trend. Finally, for r more than the aforementioned rank results indicate to stop to reject the null hypothesis because the trace statistics become less than their critical values. Consequently, we can conclude that there are 2 cointegration vectors. The existence of one or more cointegration vectors explains that the variables have a long run relationship and we should continue to use VECM (Vector Error Correction Model).

Based on these findings, the long-run equilibrium relationship is given by the following relation (results for long-run cointegrating equation):

$$V_t = -16.55593 - 10.98560\, R_{t-1} - 0.000692\, OS_{t-1} - 0.001610\, PS_{t-1} + \varepsilon_t \qquad (3)$$

$$(-19.2067) \qquad (-0.51491) \qquad (-3.48351)$$

t-statistics are given in ( ). Since the selected series are cointegrated, a VECM is set up for investigating short-run and long-run causality. In the VECM, the first difference of the endogenous variable (trading volume in log) is regressed on a 3 period lags of the cointegration equation. The VECM contains the cointegration relation built into the specification so that it restricts the long-run behavior of the endogenous variable to converge to its cointagrating relationship while allowing for short-run adjustment dynamics. The error correction model can be written by the following equations:

$$\Delta V_t = \beta_{10} + \sum_{i=1}^{k11} \beta_{11i}\Delta V_{t-i} + \sum_{i=1}^{k12} \beta_{12j}\Delta R_{t-j} + \sum_{i=1}^{k13} \beta_{13m}\Delta OS_{t-m}$$
$$+ \sum_{i=1}^{k14} \beta_{14n}\Delta PS_{t-n} + \beta_{15}ECT_{t-1} + \mu_{1t}$$

(4)

$$\Delta R_t = \beta_{10} + \sum_{i=1}^{k21} \beta_{21i}\Delta R_{t-i} + \sum_{i=1}^{k22} \beta_{22j}\Delta V_{t-j} + \sum_{i=1}^{k23} \beta_{23m}\Delta OS_{t-m}$$
$$+ \sum_{i=1}^{k24} \beta_{24n}\Delta PS_{t-n} + \beta_{25}ECT_{t-1} + \mu_{2t}$$

(5)

$$\Delta OS_t = \beta_{30} + \sum_{i=1}^{k31} \beta_{31i}\Delta V_{t-i} + \sum_{i=1}^{k32} \beta_{32j}\Delta R_{t-j} + \sum_{i=1}^{k33} \beta_{33m}\Delta OS_{t-m}$$
$$+ \sum_{i=1}^{k34} \beta_{34n}\Delta PS_{t-n} + \beta_{35}ECT_{t-1} + \mu_{3t}$$

(6)

$$\Delta PS_t = \beta_{40} + \sum_{i=1}^{k41} \beta_{41i}\Delta V_{t-i} + \sum_{i=1}^{k42} \beta_{42j}\Delta R_{t-j} + \sum_{i=1}^{k43} \beta_{43m}\Delta OS_{t-m}$$
$$+ \sum_{i=1}^{k44} \beta_{44n}\Delta PS_{t-n} + \beta_{45}ECT_{t-1} + \mu_{4t}$$

(7)

where V_t, R_t, OS_t, OP_t, and μ_t denote respectively the trading volume, the US stock market return, the optimism shock, the pessimism shock and the error term that follows a Gaussian white noise. Δ and ECT denote respectively the difference operator and the error correction term. The significance of coefficients (β_i) of the explanatory variables is mentioned as the presence of causality in the short-run.

The sources of causality can be identified from the significance test of the coefficients of the independent variables in the VECM. Regarding the causality of the short-run, we can test the nullity of the parameters associated with independent variables in each equation of the VECM using the χ^2-Wald statistics. The causality in the long-run can be tested by the significance of the speed of adjustment. We use the t-statistics of the coefficients of the ECT, which indicate if there are long-run causal effects. The VECM is estimated by the maximum likelihood method. The lag length is selected based on the Schwarz Information Criterion (SC). Table 4 reports the estimation results of the error correction model.

Table 4. Estimation Results of the Error Correction Model

		ΔV_t	ΔR_t	ΔOS_t	ΔPS_t
Long-Run	ECT_{t-1}	-0.001365*** (-3.59991)	0.065754*** (7.09957)	-0.224868** (-2.98751)	0.039604 (0.19696)
Short–Run	ΔV_{t-1}	-0.408973*** (-15.4225)	-0.695147 (-1.07359)	0.871704* (0.16565)	-9.116828 (-0.64854)
	ΔV_{t-2}	-0.263721*** (-9.47188)	-0.270062 (-0.39725)	9.833475* (1.77981)	-22.31821 (-1.51212)
	ΔV_{t-3}	-0.169219*** (-6.39327)	0.510835 (0.79042)	1.389072 (0.26447)	5.530460 (0.39416)
	ΔR_{t-1}	-0.009825** (-2.70055)	-0.064034 (-0.72084)	0.447755 (0.62022)	-0.243761 (-0.12639)
	ΔR_{t-2}	-0.005755** (-2.01192)	-0.039960 (-0.57218)	0.477611 (0.84149)	-1.638778 (-1.08082)
	ΔR_{t-3}	-0.000710 (-0.58483)	-0.003274 (-0.11048)	0.057854 (0.24022)	-0.029865 (-0.04642)
	ΔOS_{t-1}	-0.000217 (-1.18422)	-0.018694*** (-4.17484)	-0.143152*** (-3.93382)	-0.057933 (-0.59594)
	ΔOS_{t-2}	-0.000215 (-1.15896)	0.005500 (1.21632)	0.032880 (0.89473)	0.194400** (1.98023)
	ΔOS_{t-3}	-0.000153 (-0.83521)	-0.004993 (-1.11262)	0.041295 (1.13230)	-0.151832 (-1.55845)
	ΔPS_{t-1}	-0.000265** (-2.58276)	-0.006534** (-2.60411)	0.058286** (2.85838)	-0.153062** (-2.80984)
	ΔPS_{t-2}	-0.000019 (-0.18324)	0.002094 (0.82501)	0.056732** (2.75085)	0.034117 (0.61925)
	ΔPS_{t-3}	-0.000081 (-0.78388)	-0.001451 (-0.57287)	0.025596 (1.24320)	-0.097307* (-1.76920)
	Intercept	0.004230 (1.22578)	0.014572 (0.17295)	-0.576218 (-0.84154)	3.512770* (1.92043)
	R-squared F-statistic	0.169733 21.73266	0.497593 105.2891	0.182855 23.78877	0.042325 4.698309

*Note: this table shows the results for the VECM model. The first line reports the results for the long run equilibrium. Lines 2 to 13 reports results for the short term run. The first column reports results for the trading volume, column 2 reports results for the stock returns, column 3 and 4 report results for optimistic and pessimistic shock indicators. *, ** and *** denote rejection of the null hypothesis at the 10%, 5% and 1% levels of significance, respectively. The lag length in all the tests has been selected according to the Schwarz Information Criterion (SC).*

Results in Table 4 shows a negative sign of the cointegration equation coefficient for the Trading Volume and the optimism shocks equations at 1% and 5% level of significance, respectively. This result confirms the existence of long-run equilibrium relationships. We notice however that the endogenous variable converge to its cointagrating relationship with a lower adjustment speed for the trading volume equation and a speedy adjustment for the optimism shocks equation. As regards the short-run causality, results show significant sensitivity of the changes in trading volume to its historical variations, to the stock market specific shocks and to the pessimism shocks with a negative sign and a high sensitivity to their experiences in trading and a less sensitivity to their feelings and psychological perception of the market evolution. This result is confirmed by the impulse response functions of the trading volume to the different types of shocks (specific shock, optimism and pessimism shocks).

Figure 2 shows the generalized impulse response functions of trading volume to a shock affecting the following variables: (i) stock market returns (specific shocks); (ii) optimism; (iii) pessimism. We find that the response of the trading volume of the US market shocks may differ depending on the nature of the impulse variables. The main results can be summarized as follows.

First, we find nonsignificant effects of the stock market returns (specific shocks) and the optimism shock in the short-term (about the first two weeks). Starting in the third week the trading volume reacts significantly and positively to the stock market returns. The response to the optimism shock is negative and remains quite smoothed. We find also a significant and negative response of trading volume to pessimism shocks. The speed of response is very faster than that observed in the stock market returns and the optimism shocks (after 1 week for the pessimism vs. after about 2 to 3 weeks for the stock returns and the optimism). The high sensitivity of trading volume to the pessimism component is due to the effect of the series of negative events that characterized the economic system in the US during the selected period and that exerted significant impact on the psychological state of investors.

Figure 2. Generalized Impulse Functions of Trading Volume to Stock Market Returns and Shocks of Optimism and Pessimism

Response of Trading Volume to Stock Market Return Innovation

Response of Trading Volume to Optimistic Innovation

Response of Trading Volume to Pessimistic Innovation
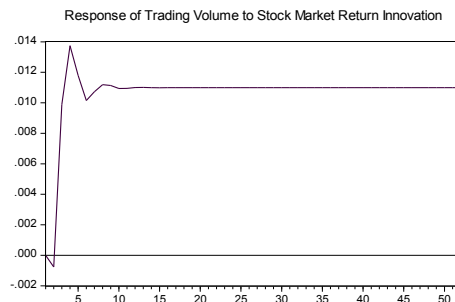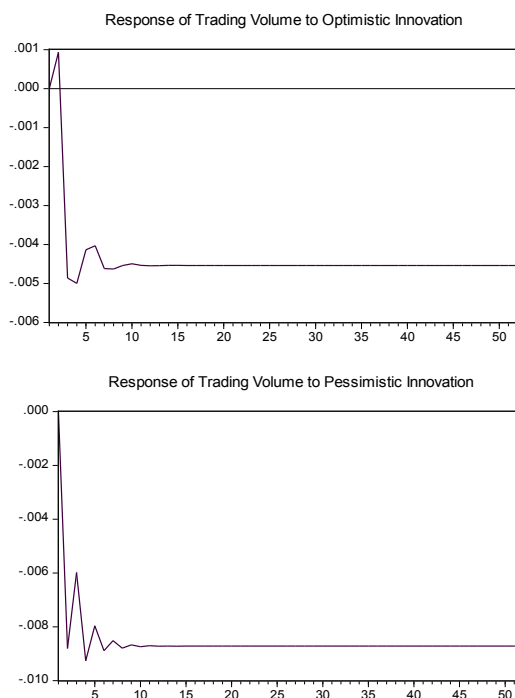
Conclusion

The relation between trading volume and stock price changes has received considerable attention over the past two decades in the field of finance. Several authors attribute, however, the disparity in results to exogenous effects associated in part to the change in the psychological state of investors. This paper analyzes the response of trading volume to the change in investors' psychological state. Waiting for good or bad results, investors express optimistic and pessimistic states of mind. Investors who wait for a positive evolution of stock market react aggressively and increase their trading volume. Once the stock market moves in the opposite sense and their expectations don't materialize, they loss of confidence and assume an optimism shock. When they wait for bad results and decrease, therefore, their trading, however the state of returns be a success, they assume a pessimism shock. The sample includes 1401 time series observations over the period 1987:07-2014:05. The results we obtained based on the Johansen and Joelius cointegration tests and the VECM model show a higher sensitivity of investor's trading behavior to their pessimistic forecasts than to their optimistic forecasts. The US stock market reacts more significantly following a pessimism shock than to an optimism shock. This result suggests that investors overweight the probability of bad event and underestimate the probability of good events and is in line with previous predictions in literature (see, for example, Carver et al. 2010; Weinstein, 1980; Chen, 2013). The extensive sensitivity of investors trading levels to pessimism shocks can be due to a series of pessimistic events that happened in the US over the selected period, which

push the US market to become more pessimistic and significantly sensitive to all events able to affect directly or indirectly the US economy. Psychological viewpoint confirms the American investors' psychological state. In fact, optimistic sentiment can be built across the time, but is broken after a simple shock.

In regard to the validity of the results we found the pessimistic state of the US stock market is due to the series of events the US has sustained over the last two decades. In major, these events have occurred inside the US country. In fact, the US has experienced a long period of turbulence starting with the first war in Irak of 1991 known as the "*Operation Desert Storm*" (17 January 1991 to 28 February 1991) to the bursting of the Internet bubble in Mars 2000, the attack of 11 September, the war in Afghanistan (07 October 2001), the series of failures and scandals that affect the telecommunication and technology giants (World-com failure in 2001-2002, the Enron failure in 2001 and the Tycho-electronics failure in 2002), …), the second war in Irak (20 Mars 2003 to 15 December 2011), the subprime crisis. These events have influenced sensitively the psychological state of the population and in particular of the investors. This period has been one of the most pessimistic period that knows the US. This has induced a substantial change in the investors' psychological state. Rational expectation losses of popularity and the investors expressed irrational behaviors. They have expressed heterogeneous psychological states moving from optimistic to pessimistic feelings and sentiments. Their decisions have been driven by their state of sentiment varying from optimism to pessimism. The intensity of negative events has feed in the investors a sense of pessimism and determined their trading strategies which explain the aforementioned results we find in this study. This behavior expressed by the investors over the aforementioned pessimistic period is in line with the findings of Ali and Gurun (2009) who document that investors are more alert during pessimistic periods and less attentive at optimistic times.

One of the important contributions of this paper is to introduce the first specifications of optimistic and pessimistic shocks. However, although this contribution one of the limitation is to incorporate observations describing the individual investor sentiments such as those issued from the AAII and II indicator weekly published by the American Association of Individual Investor.

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An Empirical Analysis of Real Deposits in Nigeria

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Abstract: *The difference between estimated parameters of money supply and currency-deposit ratio is used to examine the behaviour of real deposits in Nigeria between 1960 and 2012. This is done using unrestricted error correction modelling within the bounds testing approach to cointegration proposed by Pesaran et al. (2001). Our findings revealed that inflation, real income and interest rates remain major factors influencing real deposit dynamics in Nigeria. Interestingly, financial innovation measured by the ratio of credit to the private sector and GDP was found to increase real deposits by 0.014% while the shadow economy accounted for the 0.96% fall in real deposits recorded. While interest rate and inflation remain quantitatively important in explaining long-run real deposit behaviour in Nigeria, our finding further underscores the need for monetary authorities to mainstream the informal sector into the financial system given the significant negative influence the shadow economy exerted on real deposits.*

Introduction

A requisite component of economic growth and development is a well-functioning financial system characterised by a banking sub-sector that efficiently intermediates between surplus and deficit holders of funds. In a developing economy like Nigeria where the non-bank component of the financial sector is limited, problems in deposit money banks (DMBs) are instantly transmitted to the rest of the economy (Olofin and Afangideh, 2008). This is in view of the fact that commercial banks facilitate a bulk of financial transactions. Nevertheless, banking dominance of the Nigerian financial system has, however, dropped as controlled financial system assets fell from 90.5% in 2006 to 78.6% in 2011 (IMF, 2013).

The main sources of the banking liquidity in Nigeria are public and private sector deposits which DMBs transmit to deficit holders of funds. However, growth rate of deposits have been lopsided in recent times as the rate fell from 65% in 2008 to -11.3% and -1.6% in 2010 and 2012, respectively (International Monetary Fund, 2013). It follows therefore that a negative shock to the depositary base will inhibit the flow of credit, constrain development of domestic industries and adversely affect economic growth. Therefore, factors influencing savings' decisions of households and firms become important determinants of a stable banking sector with particular reference to its intermediation role.[i]

An assessment of real deposits has gained ample attention in the literature (See Tvalodze and Tchaidze, 2011 for Georgia; Kibet, Mutai, Ouma, Ouma and Owuor, 2009 for Kenya; Dadkhah and Rajen, 1988 for India; Felmingham and Qing, 2001 for Australia; Hasan, 2001 for China; Mutluer and Yasemin, 2002 for Turkey; Lucas, 1988 for US; Vega, 1998 for Spain). Similarly, the behaviour of real deposits has been analysed within the context of currency deposit ratio. In this regard, Khaskeli, Ahmed and Hyder (2013) analysed the behaviour and determinants of the currency deposit ratio in Pakistan based on the notion that an increase in currency in circulation reduces deposits and invariably, loanable funds. This is because an increase in the volume of currency in circulation implies that deposits are being withdrawn from the banks, which restrict their ability to meet investors' credit demand.

Research on the factors affecting real deposit creation in Nigeria is scanty, as inadequate attention has been given to the behaviour of real deposits with specific reference to the dynamic interaction of money supply and currency in circulation. The dominant strand of literature has focused on estimating the determinants and behaviour of real deposits (See Nwachukwu and Odigie, 2009; Odemero, 2012; Uneze, 2013; Nwachukwu and Egwaikhide, 2007, Nwachukwu, 2011) while some others have inferred real deposit behaviour on the basis of money demand models (See Aschani, 2010; Kumar, Webber and Fargher, 2010; Chukwu, Agu and Onah, 2010; Omotor, 2010; amongst others). It is against this background that this study departs from the literature by examining the behaviour of the real deposits in Nigeria by considering the difference between estimated broad money balance (money supply) and currency deposit ratio.[ii]

An investigation of the behavioural patterns of real deposits in Nigeria is expected to play a pivot role in formulating and fine-tuning financial sector and monetary policies, respectively. Notably, a major component of such policy considerations is increased transmission of funds to the real sector; particularly geared towards stimulating non-oil sector growth that has remained at the forefront of government's policy objectives over the years. For an emerging economy like Nigeria with high savings and investment gaps, enhanced real deposit is critical for sustained "trickle-down" growth. This is further exacerbated by the crucial role of domestic saving mobilisation in the sustenance of domestic saving-investment-growth chain in developing economies (Nwachukwu, 2011). Moreover, the level of domestic saving and its determinants will not only help ascertain the policy variables that should be considered in macroeconomic policy formulation, but stimulate the much needed credit for real sector development.

The empirical analysis is premised on annual data between 1960 and 2012. We utilise the bounds testing approach to cointegration, developed by Pesaran*et al.* (2001) within an autoregressive distributed lag (ARDL) framework, to test for a long-run level relationship. The bound testing approach has certain advantages in comparison to other cointegration procedures (such as Engle and Granger, 1987; Johansen and Juselius, 1990). Firstly, endogeneity problems and inability to test hypotheses on the estimated coefficients in the long-run associated with the Engle-Granger (1987) method are avoided. Secondly, the long and short-run parameters of the model in question are estimated simultaneously. Lastly, the approach is relieved of the burden of establishing the order of integration amongst the variables and of pre-testing for unit root. The study is organised as follows: Section two examines the trend and behaviour of real deposits in Nigeria while Section three discusses the related literature. Analytical framework and estimation techniques are explored in Section four while Section 5 concludes and highlights policy implications.

Facts about Real Deposits and its Potential Determinants

A remarkable development in the Nigerian financial sector that is directly related to real deposits formation is the recent increase in electronic (e-card transactions). The value and volume increased accordingly from 195,525,568 and N1,072.90 billion in 2010 to 355,252,401 and N1,671.4 billion in 2011, reflecting an increase of 81.5% and 55.8%, respectively. A plausible explanation for this jump is the increased confidence in electronic card payments. Data on various e-payment channels indicated that ATMs remained the most patronised, accounting for 97.8%, followed by web payments, 1.0 percent, Point-of-Sale (POS) terminals, and mobile payments, 0.6% each (Central Bank of Nigeria, 2011). Likewise, in value terms, ATMs accounted for 93.4%, web 3.5%, Point of Sale (POS) 1.9% and mobile payments, 1.2% (*ibid.*).

The Central Bank of Nigeria (CBN) annual report and statement of accounts 2011 revealed that the number of Automated Teller Machines (ATMs) stood at 9,640, while the volume and value of transactions amounted to 347,569,999 and N1,561.75 billion, at end-December 2011, respectively. According to the report, these figures reflected increases of 86.7% and 63.7%, respectively, over the volume and value of186,153,142

and N954.04 billion, in 2010.Likewise, the volume and value of mobile payments increased by 215.6 and 185.8% from1,156,553 and N6.7 billion to 3,649,374 and N19.0 billion, respectively, at end-December 2011.

The level of financial innovation may have accounted for the increased deposits recorded. Illustratively, aggregate financial savings rose by N427.9 billion or 6.7% to N6,858.5 billion, compared with N6,430.6 billion in 2010. The ratio of financial savings to GDP was 18.8%, compared with 32.9% in 2010. The DMBs remained the dominant depository institutions within the financial system and accounted for 95.2% of the total financial savings, compared with 92.6% in the preceding year. Other savings institutions, namely, the PMBs, life insurance funds, the pension funds, the Nigerian Social Insurance Trust Fund (NSITF), and microfinance banks accounted for the balance of 4.8%.

The depth of the financial system (M2 to gross domestic product ratio) fell to 36.4% down from the 42.7% and 39.5% recorded in 2009 and 2010, respectively while the ratio of private sector credit to gross domestic product (GDP) (bank financing of the economy) stood at 53.1% compared with the 58.8% observed in 2010. In addition, the intermediation efficiency indicator, as measured by the ratio of currency outside banks to broad money supply, at 9.4%, remained the same as at 2010.The ratio of financial savings to GDP declined to 17.9%, from 20.2% in the preceding year. The ratio of CIC to GDP (volume of cash in circulation) declined slightly to 4.3% from 4.7%recorded in 2008, 2009 and 2010. Similarly, the size of the DMBs' assets relative to the size of the economy, indicated by the ratio of DMBs total assets to GDP, declined slightly from 58.8% at end-December 2010 to 53.1% in 2011.

Figure 1. Monetary Aggregates and Measures of Financial/Banking Developments

Aggregates (N' Billion)	2006	2007	2008	2009	2010	2011
Nominal GDP	18,709.6	20,657.3	24,296.3	24,712.7	29,108.0	36,531.9
Broad money (M2)	4,027.9	5,809.8	9,166.8	10,767.4	11,488.7	13,300.3
Quasi Money (Savings)	1,747.3	2,693.6	4,309.5	5,763.5	5,954.3	6,531.9
Currency in circulation (CIC)	779.3	960.8	1,155.3	1,181.5	1,378.0	1,565.8
Currency Outside banks (COB)	650.9	737.9	892.8	927.2	1,082.2	1,244.8
Credit to Private Sector (CPS)	2,650.8	5,056.7	8,059.5	10,206.1	9,703.7	12,934.3
DMBs Assets	7,172.9	10,981.7	15,919.6	15,522.9	17,331.6	19,396.6
CBN Assets	10,034.5	8,689.0	10,204.0	8,898.4	8,767.7	15,796.1
Banking System Assets	17,207.4	19,670.7	26,123.5	27,726.8	26,230.0	28,164.3

Monetary Ratio (%)						
M2/GDP	21.5	28.1	37.7	43.6	39.1	36.4
CIC/ M2	19.3	16.5	12.6	11.0	12.0	11.8
COB/ M2	16.2	12.7	9.7	8.6	9.4	9.4
Quasi Money/ M2	43.4	46.4	47.0	53.5	51.7	49.1
CIC/GDP	4.2	4.7	4.8	4.8	4.7	4.3
CPS/GDP	14.3	24.5	33.2	41.3	58.8	53.1
CPS/Non-Oil GDP	13.7	38.5	55.4	67.2	50.2	58.7
DMBs Assets/GDP	22.1	53.2	65.5	70.9	58.8	53.1
CBN's Assets/GDP	38.3	48.6	35.8	41.3	30.2	24.0
BSA/GDP	23.6	95.2	107.5	112.2	88.9	77.1
FS/GDP	92.0	12.9	17.5	22.8	20.2	17.9

Source: Central Bank of Nigeria Annual Report and Statement of Account (2008, 2011)

Although the Nigerian financial sector has particularly in the last decade evolved, many questions regarding real deposit formation and its underlying determinants remain unanswered. Although banking reforms undertaken in 2004 (banking sector consolidation) and the progress made subsequently in the regulatory framework with respect to enhanced risk management have led to a stable financial sector, real deposits have remained relatively low recording only marginal increments. Stable growth as well as improvement in governments' fiscal position has mitigated the economy's exposure to risks. This has resulted in the financial sector being a major driver of the Nigerian economy even in the absence of requisite credit to finance real sector funding deficit.

Review of Related Literature

There is a huge pool of studies relating to money demand and currency-deposit that to assess their determinants. Some authors have focused on estimating money demand functions such as Odularu and Okunrinboye (2009), Achsani (2010), Kumar, Webber and Fargher (2010), Chukwu, Agu and Onah (2010), Omotor (2011), Tvalodze and Tchaidze (2011)found an the existence of a stable money demand functions. However, efforts by Nwachukwu and Odigie (2009), Uneze (2013), Odemero (2012), Kibet*et al.* (2009), Nwachukwu and Egwaikhide (2007), Khaskheli*et al.* (2013) and Nwachukwu (2011) have also estimated deposit equations to ascertain its driving factors.

Nwachukwu and Egwaikhide (2007) examined the determinants of private saving in Nigeria by comparing estimation outcomes of an error correction model with results from partial adjustment, growth rate and static models. Based on their findings, they conclude that the error correction model performs better than the other models. Its results reveal that saving rate rises with the level of disposable income but falls with

the rate of growth of disposable income. The real interest rate on bank deposits has a significant negative impact while public saving did not crowd-out private saving. Furthermore, external terms of trade, inflation rate and external debt service ratio had a positive impact on private saving.

Kibet*et al.* (2009) also investigated the underlying factors that influence savings among groups- teachers, entrepreneurs and farmers- in rural parts of Nakuru District of Kenya. The sample comprised of 359 teachers, entrepreneurs and farmers which, were selected through multi-stage sampling technique from seven rural administrative divisions of the district. Using least squares method the study found that type of occupation, household income, age and gender of household head, level of education, dependency ratio, service charge determine household saving, transport costs and credit access.

Finger and Hesse (2009) examined the determinants of commercial bank deposits in Lebanon. They found that domestic factors such as economic activity, prices, and the interest differential between the Lebanese pound and the U.S. dollar are significant in explaining deposit demand, as are external factors such as the economic and financial conditions of developed countries as well as variables that measure the availability of funds in the Gulf. Impulse response functions and variance decomposition analyses underscore the relative importance of the external variables.[iii]

Nwachukwu and Odigie (2009), predicated on the life cycle hypothesis, examined the determinants and trend of private saving in Nigeria during the period 1970 – 2007 by considering the effects of a group of policy and non-policy variables on private saving (income growth, interest rate, fiscal policy, and financial development). Relying on error correction modelling approach, the results revealed that saving rate rises with both the growth rate of disposable income and real interest rate on bank deposits. However, public saving seems not to crowd-out private saving while the degree of financial depth was found to have a negative but insignificant impact on saving.

Odularu and Okunrinboye (2009) tried to ascertain whether financial innovations that occurred in Nigeria after the SAP of 1986 affected the demand for money in Nigeria using Engle and Granger two-step cointegration technique. While the study revealed that income is positively related to the demand for cash balances and interest rate inversely related to demand for real cash balances, it also showed that the financial innovations have not significantly affected demand for money in Nigeria. This may be attributed to the fact that a financial innovation does not directly affect money demand and the expected channel of effect is through real deposits. This issue was addressed by Tvalodze and Tchaidze (2011) in their study of deposit formation in Georgia. The authors modelled the demand for the real broad money balances and the cash-deposit ratio between the period 1996 and 2009. Their findings suggested that the main factors that affected deposits were income, development of the financial sector and changes in the tax burden, while changes in the interest rate and inflation played a minor role. The results also showed that geopolitical events affect banking sector confidence.

Nwachukwu (2011) discusses the trend in Nigerian saving behaviour and reviews policy options to increase domestic saving. It also examined the determinants of private saving in Nigeria during the period1970–2010. Employing error correction modelling, the study revealed that saving rate rises with both the growth rate of disposable income and the real interest rate on bank deposits. The result also revealed that public saving did not crowd out private saving; suggesting that government policies aimed at improving the fiscal balance has the potential of bringing about a substantial increase in the national saving rate. The degree of financial depth had a negative but insignificant impact on saving behaviour in Nigeria.

Odemero (2012) investigated the dual determinants of savings mobilisation among agri-business entrepreneurial self- help groups in Edo state, Nigeria and data for the study was based on questionnaires issued to 96 agro-allied businesses. The data was analysed using descriptive statistics (percentages, mean, and other statistical tools) and inferential statistics (multiple regression analysis). The result showed that interest rate, farm income and age distribution of savers significantly (5%) contributed to saving mobilisation.

Uneze (2013) assessed how socio-economic factors of farmer-members of cooperative in agricultural group lending scheme influence their decisions to make financial savings with their cooperatives. The focus of the study was on Anambra state and data was sourced from 296 farmer-members of cooperative societies randomly selected from National Programme for Food Security (NPFS) and Rural Finance Institution Building Programme (RUFIN) agricultural group lending schemes. The study relied on descriptive statistics such as frequency distribution, percentages and means to analyse the data. The results showed that about 43.1% of the total variation in deposit mobilisation was explained by the 10 socio-economic variables included in the model. The significant variables affecting deposit mobilisation in cooperatives by farmers in the group leading scheme were value of assets, off-farm income, age of household head, level of farm diversification and total value of farmer's loan.

Khaskheli et al. (2013) assessed the driving factors underlying the significant increase in currency deposits ratio since. The authors found a negative relationship between currency and total private sector deposits which confirmed that an increase in currency depletes deposits, which in turn inhibits economic growth by restricting supply of loanable funds. Digging further, using graphical analysis, they attempt assess determinants of currency deposits ratio and revealed that inflation, government budgetary borrowing, industrial production index, investment in national saving schemes, remittances inflow, and wheat procurement were found to be the prominent factors behind increasing currency deposits ratio.

Nwankwo, Ewuim and Asoya (2013) assessed the effect of cooperatives on the savings behaviour of members in Oyi LGA of Anambra State Nigeria with data from 195 randomly selected members of various credit cooperatives. Utilising descriptive and multiple regression analysis the study showed that cooperative membership had a positive impact on savings behaviour of members. The study found that older members

had more savings than newer members. The marginal propensity to save (MPS) of 9.3% was significant as it showed that rural dwellers were more inclined towards saving. Length of membership in cooperative was also found to be an important determinant of savings thus confirming that older members saved more.

Methodology

Analytical Framework and Model Specification

Economic theory gives no a priori specification as to the correct functional form of the demand for money relation (Mills, 1978). Nevertheless, the foundation of money demand functions is rooted in the simple money demand model which postulates that demand for money depends on income and is algebraically expressed as:

$$M_i = M_i(Y)$$

Invoking the Keynesian approach and including interest rate (r) as a measure of the implicit cost of holding real cash balances rather than a wide range of interest-bearing assets as well as income (Y), as a measure of the transaction demand for money yields;

$$M_i = M_i(Y, r)$$

Taking the logarithm results in

$$lnM_i = ln\alpha_0 + ln\alpha_1 Y \text{-} ln\alpha_2 \text{r}$$

This implies that the demand for real balances (M) is a function of income and interest rate. Apriori, $\frac{\partial M}{\partial r} < 0$ and $\frac{\partial M}{\partial Y} > 0$

While this approach has been adopted in various studies, it independently and explicitly fails to account for factors affecting households' savings decisions which are important determinants of overall financial system stability. As noted by Tvalodze and Tchaidze (2011), decisions made by households and firms on allocation of financial resources are significantly affected by the country's economic conditions and subsequently, depositors' behaviour based on these decisions, impacts on liquidity available to DMBs. This invariably affects the stability of the financial sector. Ezema (2009) noted that in the Nigerian monetary policy framework, although the currency-deposit ratio is a function of the cash preferences of the economic agents, it may be sensitive to interest rate movements. In this regard, Cagan (1965), Boughton and Elmus (1979), Dadkhah and Rajen (1988), Hasan (2001) examined the behaviour of currency-deposit ratio considering the role of interest rates and income..

This study is predicated on the following identity:

RD = RBM - CDR   (1)

Where denotes real deposits while RBM and denote real money balances and curren-

cy-deposit ratio, respectively. Real broad money balance (is modelled as a decreasing function of interest rate (r) and an increasing function of income (Y) and is presented as;

$$RBM = F(Y, r); \; F_Y > 0, F_r > 0^{iv}$$ (2)

However, we adopt the specification of Tvalodze and Tchaidze (2011) by augmenting equation 2 with inflation which represents the opportunity costs of holding money with respect to real assets and is expected to have a negative coefficient.

$$RBM = \phi_0 + \phi_1 Y_t + \phi_2 r_t + \phi_3 \pi_t + \varepsilon_t$$ (3)

Other variables are as earlier defined while and represent inflation rate and the error term (assumed to be white noise), respectively. In the literature, the currency-deposit ratio is modelled as a function of income growth (Hasan, 2001), opportunity cost of holding currency or nominal interest rate (Dadkhah and Mookerjee, 1988), inflation (Tvalodze and Tchaidze, 2011), financial sophistication (Cagan, 1965) and spread of the shadow economy (Mathews, 1982). The cash-deposit ratio model is specified as follows;

$$CDR = \phi_0 + \phi_1 Y_t + \phi_2 r_t + \phi_3 T_t + \phi_3 \Gamma_t + \varepsilon_t$$ (4)

All variables are as earlier defined. and denote the effective tax burden measure and level of financial innovation. As income (Y) rises, the share of deposits increase and thus, the ratio fall. Likewise the increase in nominal interest rate (r) reduces the attractiveness of holding currency relative to deposits and invariably reduces the currency-deposit ratio. Inflation is also an indirect function of the ratio while an increase in the range of available liquid financial assets reduces domestic demand for currency. Lastly, transactions in the informal economy tend to be in form of cash since bank records could lead to detection by the tax authorities. Thus, it is expected that the demand for cash will vary directly with the average rate of tax, which, stimulates the shadow economy.

The following dynamics of the model is rooted in the work of Tvalodze and Tchaidze (2011). Recall from equation 1; a real deposit is the difference between real broad money balances and real currency. Assume equations 3 and 4 are re-expressed as follows;

$$\ln(RBM) = F(v) \Rightarrow RBM = e^{F(v)}$$ (5)

$$\ln(CDR) = E(\zeta) \Rightarrow RCIC = RDe^{E(\zeta)}$$ (6)

Where is a vector of independent variables in the real broad money equation while is a vector of explanatory variables in the currency-deposit ratio equation. RCIC and RD refer to real currency in circulation and real deposits, respectively. Recall from equation 1 that $RD = RBM - CDR$ and therefore,

$$RD = RBM - RCIC * RD \tag{7}$$

Substituting equations 5 and 6 into equation 7 results in;

$$RD = e^{F(v)} - RDe^{E(\zeta)} \tag{8}$$

$$e^{F(v)} = RD + RDe^{E(\zeta)} \tag{9}$$

$$e^{F(v)} = RD\left(1 + e^{E(\zeta)}\right) \tag{10}$$

$$RD = \frac{e^{F(v)}}{1 + e^{E(\zeta)}} \tag{11}$$

Log-linearising equation 11 results in;

$$ln(RD) = F(v) - ln\left(1 + e^{E(\zeta)}\right) \approx F(v) - e^{E(\zeta)} \approx F(v) - E(\zeta) - 1 \tag{12}$$

Estimation Technique

Deposit formation is calibrated using a three-step procedure: (i) estimation of the money demand function (ii) estimation of the currency-deposit ratio; and (iii) real deposits is characterised on the basis of the output of (i) and (ii) above. We propose to use the bounds testing approach to co integration proposed by Pesaran *et al*. (2001).[v]

This approach has several advantages over other cointegration techniques. It eliminates the burden of having to establish the order of integration amongst the variables and/or pre-testing for unit roots. The ARDL approach to testing for the existence of a long-run relationship between the variables in levels is applicable irrespective of whether the underlying regressors are purely $I(0)$, purely $I(1)$, or fractionally integrated. Also, the approach is applicable to studies using data with limited time coverage. The ARDL representation of equation (3) and (4) are:

$$\Delta ln\frac{\varphi_t}{\rho_t} = \phi_0 + \sum_{i=1}^{m} \phi_{1i}\Delta lnY_{t-i} + \sum_{i=0}^{m} \phi_{2i}\Delta r_{t-i} + \sum_{i=0}^{m} \phi_{3i}\Delta \pi_{t-i} + \phi_4 lnY_{t-1} + \phi_5 r_{t-1} + \phi_6 \pi_{t-1} \tag{13}$$

$$\Delta ln\frac{\theta_t}{\varphi_t} = \phi_0 + \sum_{i=1}^{m} \phi_{1i}\Delta lnY_{t-i} + \sum_{i=0}^{m} \phi_{2i}\Delta r_{t-i} + \sum_{i=0}^{m} \phi_{3i}\Delta T_{t-i} + \\ \sum_{i=0}^{m} \phi_{4i}\Delta ln\Gamma_{t-i} + \phi_5 lnY_{t-1} + \phi_6 r_{t-1} + \phi_7 T_{t-1} + \phi_8 \Gamma_{t-1} \tag{14}$$

Where $\Delta ln\frac{\varphi_t}{\rho_t}, \Delta ln\frac{\theta_t}{\varphi_t}, \Delta lnY, \Delta lnr, \Delta ln\pi, \Delta lnT, \Delta ln\Gamma$ represent the first differences of real money balances, currency in circulation, income, interest rate, inflation, effective tax burden

and financial innovation respectively. The bounds test is a Wald Test (or F-test) in which the joint significance of coefficients for lagged variables is tested with F-statistics calculated based on the null hypothesis. The distribution of the test statistics under the null is non-standard, in which critical values depend on the order of integration of variables involved. The joint significance test with respect to equations (13) and (14) is conducted based on the following hypothesis:

$$H_0: \phi_4 = \phi_5 = \phi_6 \text{ and } H_1: \phi_4 \neq \phi_5 \neq \phi_6$$
$$H_0: \phi_5 = \phi_6 = \phi_7 = \phi_8 \text{ and } H_1: \phi_5 \neq \phi_6 \neq \phi_7 \neq \phi_8$$

Based on Monte Carlo simulation, Pesaran *et al.* (2001) tabulates asymptotic critical values, depending on whether or not drift and/or time trend terms are included as well as the number of independent variables. Given the number of independent variables, if all variables are I(0), the critical value approaches a minimum and, if they are all I(1), the corresponding critical value becomes a maximum. In the case of a mixture of integrating order, the critical value falls between a minimum and a maximum. Therefore, if the calculated F-statistics under the null is located outside the maximum, the null hypothesis of no cointegration is rejected, while if it is located inside the minimum, the null is not rejected. Finally, if the test statistics falls between them, one cannot draw a conclusive decision. In this case, further investigation based on more information about orders of integration is required to reach a definite conclusion. Finally, the cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) stability tests based on the recursive regression residuals are carried out to determine the stability of the model.

Data Issues

Annual dataset between 1960 and 2012 is utilised. The data is sourced from the Central Bank (CBN) of Nigeria statistical bulletin (2011) and various issues of the annual report and statement of account. The price level CPI (INF) is used to capture inflation while real GDP is used to capture real income (RGDP). Money supply defined as sum of money outside banks and deposits denominated in local and foreign currency is used (RBM). The nominal rate of return of broad money is captured by nominal interest rate (NIR). Financial sophistication of the economy is captured by the credit to the private sector-GDP ratio (CPGR) since more appropriate measures such as debit and credit cards in circulation, automated teller machines, point of sale machines etc are not readily available over a long period of time (CPGR). The shadow economy effect is captured by the ratio of tax revenues to the nominal GDP (TRGR). All the variables excluding ratios and rates are in logarithmic form.

Empirical Analysis and Discussion of Results

The summary statistics and correlation analysis of variables used in the estimation are presented in Tables 2 and 3. The average values of the nominal rate of return on deposit (NIR), inflation (INF), log of real broad money (lnRBM) and log of real GDP (lnRGDP)

during the period used in the study are 9.38%, 16.38%, 9.44 and 12.12 respectively. Currency-deposit ratio (CDR), nominal interest rate (NIR), total revenue-GDP ratio (TRGR) and private sector credit-GDP ratio (CPGR) recorded mean values of 0.85, 9.4, 0.1 and 14.72, respectively. During the period under review, the minimum and maximum values of inflation were -3.37% and 72.84% which was significantly above values recorded for other variables. The lowest minimum and maximum values were observed for tax revenue-GDP ratio with 0.04 and 0.24, respectively.

Table 2. Descriptive Statistics of Variables used in Estimation

	INF	lnRBM	lnRGDP	CDR	NIR	TRGR	CPGR
Mean	16.38	9.44	12.12	0.85	9.38	0.09	14.72
Median	11.58	9.58	11.14	0.72	8.00	0.07	12.46
Maximum	72.84	11.22	17.33	1.84	26.00	0.24	51.66
Minimum	-3.73	7.82	7.71	0.20	3.46	0.04	4.78
Std. Dev.	16.27	0.93	3.25	0.44	5.44	0.05	9.67
Skewness	1.80	-0.05	0.19	0.64	0.80	1.57	2.01
Kurtosis	5.73	2.48	1.66	2.58	2.90	4.06	7.31
Jarque-Bera	45.06	0.62	4.32	3.99	5.62	24.27	76.69
Probability	0.00	0.73	0.12	0.14	0.06	0.00	0.00
Sum	868.14	500.10	642.29	45.18	497.02	4.62	780.15
Sum Sq. Dev.	13771.73	44.68	548.00	9.92	1539.97	0.15	4860.07
Observations	53	53	53	53	53	53	53

Table 3. Correlation Analysis of Variables used in Estimation

	CDR	CPGR	INF	NIR	lnMS	lnRGDP	TRGR
CD	1.00	-0.63	-0.11	-0.23	-0.75	-0.71	0.70
CPSG	-0.63	1.00	-0.02	0.04	0.66	0.60	-0.28
INF	-0.11	-0.02	1.00	0.47	0.19	0.19	-0.36
IR	-0.23	0.04	0.47	1.00	0.54	0.55	-0.38
MS	-0.75	0.66	0.19	0.54	1.00	1.00	-0.54
RGDP	-0.71	0.60	0.19	0.55	1.00	1.00	-0.53
TRG	0.70	-0.28	-0.36	-0.38	-0.54	-0.53	1.00

Long-run and Contemporaneous Dynamics

In order to ascertain the existence of a long run relationship among the variables in equations (13) and (14), the F-statistic (Wald test) for the bounds test was computed. The F-statistic and critical bounds values for testing the null hypothesis of no cointegrating relationship are reported in Table 4. The computed F-statistics of 5.40 and 4.30 in both models were found to exceed the lower and upper bounds critical

values at the 5% significance level using the critical values provided by Pesaran*et al.* (2001). Therefore, the null of no cointegration is rejected. This implies that the variables in equations 13 and 14 are cointegrated.

Table 4. Bound Testing for Cointegration[vi]

	Critical Bound			
	F-stat	**Lower**	**Upper**	**k**
Model 1 (Equation 13)	5.40	3.47	4.45	3
Model 1 (Equation 14)	4.30	3.03	4.06	4

The long run coefficients are presented in Table 5. In the case of model 1, the estimated long run elasticities for interest rate (NIR) and income (RGDP) are 0.532 and -0.015 respectively. Both estimated elasticities have the expected signs but only real income was statistically significant at the 5% level of significance. For example, our results suggest that a 1% increase in real income (RGDP) will increase real broad money (RBM) by 0.53% while an increase in the opportunity cost of holding money will reduce real money demand (RBM) by 0.015%. Unexpectedly, our results also showed that a 1% increase in inflation engenders an infinitesimal 0.008% decrease in money demand. Nevertheless, inflation was found to be insignificant in explaining money demand. The currency deposit equation expressed in model 2 revealed that the degree of responsiveness of the currency-deposit ratio (CD) to income and interest rate are 0.493% and 0.107% and are both statistically significant. The financial innovation measure, captured by credit to the private sector to GDP ratio (CPSG) was positive and statistically significant at the 5% level. The measure of the shadow economy (TRG) was also positive but statistically insignificant.

Table 5. Estimated Long-run Coefficients

Model 1 (Dep. Var.: RBM			Model 2 (Dep. Var.:CD		
Variable	**Coefficient**	**Prob.**	**Variable**	**Coefficient**	**Prob.**
Constant	1.220	0.081	**Constant**	-2.246	0.035
Trend	0.120	0.000	**Trend**	-0.163	0.001
lnRGDP	0.532	0.000	**lnRGDP**	0.493	0.005
NIR	-0.015	0.170	**NIR**	0.107	0.000
INF	-0.008	0.843	**CPSG**	0.037	0.008
			TRG	0.480	0.753

Notes: ARDL (2,0,0,1) selected based on Schwarz Bayesian Criterion.

The estimates of the error correction model are presented in models 1 and 2 of Table 6. Evidently, the results of the long-run estimates are not supported except for inflation whose coefficient was negative and statistically significant. From model 1, the coefficient of the first difference of income and real money demand were both statistically significant with coefficient values of 0.141% and -0.004%, respectively. In

the short run, the effect of the first difference of inflation is significant and negatively related to money demand as a 1% increase in price will reduce money demand by 0.003% in Nigeria.

In model 2, the short run estimates of the currency-deposit equation are presented. While the first difference of real income is found to be negatively related to currency deposit ratio, interest rate was found to be positively related to currency deposit ratio. Both findings were statistically significant. However, a pertinent observation is the negative effect of the first difference of the one period lagged value of nominal interest rate which was found to be negative and statistically significant. However, contrary to expectation, financial deepening or innovation did not have the expected negative effect on currency-deposit ratio as the Nigerian financial system, despite significant deepening, is faced with high currency in circulation and less deposits.[vii] In other words, a 1% increase in the depth of the financial sector induced a 0.004% increase currency-deposit ratio.

The error correction terms ect(-1) in both models are negative and statistically significant, thus corroborating the results of the cointegration tests which suggested the existence of a long run relationship between the variables. The error correction value of -0.265 in model 1and -0.359 in model 2 indicates that 26.5%and 35.9% of the previous year's deviation from long run equilibrium will be restored within a year.

Table 6. Error Correction Representation of ARDL Model

| Model 1 (Dep. Var.: D(RBM))			Model 2 (Dep. Var.: D(CD))		
Variable	Coefficient	T-Ratio (Prob.)	Variable	Coefficient	T-Ratio(Prob.)
C	0.323	1.161(0.114)	C	-0.805	-2.338(0.024)
@TREND	0.032	3.331(0.002)	@TREND	-0.058	-3.804(0.000)
D(lnRGDP)	0.141	4.102(0.000)	D(lnRGDP)	-0.041	-3.364(0.718)
D(NIR)	-0.004	-1.311(0.196)	D(NIR)	0.001	0.320(0.750)
D(INF)	-0.003	2.751(0.009)	D(NIR(-1))	-0.024	-3.319(0.002)
ect(-1)	-0.265	-5.241(0.000)	D(TRG)	-0.96	-1.735(0.090)
			D(CPSG)	0.014	3.600(0.001)
			ect(-1)	-0.359	-4.070(0.000)
R-Squared	0.67		R-Squared	0.5	
Adj R-Squared	0.62		Adj R-Squared	0.38	
S.E. of Regresion	0.08		S.E. of Regresion	0.1	
F-Statistic	14.58		F-Statistic	5.8	
Prob. (F-Statistic)	0.00		Prob. (F-Statistic)	0.00	
DW-Statistic	2.09		DW-Statistic	2.44	

Notes: 51 observations (1962-2012) were used and ARDL (1,1,2,1,0) was selected based on Schwarz Bayesian Criterion.

The diagnostic tests of our model revealed no evidence of serial correlation. The model passes the Jarque-Bera normality tests suggesting that the errors are normally distributed. The RESET test indicates that the model is correctly specified while the F-forecast test indicates the predictive power of the model. Finally, the adjusted R-square of 0.67 (model 1) and 0.56 (model 2) indicate that 67% and 56% of the variation in broad money and currency-deposit ratio is explained by the independent variables in the respective models. Also, the Durbin-Watson statistic in both models is approximately 2. The outcome of these statistical diagnostic tests suggests the model is well behaved. The model also satisfies the stability test- the CUSUM of recursive residuals (Figure 1) and the CUSUMQ of recursive residuals tests (Figure 2) of structural stability. Both figures show that the parameters of the model are stable during the sample period.

Model 1 Stability Test
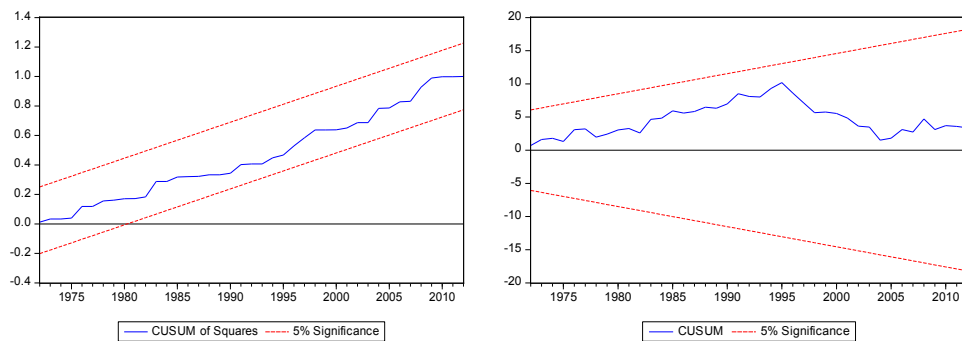
Model 2 Stability Test
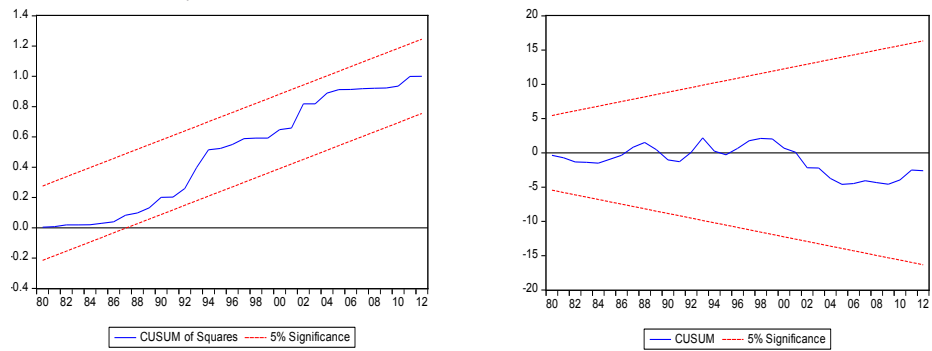
In order to obtain the final specification for real deposits, invoking equation 1, we combine two equations as stipulated in the identity represented by equation 1. The resulting equation yields;

$$RD = 1.128c + 0.09@trend + 0.182\Delta lnRGDP_t + 0.003\Delta NIR - 0.003\Delta INF \\ - 0.024\Delta NIR_{t-1} - 0.96\Delta TRG_t + 0.014\Delta CPSG$$

This equation reveals that the degree of responsiveness of real deposits to changes in income is 0.182%. This implies that people increase their deposits as the economy expands. Unexpectedly, interest rates and its one period lagged value were found to be negatively related to real deposits while inflation, in line with theoretical expectation was found to negatively affect deposits. The effect of financial innovation is marginal but positive as increased financial sophistication spurred deposits. The reason for this outcome may be the growing financial innovations provided by DMBs and the cashless policy pursued by the central bank of Nigeria, which increases the attractiveness of deposits relative to cash. Another plausible explanation for the very low coefficient observed is that in Nigeria, security of e-banking and e-payment services remains an issue of concern to depositors as it would take time to adjust to such technological changes and innovations in the banking sector. Notably, the shadow economy had a negative effect on deposit formation in Nigeria.

Conclusion

The paper assessed the formation of real deposits in the Nigerian banking sector between 1960 and 2012. Real deposit was modelled as an identity that captures the difference between an estimated money demand and currency-deposit ratio models. The ARDL bounds testing approach to cointegration and unrestricted error correction model was used to ascertain the long- and short-run relationships. Our findings showed that inflation, real income, money supply and financial depth where negatively related to depositary base. This implies that if prices are high, real deposits will fall while higher incomes, contrary to theory led to a fall in deposits. A deeper financial system characterised by innovations increases the incentive to save. The one-period lagged value of the currency-deposit ratio and interest rate where found to be positive functions of real deposits. In other words, higher interest rates enhance saving behaviour. Evidently, financial innovation, domestic price and interest rate play a significant role in real deposit behaviour. The effect of income did not conform to theory as it exerted a negative effect on depositary base and we expected that higher incomes should enhance savings. However, this was not the case in Nigeria and this may be partly explained by the general increase in prices and low purchasing power occasioned by high inequality and poverty which negatively affects real deposit behaviour of households. A major implication of our finding is the need to increase access to financial services as a deepened financial system was found to significantly influence depositors' saving behaviour even though the coefficient was low. In addition, reducing the financial transactions through the informal sector may spur real deposits as our measure of the shadow economy negatively affected real deposit formation. Also, government may consider the pursuit of labour-intensive policies that create wealth thereby increasing disposable incomes and encouraging deposits.

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Mohammed Shuaibu

Appendix

Table A1: Autoregressive Distributed Lag Estimates

Model 1[viii]			Model 2[ix]		
Variable	Coefficient	T-Stat (Prob)	Variable	Coefficient	T-Stat (Prob)
c	0.323	1.612 (0.114)	c	-0.805	-2.338(0.024)
@trend	0.032	3.331(0.002)	@trend	-0.058	-3.804(0.000)
MS(-1)	1.156	9.329(0.000)	CD(-1)	0.641	7.278(0.000)
MS(-2)	-0.421	-3.811(0.000)	RGDP	-0.04	-0.364(0.718)
RGDP	0.141	4.102(0.000)	RGDP(-1)	0.218	2.089(0.043)
IR	-0.004	-1.312(0.197)	IR	0.002	0.320(0.750)
INF	0.003	2.751(0.009)	IR(-1)	0.013	1.826(0.075)
INF(-1)	-0.003	-3.099(0.003)	IR(-2)	0.024	3.319(0.002)
			TRG	-0.96	-1.735(0.091)
			TRG(-1)	1.132	2.353(0.024)
			CPSG	0.013	3.600(0.001)
Diagnostic Tests					
R-Squared	0.99		R-Squared	0.95	
Adj. R-Squared	0.99		Adj. R-Squared	0.94	
S.E. Regression	0.08		S.E. Regression	0.10	
F-Stat.	13.90		F-Stat.	76.25	
Prob. (F-Stat.)	0.00		Prob. (F-Stat.)	0.00	
DW-Statistic	2.09		DW-Statistic	2.44	
	LM Version	F Version		LM Version	F Version
Serial Correlation	0.300(0.58)	0.249(0.621)	Serial Correlation	3.993(0.046)	3.313(0.076)
Functional Form	2.859(0.09)	2.495(0.122)	Functional Form	3.892(0.049)	3.222(0.080)
Normality	1.131(0.57)	na	Normality	50.978(0.000)	na
Heteros.	0.093(0.76)	0.089(0.766)	Heteros.	8.435(0.004)	9.710(0.003)

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[i] This stability is affected as liquidity of DMBs is influenced by depositors' saving and investment decisions which, are in turn influenced by domestic macroeconomic conditions and external shocks.

ii This is further reinforced by the effectiveness of money demand and currency deposit ratio parameters in explaining real deposit behavior (See Tvalodze and Tchaidze, 2011 for a lucid exposition of the linkages).

iii At the micro level, the authors also found that bank-specific variables such as perceived riskiness of individual banks, liquidity buffers, loan exposure, and interest margins significantly influence demand for deposits.

iv It is pertinent to note that inflation and real interest rate enter the model independently in a bid to distinguish between two effects: the interest rate on deposit is the rate of return on broad money with an expected positive sign, while inflation represents the implicit cost of holding money relative to real assets with an expected negative sign.

v Also, the Engle and Granger (1987) co-integration test and the Johansen (1988) and Johansen and Juselius (1990) co integration test, which may not may not be appropriate, especially when a small sample size is considered (see, Narayan and Smyth 2005).

vi No trend and intercept were considered in models 1 and 2. Table C1.v: Case V with unrestricted Intercept and unrestricted trend Pesaran *et al.* (2001).

vii There are at least two economic costs of currency in circulation that need to be highlighted. First, an increase in currency in circulation implies a decline in deposits and consequently a decrease in the availability of loanable funds for investment by restricting credit creation which is crucial for economic growth. Second, a rise in currency in circulation signals inflationary pressures (Khaskheli *et al.* 2013).

viii ARDL(2,0,0,1) selected based on Schwarz Bayesian Criterion.

ix ARDL (1,1,2,1,0) selected based on Schwarz Bayesian Criterion.

Twin Deficit in Nigeria: A Re-Examination

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Abstract: *This study re-examines the long run relationship between the budget and current account deficits in an oil-dependent open economy like Nigeria using a multivariate Granger causality test within the VECM framework. This result confirmed the existence of a long run relationship between the budget and current account deficit in Nigeria, thus supporting the Mudell-Fleming theory and refuting the Ricardian Equivalence Hypothesis (REH). The causality result indicates no causality between budget deficit and current account while the current account deficit causes budget account deficit. This implies that reduction in the current account deficits will help reduce the "twin deficit" dilemma.*

Introduction

In empirical literature, there are two major theories that are used to explain the causal link between budget deficit and current account deficits. These are the Mundell-Fleming Model of Exchange Rate Regime and the Ricardian Equivalence Hypothesis (REH). The traditional Keynesians use the Mundell-Fleming model to explain the twin deficit relationship and they argued that when budget deficit increases, the current account balance will deteriorate as the increases in the budget deficits will drive up domestic interest rates, real exchange rate and rate of capital inflows. On the other hand, while acknowledging the detrimental effects of large fiscal deficits on the economy, the critics of the Mundell-Fleming model have disputed the sequence of causation implied by the model (Harshemzadeh and Wilson, 2006). These groups of researchers used the Ricardian Equivalence Hypothesis (REH) to argue that no relationship exists between the two deficits as budget deficits results mainly from tax cuts which tend to reduce public revenue and public savings. They opined that individuals will perceive these tax cuts as incurring future tax liabilities and thus will increase savings rather than consumption.

Nigeria, experiences over the years have shown that there have been periods of persistent and rising budget deficits as well as periods with current account deficits. As such, it is evident that the Nigerian economy has been experiencing the twin deficit phenomenon. In the same vein, Nigeria as an oil-exporting country where revenue from oil production contributes more than 95% of its foreign exchange, 40 percent of GDP and 80 percent of fiscal revenues makes the economy susceptible to fluctuations in government revenues as a result of volatility in oil revenue (Onafowokan and Owoye, 2006).

In Nigeria, two studies are of prominence in this respect, these are Egwaikhide (1997), Egwaikhide *et al* (2002) and Onafowokan and Owoye (2006). Egwaikhide (1997) examined the effects of budget deficits on the current account balance in Nigeria and concluded that quantitative evidence suggests that budget policy affects the current account balance for Nigeria. Egwaikhide *et al* (2002) in their paper on causality between budget deficit and current account balance for a number of African countries, found a unidirectional causality from the budget deficits to the current account deficits to exists for Benin, Burkina Faso, Ghana, Nigeria and South Africa. Onafowokan and Owoye (2006) examined the relationship between budget and trade deficits. Their findings showed evidence of positive relationship between trade and budget deficits in both the short and long run but that causality is unidirectional running from trade deficits to budget deficits.

Apart from the fact that these studies in Nigeria utilized a bivariate framework commonly used in previous empirical studies which this study tends to improve upon by using a multivariate framework of Granger causality analysis, available data from the last ten years showed that the two deficits have not been moving together as argued by the two studies (Egwaikhide, 1997 and Onafowokan and Owoye, 2006) that were previously done for Nigeria. The most recent study to the best of my knowledge was

carried out in 2006 and between then and now; there could have been some adjustment. Consequently, it becomes imperative to re-visit and re-examine the validity of the twin deficit phenomenon for Nigeria.

As it is believed in open economy macroeconomics that budget deficit leads to deterioration of the current account balance (Jayaraman et al, 2008), it therefore becomes imperative to find out if the resulting current account balance experienced by the Nigerian economy is as a result of the substantial increase in its budget deficit over the years as has been argued by the twin deficit hypothesis or it is the other way round. This thus raises some pertinent questions like – Is the twin deficit hypothesis still valid for Nigeria? Is there a long run relationship between budget deficits and the current account deficits? What are the major channels of transmission through which budget deficits affect current account deficits? What is the direction of causality between the budget deficit and the current account deficit?

In response to the above questions and given the recent fiscal expansion due to the global financial crisis, it becomes relevant and significant for a study like this to revisit the twin deficit phenomenon for Nigeria and examine the direction of causality. Thus, using time series annual (secondary) data covering the period 1970 through to 2010, the study re-examines the long run relationship between the budget and current account deficits in Nigeria.

Following this introductory section, section two reviews the literature while section three examines some stylized facts on budget and current account deficit in Nigeria. Section four contains the methodology and empirical analysis while section five concludes the study.

Literature Review

Theoretical Review

In empirical literature, two major theories are commonly used to explain the causal link between the budget deficit and the current account deficits. They include the Mundell-Fleming model of exchange rate regime and the Ricardian Equivalence Hypothesis approach.

The Mundell-Fleming Model Framework

This model was developed by the works of Robert Mundell (1968) and J. Marcus Fleming (1967) and it offers an exchange rate approach to analyzing how the budget and current account deficits are related. The model presupposes a small open economy with full international capital mobility with the assumption that interest rate is the same in the world economy, except in cases where capital controls exist (Olga, 2000). It posits that a positive relationship exists between the two deficits and that causality is from budget deficit to current account deficit. The model is often used by the conventional Keynesians to argue that an increase in the budget deficits would cause an increase in domestic absorption, increase aggregate demand and put upward pressure

on domestic interest rate above the world rate. This in turn increases imports, reduce export and bring about an appreciation of the exchange rate thereby deteriorating the current account balance.

According to Fleegler (2006), as a government borrows to finance its deficits, it drives up borrowing costs or the interest rates. A higher interest rate makes domestic securities more attractive and leads to an increased demand for the domestic currency causing an appreciation of the domestic currency due to the capital inflows. As the currency appreciates, domestic goods become more expensive relative to foreign goods thereby leading citizens to increase imports thus increasing the trade deficit (Fleegler, 2006). Onafowora et al (2006) also argued that in this framework, an increase in government deficit spending will cause an increase in aggregate demand and the domestic interest rate. If the domestic interest rate is higher than the world interest rate, there will be a net capital inflow from abroad and the domestic currency will appreciate. This results to a rise in imports, a fall in export and the deterioration of the current account balance.

Harshemzadeh and Wilson (2006) also posited that an increase in the fiscal deficit will lead to current account imbalance by driving up domestic interest rates, exchange rate and rate of capital inflows. Chang and Hsu (2009) equally argued that the increase in the budget deficit induces an upward pressure on interest rates which in turn trigger capital inflows and an appreciation of exchange rates ultimately leading to an increase in the current account deficit. Arize and Melinderos (2008) pointed out that even though the Mundell-Fleming suggests a unidirectional causality from budget deficit to current account deficit, there could be a reverse causality from the current account deficit to the budget deficit. This can come about if there is a change in expected inflation. A decrease in expected inflation would lead to currency appreciation and thus decrease net exports and increase the trade deficits.

Chang and Hsu (2009) also provided another possible explanation reverse causality between the budget deficit and current account deficit by stating that this reversal could occur if deterioration in the current account balance leads to a slower pace of growth and hence an increase in the budget deficit. Kim and Kim (2006) equally argued that out reverse causality could be as a result of excessive trade deficits plunging an economy into a recession and subsequently leading to a financial or solvency crisis in which large injections of public fund may be needed to rehabilitate the struggling financial sector or minimize the severity of a recession. This reverse causality was referred to as "current account targeting" and suggests that external adjustments may be sought through the budget or fiscal policy. Furthermore, Arize and Melinderos (2008) posited that bidirectional causality could also exist between the twin deficits whereby the existence of significant feedbacks causes causality to run in both directions. This was corroborated by Chang and Hsu (2009). Thus, it becomes necessary to complement budget-cut policies with a coherent package, focusing on policies for export promotion, productivity improvement and exchange rate (Arize and Melinderos, 2008).

The Ricardian Equivalence Hypothesis

An alternative explanation for the existence of long run equilibrium relationship between the budget deficit and the current account deficit is based on the Ricardian Equivalence Hypothesis (REH) which is commonly associated with the work of Barro (1989). He stated that the ricardian equivalence implies that taxpayers do not view government bonds as net wealth; hence its acquisition by individuals does not alter their consumption behaviour. Critics of the Mundell-Fleming framework question the sequence of causation described by the model and thus employed the Ricardian equivalence hypothesis to argue the absence of any relationship between budget deficit and current account deficit. These proponents argue that in a Ricardian world, it is believed that a budget deficit that is financed through a tax cut and bond sales would be perceived by individuals as incurring future tax liabilities to service and retire the increased debt (Onafowora and Owoye, 2006; Yanik, 2006 and Ratha, 2011). The Ricardian Equivalence Hypothesis dispenses entirely with the income-expenditure approach and relied instead on the inter-temporal approach.

They asserted that since a government"s means of finance do not alter private agents" inter-temporal budget constraints; the real interest rate, the quantity of investment or current account balance will not be affected. They claimed that budget deficits do not cause any interest and exchange rate changes which thus have no effect on the current account imbalances (Chang and Hsu (2009). The main assumption of the REH is that changes in budget deficit will have no effects on domestic interest rates, total savings, investment, price level and national income; thus not having effect on current account balance. The argument is that a reduction in taxes which is accompanied by an increase in budget deficit does not affect growth of consumption and hence, does not have any expansionary effect as households tend to increase savings in anticipation of higher taxes in the future which are necessary to redeem the debt (Gadong, 2009).

Furthermore, Mamdouh (2000) posited that a tax cut (leading to a budget deficit) has the effect of reducing public revenues and public savings thus enlarging the budget deficit. This however, increases private savings by an amount equal to the expected increase in the tax burden in future years (Arize and Melinderos, 2008). In other words, savings will respond positively to the changes in budget deficit leaving the trade deficit unaltered. Equally, if the government runs a deficit by borrowing, economic agents being rational will expect that government will raise future taxes to finance the borrowing (budget deficit) and so they will rather increase their savings to meet the future tax burden. Thus, alterations in the composition of public financing will have no impact on real interest rate, aggregate demand, private spending, exchange rate and ultimately, the current account balance (Arize and Melinderos, 2008). However, the ricardian equivalence theorem argues that either ways of financing the deficit (through reduced taxes or issuance of bonds), the present value wealth of private households is not altered since both temporarily reduced taxes and issuance of bonds represents future tax liabilities (Hakro, 2009).

Methodological and Empirical Review

In analysing the relationship between the budget deficit and the current account deficit, the most commonly used method employed in estimation is the co-integration approach, the Granger causality test, Vector Error Correction(VEC) model and the Vector Autoregressive (VAR) model (Chang and Hsu, 2009; Hashemzadeh and Wilson, 2006). The nature of this relationship is said to vary across countries and periods and different studies arrived at different conclusions as a results of difference in data set used and methodologies (Hashemzadeh and Wilson, 2006). Abbas et al (2010) identified three categories of methodologies broadly used to study the twin deficits relationship. The first category studies the impact of fiscal policy on external balance using causality tests and VARs. The second category analyze the long term correlation between indicators of fiscal policy and external imbalances using co-integration techniques and single or panel regression techniques. The third category invokes the narrative approach to identify exogenous changes in fiscal policy and uses regression analysis to study the impact on external imbalances.

This study takes a look at a review of some of the methods used in some previous studies carried out on the twin deficit relationship. Arize and Melinderos (2008) employed the conventional fractional co-integration approach and the multivariate Wald test for Granger causality in testing for dynamic linkages and causality between the budget and trade deficits for selected countries in Africa. Their study found a uni-directional causality and thus supported the twin deficit hypothesis. Ganchev (2010) used VAR and VEC model in his analysis for Bulgaria and his results rejected the twin deficit hypothesis in the short run but indicated it might be valid in the long run.

Egwaikhide (1997) did a simulation exercise by constructing a number of behavioural equations using descriptive statistics such as t-values, F-test, DW test, R2 and the standard error of the regression. His simulation experiments show that budget deficit, engendered by increased expenditure, leads to a deterioration of the current account. Korsu (2006) performed a similar simulation experiment to that of Egwaikhide (1997) to investigate the effects of fiscal deficits on the external sector performance for Sierra Leone, but he used a 3 Stage Least Squares (3SLS) approach. His study could not directly identify the direction of causality. Shukur and Hatemi (2002) tested the causality direction between the twin deficits in the US using the Rao s multivariate F-test combined with Bootstraps simulation technique which they argued has appealing properties. Their study found that there is a uni-directional causality which runs from current account deficit to budget deficit. Specifically, budget deficit granger causes current account deficit for 1975 to 1989 sub-period, while current account deficit granger causes budget deficit for the 1990 to 1998 sub-period. Afonso and Rault (2009) equally employed the Bootstrap panel Granger causality test to investigate existence of causality between current account balance and budget balance for different EU and OECD countries. Their results showed a causal relation from budget deficits to current account deficits for several EU countries: Bulgaria, Czech Republic, Estonia, Finland, France, Italy, Hungary, Lithuania, Poland, and Slovakia, along the lines of the so-called twin-deficit relationship.

Olga (2000) employed co-integration and Granger-causality test and found the transmission mechanism between the two deficits to be mainly through the exchange rate for Ukraine. The finding showed that budget deficits and current account deficit were co-integrated while uni-directional causality from budget deficit to current account deficit existed. Yanik (2006) employed co-integration, Granger-causality, VEC and impulse response in his methodology while using quarterly data for Turkey. He found that both deficits are counter-cyclical and move together in the long run indicating uni-directional causality, where current account deficit causes budget deficit, but not the reverse. Zamanzadeh and Mehrara (2011) and Celik and Deliz (undated) also used the same techniques of estimation for Iran and a number of emerging economies respectively. Their findings showed that bi-directional relationship existed between the government budget deficit and non-oil current account. Brian (undated) also used quarterly data of Argentina with co-integration, Granger-causality and chow test. He found that there was no determinable Granger-causal relationship between budget data and trade deficit data. Likewise Mukhtar et al (2007) who made use of quarterly time series data for Pakistan employing co-integration technique and Granger-causality test. Their study found that a long run relationship exists between the two deficits and also there was bi-directional causality between the two deficits.

Zengin (n.d)'s VAR model for Turkey indicated that trade deficit do not directly bring (Granger-causes) about budget deficits but that budget deficit directly affects trade deficits. Ratha (2011) employed the Bounds-testing approach to co-integration and error correction modelling on the monthly and quarterly data of India. He concluded that twin-deficits theory holds in the short-run, but not in the long run for India. Baharumshah, et al (2006) examined the twin deficit hypothesis in Indonesia, Malaysia, the Philippines and Thailand using co-integration, impulse response function and variance decomposition of the VAR model. Their study found long run relationships between budget and current account deficits. Also, for Thailand, there was a unidirectional relationship, which runs from budget deficit to current account deficit. For Indonesia the reverse causation (current account targeting) was detected while the empirical results indicate that a bi-directional pattern of causality exists for Malaysia and the Philippines. Abbas et al (2010) used panel regression and panel VAR for a number of countries ranging from low income countries to emerging economies and then advanced economies in his methodology. They concluded that the association between fiscal policy and the emergence of large external imbalances is limited. Hashemzadeh and Wade (2006) and Evan and Tang (2009) in emphasizing the dynamic relation between the two deficits employed the VAR technique and causality tests in their methodology for Cambodia, a transition economy in South East Asia. Hashemzadeh and Wade (2006) empirical findings suggest that the incidence of twin deficits appears to be country specific. And the observed cross-country variations with respect to the effects of fiscal deficits on current account deficits tend to show that the dynamic relationship between the two deficits is subject to change depending on the underlying tax system, trade patterns and barriers, monetary regimes, the exchange rate and a complex host of internal and international forces that shape a country's economic status in the global economy. Furthermore, their findings indicated that the presence

and the direction of causality between the two deficits is generally country specific and ambiguous in certain cases. For Evan and Tang (2009), their study of Cambodia also supports the twin deficits hypothesis in which the budget deficits do cause external deficits, in the short run while these two variables are moving together in the long run.

Chang and Hsu (2009) and Evan et al. (undated) adopted the Toda and Yamamoto (1995) modified WALD (MWALD) for testing Granger non-causality to evaluate the budget-current account nexus for the regional economy and Malaysia respectively. Chang and Hsu (2009) claimed that budget deficits do not cause any interest and exchange rate changes which thus have no effect on the current account imbalances while Evan *et al* (n.d) did not find a significant effect of the budget deficit on the current account. Fleegler (2006) did a cross-country empirical approach by employing the multi co-integration analysis in his methodology. The findings suggest that an economy's susceptibility to the twin deficits may be time-specific and influenced by a variety of factors. And specifically, a country's susceptibility is in part influenced by where the country is in the development process, who it trades with, and what it imports and exports. Rauf and Khah (2011) investigated the relationship between the twin deficit in Pakistan using simple OLS regression technique and Granger causality. They found that increase in the budget deficit is caused by a decrease of trade account deficit (the largest component in the current account) Egwaikhide et al (2002) employed simple regression equation and Granger-causality tests in their own methodology for a number of West African countries which includes Nigeria and found that budget deficit leads to a deterioration of the current account balance. Saleh (2006) employed the Unrestricted Error Correction Model (UECM) and bounds test (co-integration test) in testing the Keynesian proposition for Lebanon and his findings partially supported the Keynesian view of the "twin deficit" hypothesis. Schismita and Sudipta (2011) provided fresh evidence on the twin deficit hypothesis for India within a multi-dimensional system by giving descriptive statistics and analysis. Their study found that there was a reverse causation in the twin deficit hypothesis for India and oil prices helped complete the chain of reverse causation. Also, the direction of causation is unambiguously seen to run from oil prices to the external deficit to the fiscal deficit

Onafowora and Owoye (2006) found a positive relationship between trade and budget deficits in both the short run and long run. Their results supported the conventional Keynesian twin deficits position and refute the Ricardian equivalence hypothesis for Nigeria. Olga (2000) found budget deficit and current account to be co-integrated in which case budget deficit Granger-causes a current account deficit for Ukraine. Ganchev (2010) found the existence of dual causality between fiscal and current account deficits for the Bulgarian economy. Yanik (2006) using quarterly data of Turkey supported the REH or the twin divergence theory, stating that causality runs from current account deficit to budget deficits. Brian (undated) did the twin deficit analysis for Argentina and also did not find any relationship to exist between the two deficits. Zengin (undated) on the other hand supported the twin deficit hypothesis as he found budget deficit to influence trade balance. Ratha (2011) empirical results suggested that the twin deficit theory holds for India in the short run but not in the long-run.

Abbas et al. (2010) found the association between fiscal policy and emergence of large external imbalances to be limited. An improvement in the fiscal balance of 1% of GDP improves the current account balance by 0.2-0.3 percent of GDP upon impact in emerging and low income economies. Hashemzadeh and Wilson (2006) emphasized that the dynamic relationship between the two deficits is subject to change, depending on the underlying tax system, trade patterns and barriers, exchange rate and a host of internal and international forces that help to shape an economy. Chang and Hsu (2009) provided broader evidence on the debate of causal linkage between the budget and current account deficits for five North European countries, four Asian Tigers and the United States, concluding that most of the countries supported the twin deficit hypothesis but the strength varies across countries noting that none of the countries studied supported the REH.

Fleegler (2006) did a cross-country empirical approach of countries at different stages of development to ascertain the validity of the twin deficit theory and found multiple factors contribute to a country''s susceptibility to the twin deficit. Such factors include the country''s stage in its developmental process and its trading partners. Egwaikhide et al (2002)'s empirical result revealed that for 16 African countries including Nigeria, budget deficit leads to a deterioration of the current account balance. Mukhtar et al (2007) made use of quarterly data in testing the twin deficit theory in Pakistan and found a long run relationship to exist between budget and current account deficit. Their study however put a doubt on the use of single-equation approach to analysing the twin deficit hypothesis. Kulkarmi and Erickson (2001) tested the twin deficit hypothesis with the annual data of India, Pakistan and Mexico. They found no evidence of twin deficits and causality in Mexico, strong evidence for India and Pakistan. However, causality for Pakistan was in opposite direction, that is, a reverse causality.

Zamanzadeh and Mehrara (2011) found support for the twin deficit hypothesis in Iran, likewise the study of Jayaraman and Choong (2008) in Vanuatu, a small open Island economy in South Pacific. Celik and Deniz (undated) analyzed the Keynesian well-known twin deficit hypothesis for a group of emerging countries using quarterly data, they found support for the twin deficit theory. Saleh (2006) observed that in the case of Lebanon, causality runs from trade deficit to budget deficit, supporting the Keynesian view that there is a linkage between the two deficits. Shukur and Hatemi (2002) employed the Rao''s multivariate F-test combined with bootstraps simulation technique in testing for the twin deficit phenomenon in the US. They found structural breaks to be of paramount importance when causality test was conducted as both budget deficit and current account did not granger cause each other using the whole sample. After splitting the sample into two sub periods, results showed that budget deficit causes current account deficits in the first period while the opposite occurred for the second period. Mukhtar et al (2007) found a long run relationship between the deficits and bi-directional causality using quarterly time series data for Pakistan. Rauf and Khan (2011) using annual data found reverse causality to be strong in Pakistan.

Ratha (2011) employed the bounds-testing approach to co-integration and error correction modelling on monthly and quarterly data for India and concluded that the

twin deficit theory holds in the short run while the Ricardian Equivalence Hypothesis is what holds in the long run. The findings of Suchismita and Sudiptal (2011) supported reverse causality for India. Zengin (n.d) found support for the twin deficit hypothesis in Turkey using a VAR model and posterior probability bounds test. On the other hand, Yanik (2006), using Turkish quarterly data and the method of Granger-non-causality tests and VAR, found both budget deficit and current account to be counter-cyclical and supported the "twin divergence" or ricardian equivalence hypothesis for Turkey. Momdouth (2002) found that neither the twin deficit hypothesis nor the ricardian equivalence hypothesis was valid for Saudi Arabia as a petroleum economy. Zamanzadeh and Mehrara (2011) found support for the twin deficit hypothesis for Iran rather than the ricardian equivalence hypothesis. Neaime (2008)'s empirical results for Lebanon showed support for the existence of uni-directional causal relationship in the short run from budget deficit to current account deficit. Celik and Deniz (n.d) analysed the twin deficit phenomenon for 6 emerging economies and found support for the twin deficit hypothesis using advanced econometric techniques for the panel data. Arize and Melinderos (2008) using a panel of 10 African countries revealed that a positive long run relation exists however, weak link between the two deficits was found in the short run and that budget deficits causes current account deficits.

Below is a summary of empirical studies, their type of data set, the methodology they employed and their results in tabular form.

Table 1. Synopsis of Empirical Studies from the Literature

S/N	Author	Methodology	Transmission Mechanism	Direction of Causality	Findings/Results
1.	Onafowora and Owoye (2006)	Nigeria, annual data, 1970-2001, co-integration, Granger-causality and VEC model.	Interest rate was found to be strongly exogenous.	Uni-directional Causality from trade deficit to budget deficit.	A positive long run relationship exists between trade deficits and budget deficits. Supports conventional "twin deficit" hypothesis
2.	Olga (2000)	Ukraine, quarterly data, 1995:1 to 1999:4, co-integration and Granger-causality.	Transmission works mainly through the exchange rate.	Uni-directional Causality from budget deficit to current account deficit.	Budget deficits and current account deficit were found to be co-integrated.
3.	Ganchev (2010)	Bulgaria, annual data, 2000-2010, Granger-causality, VAR and VEC model.		Dual causality between fiscal and current account deficits.	Findings reject the "twin deficit" hypothesis in the short-run, but indicate that it might be valid in the long run.

4.	Yanik (2006)	Turkey, quarterly data, 1988:1 to 2005:2, co-integration, Granger non-causality, VAR and impulse-response analysis.	Short-run impacts of budget deficit on current account deficit are through the real exchange rate and real interest rate channels.	Uni-directional causality, current account deficit causes budget deficit, but not the reverse.	Both deficits (CAD and BD) are counter-cyclical and move together in the long run. Supports "twin divergence" or the Ricardian Equivalence Hypothesis.
5.	Arize and Melinderos (2008)	10 African countries, quarterly period 1973:2 to 2005:4. Fractional co-integration approach and error correction mechanism.		Uni-directional causality	Supports twin deficit hypothesis.
6.	Zengin (undated)	Turkey, quarterly data, 1987:1 to 1998:1, Granger-causality and VAR model.	Transmission is through interest rate and exchange rate.	Direct causal relation exists from budget deficit to trade deficit.	Supports the conventional "twin deficit" hypothesis.
7.	Ratha (2011)	India, monthly and quarterly data, 1998-2009, bounds-testing approach to co-integration and error-correction modelling.			Twin-deficits theory holds in the short-run, but not in the long run.
8.	Abbas et al. (2010)	124 countries, annual data, 1985-2007, panel VAR.		Association between fiscal policy and the emergence of large external imbalances is limited.	The impact is longer-lasting in emerging countries than in advanced countries.
9.	Hash-emzadeh and Wade (2006)	Egypt, Iran, Jordan, Kuwait, Syria, Oman, Morocco, Turkey and Yemen. Annual data, 1970-1990. Causality test and VAR.		Correlation between the two deficits is both complex and ambiguous.	Dynamic relationship between the two deficits is subject to change depending on some underlying factors.

10.	Chang and Hsu (2009)	5 North European countries, 4 Asian Tigers and the United States. Annual and quarterly data,1980 to 2007 Modified WALD test and Granger non-causality procedure.	Transmission mechanism varies across different countries. For some, interest rate, for others, exchange rate.	Direction of causality varies across the different countries.	Shows support for "twin deficit" hypothesis, though the strength varies across countries.
11.	Fleegler (2006)	US, South Korea, Mexico, Peru and Costa Rica, annual data, 1970-2004. Multi co-integration analysis.		Significant positive correlation exist between the twin deficits for most of the economies.	An economy's susceptibility to the twin deficits may be time-specific and influenced by a variety of factors.
12.	Egwaikhide et al. (2002)	16 African countries, annual data, 1970-1999, OLS and Granger-causality test.		In group, causality runs from current account to budget deficit.	Budget deficit leads to a deterioration of the current account balance
13.	Mukhtar et al. (2007)	Pakistan, quarterly time series data, 1975-2005, co-integration, Granger-causality and simultaneous equation model.		Bi-directional causality runs between the two deficits.	A long run relationship exists between the two deficits.
14.	Saleh (2006)	Lebanon, annual data, 1975-2003, co-integration (bounds test), Granger-causality and Unrestricted Error Correction Model (UECM)		Causality runs from trade deficit to budget deficit.	Results partially support the Keynesian view of the "twin deficit" hypothesis.
15	Zamanzadeh and Mehrara (2011)	Iran, annual data, 1959-2007, co-integration technique and Vector Error Correction Model (VECM).		Bi-directional relationship exists between the government budget deficit and non-oil current account.	Supports the twin deficit hypothesis.

16	Celik and Deniz (undated)	Brazil, Czech Republic, South Africa, Colombia, Mexico and Turkey, quarterly data, 1996Q1 to 2006Q4, panel co-integration technique.			Twin deficit hypothesis is supported using advanced econometric techniques for the panel data.
17.	Jayaraman and Choong (2008)	Vanuatu, annual data, 1983-2005			Evidence support twin deficit hypothesis.

Source: Compiled by the Authors

In some of the studies where evidence has been inconclusive, many reasons can be adduced to this. One important factor is the differences in data set used and methodologies (Hashemzadeh and Wade, 2006). Another reason include the possibility of excessive trade deficits plunging an economy into a recession and subsequently leading to a financial or solvency crisis in which large injections of public fund may be needed to rehabilitate the struggling financial sector or minimize the severity of a recession, Kim and Kim (2006).

Some Stylized Facts on the Twin Deficits in Nigeria

Nigeria is an oil-exporting country where the revenues from oil production contribute more than 95% of its foreign exchange earnings, 40% of Gross Domestic Product (GDP) and 80% of its fiscal revenues (Onafowokan and Owoye, 2006). The economy therefore provides a good study to test if the theory of the twin deficit on the direction of causality is valid as this dependency exposes the country to oil price shock and volatility, thereby causing fluctuations in government revenues leading to erratic patterns in public expenditure. A striking feature of Nigeria‟s fiscal operations since the second half of the 1970s is persistent and rising budget deficits (Egwaikhide, 1997). These rising budget deficits were according to Gadong (2009) as a result of the oil boom of the early 1970s, in which case the discovery and exploration of oil in commercial quantity led to an escalation in the government budget. In 1975, with the oil glut, fiscal deficits emerged in the economy. This trend continued until 1994 with the exception of 1979 and later in 1997, the trend started again.

Nigeria was one of the many developing countries that adopted the Structural Adjustment Programme (SAP) during the mid-1980s in the attempt to reduce the role of the public sector in the economy, reduce the share of fiscal deficit in the GDP, restore balance of payment equilibrium and maintain a stable price level (Onafowokan and Owoye, 2006). But as argued by Gadong (2009), the growth of government bureaucracy permitted by the oil boom, as well as the establishment of public corporations that had to be maintained even after government revenue (mainly from oil) had declined made government expenditures to remain high. Table 2 shows the budget and current

account deficit of Nigeria from 1982 to 2010. From the table, it can be observed that over the periods when fiscal deficits were sustained, these deficits as proportions of GDP went as high as 12.44 percent in 1982, 11.94 percent in 1986, 11.45 percent in 1991, 9.53 percent in 1993 and 8.93 percent in 1999. This aggravated the economy's debt profile from both domestic and foreign source prior to the debt cancellation the country received in 2005. Notice that fiscal deficits for the years between 1982 and 1994 all exceeded 4 percent of GDP.

Also, developments in the external sector revealed that periodic deficits in the current account have characterized Nigeria''s balance of payment profile. Egwaikhide (1997) stated that the current account deficit deteriorated from ₦259 million in 1976 to ₦5.2 billion in 1982, though relatively large surpluses were recorded in the last 12 years. A close inspection of available data from figure 1a and 1b show some degree of association between budget deficit and the current account deficit for most of the years. Budget deficit was recorded for most of the years, though some years experienced a current account surplus.

Figure 1a. Graph of Budget and Current Account Deficits for Nigeria, 1970 to 2010
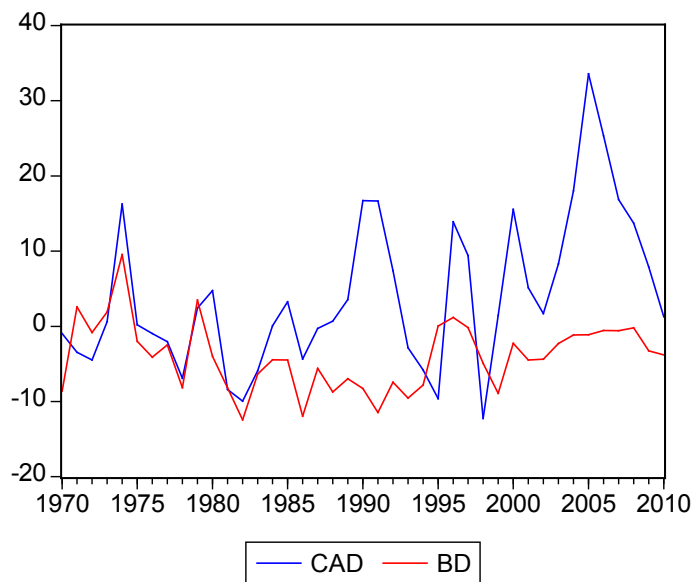
Source: CBN Statistical Bulletin (2010)

Figure 1b. Graph of Budget and Current Account Deficits for Nigeria (1970 – 2010)
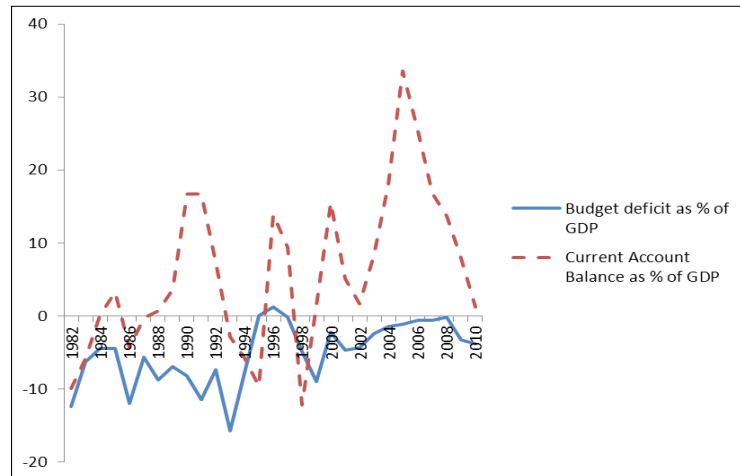
Source: CBN Statistical Bulletin (2010)

From the graph above, it can be observed in the earlier periods, both deficits move together even as they fluctuate. From the 1990s to recent periods, the current account balance has been more of a surplus than a deficit while the budget balance continues to be in deficit. This brings to mind the issue of the validity of the twin deficit hypothesis for the Nigerian economy being a oil-dependent economy. In other words, if the hypothesis holds for Nigeria, does causality still run from budget deficit to current account deficit? According to Mamdouh (2002), the Keynesian approach which implies the existence of a direct relationship from the budget deficit towards the trade deficit may not be applicable to an oil-based economy. This is because the basic source of income in an oil-based economy like Nigeria is revenue from oil export and these revenues affect government revenue and export of goods and services. It thus becomes imperative to ascertain if the direction of causality will flow from current account deficit to budget deficit.

Model Specification

Following the theoretical literature and methodology of previous empirical studies, a model can thus be specified for this study that current account deficits of Nigeria depends on government budget deficits, domestic income(real GDP), money supply, domestic interest rates and real exchange rate. Theoretically, the relationship between the twin deficits can be presented in an implicit form to give this equation:

$$CAD_t = f(BD_t, MON_t, RGDP_t, INT_t, RER_t) \qquad (1)$$

The explicit form of the model showing the linear relationship between current account deficit and budget deficit is given as follows:

$$CAD_t = \alpha_o + \alpha_1 BD_t + \alpha_2 MON_t + \alpha_3 RGDP_t + \alpha_4 INT_t + \alpha_5 RER_t + e_t \quad (2)$$

Where CAB_t is current account balance as a percentage of GDP; BD_t is budget balance as a percentage GDP; MON_t is broad money supply as a percentage of GDP; $RGDP_t$ is real GDP (proxy for domestic income); INT_t is the prime lending rate; RER_t is the real exchange rate and e_t is a white noise disturbance. α_1, α_2, α_3, α_4 and α_5 are the unknown parameters.

Technique of Estimation

The econometric analysis of the relationship between the fiscal and current account deficits usually involves the application of Granger causality (Chang and Hsu, 2006, Ganchev, 2010) and Vector Autoregressive Models (Hashemzadeh and Wilson, 2006). Thus, in line with most empirical work on twin deficit hypothesis, this study tests for the long run equilibrium relationship and direction of causality between budget and current account deficit. In doing this, the study will carry out a stationarity test, co-integration test and multivariate Granger causality test. The stationarity test helped determine if the time series are stationary or not as empirical literature has argued that estimation of time series data that have unit root will produce a spurious result. Also, the co-integration procedure will help explore the possible long run relationships among the variables in the model and interpret the evidence of this relationship as the interdependence between the variables. The Granger causality test will be carried out within the multivariate framework as against the bivariate framework that is commonly used. This will help to determine the direction of causality and feedback among the variables.

The Granger causality test thus helps to determine the direction of causality between the current account deficits and the budget deficit. This study however employs an alternative methodology for testing the causality direction between the twin deficits for Nigeria, which is the multivariate Granger-causality rather than the bivariate framework. The results of the multivariate framework are said to be more informative and reliable than the results of the bivariate framework, (Tang, 2010). Also, the Granger causality tests with the bivariate framework are likely to be biased owing to the omission of relevant variables that affects the relationship between the two deficits and their interacting variables.

The basic idea of the Granger causality is that one variable or time series can be called "causal" to another if the ability to predict the second variable is improved by incorporating information about the first, (Barret et al, 2010; Onafowokan et al, 2006). In other words, variable Y granger-causes X if in a statistically suitable manner, Y assists in predicting the future of X beyond the degree to which X already predicts its own future. According to Barret et al (2010), the Granger causality idea can be extended to the conditional case as well where Y is said to Granger cause Y conditional on Z if Y assists in predicting the future of X beyond the degree to which X and Z together already predict the future of X. This conditional Granger causality is what is termed multivariate Granger causality (Barret et al, 2010).

The Granger causality test will be performed with annual data of budget, current account deficit data and the interacting variables between the two deficits. The Augmented form of the Granger causality test involving the ECM is formulated in a multivariate p^{th} order Vector Error Correction (VEC) model and is given below:

$$\Delta Y_t = C_i + \Sigma \, \Pi_t \, \Delta Y_{t-k} + \lambda_i + ECM_{t-1} - 1 + \varepsilon_{it} \qquad (3)$$

Where:

ΔYt = 6x1 vector matrix of variables.
Πt = 6x6 square matrix of βit
$\Delta Yt-k$ = 6x1 vector matrix of lagged values of variables.
$ECMit$ = 6x1 vector matrix of the error correction model.
εit = 6x1 vector matrix of the error terms.

The above matrix equations can also be written in the following form:

$$\Delta CAD_t = \alpha_1 + \Sigma\beta_1\Delta CAD_{t-i} + \Sigma\theta_1\Delta BD_{t-i} + \Sigma\delta_1\Delta MON_{t-i} + \Sigma\gamma_1\Delta RGDP_{t-i} + \Sigma\lambda_1\Delta INT_{t-i} + \Sigma\rho_1\Delta RER^{t-1} + \Pi ECM_{t-1} + \varepsilon_t \qquad (4)$$

$$\Delta BD_t = \alpha_2 + \Sigma\beta_2\Delta BD_{t-i} + \Sigma\theta_2\Delta CAD_{t-i} + \Sigma\delta_2\Delta MON_{t-i} + \Sigma\gamma_2\Delta RGDP_{t-i} + \Sigma\lambda_2\Delta INT_{t-i} + \Sigma\rho_2\Delta RER_{t-1} + \Pi ECM_{t-1} + \varepsilon_t \qquad (5)$$

$$\Delta MON_t = \alpha_3 + \Sigma\beta_3\Delta CAD_{t-i} + \Sigma\theta_3\Delta BD_{t-i} + \Sigma\delta_3\Delta MON_{t-i} + \Sigma\gamma_3\Delta RGDP_{t-i} + \Sigma\lambda_3\Delta INT_{t-i} + \Sigma\rho_3\Delta RER_{t-1} + \Pi ECM_{t-1} + \varepsilon_t \qquad (6)$$

$$\Delta RGDP_t = \alpha_4 + \Sigma\beta_4\Delta CAD_{t-i} + \Sigma\theta_4\Delta BD_{t-i} + \Sigma\delta_4\Delta MON_{t-i} + \Sigma\gamma_4\Delta RGDP_{t-i} + \Sigma\lambda_4\Delta INT_{t-i} + \Sigma\rho_4\Delta RER_{t-1} + \Pi ECM_{t-1} + \varepsilon_t \qquad (7)$$

$$\Delta INT_t = \alpha_5 + \Sigma\beta_5\Delta CAD_{t-i} + \Sigma\theta_5\Delta BD_{t-i} + \Sigma\delta_5\Delta MON_{t-i} + \Sigma\gamma_5\Delta RGDP_{t-i} + \Sigma\lambda_5\Delta INT_{t-i} + \Sigma\rho_5\Delta RER_{t-1} + \Pi ECM_{t-1} + \varepsilon_t \qquad (8)$$

$$\Delta RER_t = \alpha_6 + \Sigma\beta_6\Delta CAD_{t-i} + \Sigma\theta_6\Delta BD^{t-i} + \Sigma\delta_6\Delta MON_{t-i} + \Sigma\gamma_6\Delta RGDP_{t-i} + \Sigma\lambda_6\Delta INT_{t-i} + \Sigma\rho_6\Delta RER_{t-1} + \Pi ECM_{t-1} + \varepsilon_t \qquad (9)$$

The choice of the test is in line with the Mudell-Fleming theory. Many studies have been done using the Ricardian Equivalence Hypothesis (REH) especially in Nigeria as such this study tries to extend this by using the Mudell-Fleming theory.

Description of Variables and A priori Expectations

Current Account Deficit as a percentage of GDP (CAD): This represents the sum of the difference between imports of goods and services, exports of goods and services plus net income from abroad and is measured as percentage of GDP. It is the dependent variable in the model of the twin deficit.

Budget Deficit as a percentage of GDP (BD): This represents the excess of government expenditure over revenues for different years measured as percentage of GDP. It is expected to have a positive sign as increases in government budget deficit will lead to a deterioration of the current account balance while reduction in budget deficit will improve the current account balance.

Money Supply as percentage of GDP (MON): This is simply defined as M2 which is broad money calculated as a percentage of GDP. It consists of narrow money in addition to savings and time deposits with banks including foreign denominated deposits. It is expected to have a positive sign as increases in money supply will improve the current account balance, that is reduce the current account deficit in the long run.

Real Gross Domestic Income (RGDP): This is used as a proxy for domestic income. It is the Gross Domestic Product at constant basic prices and is expected to be negatively signed as increases in domestic income have the effect of worsening (enlarging) the current account deficits in the long run.

Interest Rate (INT): This is the Prime lending rate which is the interest rate charged by banks to customers for loanable funds which is to be used for investment purposes. This is expected to be negatively signed as increases in domestic interest rate which is as a result of increases in aggregate demand will increase imports and worsen the current account balance in the long run.

Real Exchange Rate (RER): This is the official exchange rate at which the local currency which is the naira exchanges for a dollar. It is expected to have a negative sign as the appreciation of the domestic currency will worsen the current account balance in the long run and vice versa.

Data Sources and Measurement

This study made use of annual data for Nigeria for the period 1970 to 2010 (40 years). The current account balance, budget balance and the money supply (M2) were calculated as percentage of GDP and is represented by CABt, BBt and MONt respectively. Also, to account for different channels of interaction between the current account balance and the budget balance, other variables were included in the analysis. They include Real GDP (as a proxy for domestic income) represented as RGDP, treasury bills rate (used as a proxy for interest rate) and represented as TBR and real interest rate represented as RER. All the variables are in percentage in exception of Real GDP which is in naira, the interest rate which is in rate and the exchange rate which represents the rate at which the naira exchanges for a dollar. The data for the study was

sourced from the 2010 edition of the CBN Statistical Bulletin and the World Bank Development Indicators (WDI).

Presentation and Discussion of Results

Correlation Matrix

The correlation matrix helps to identify the level of correlation that exists among the independent variables. From Table 2, it can be observed that budget deficit has a 44 percent positive correlation with the current account deficit while real exchange rate has a strong positive correlation with the current account deficit with 58 percent. This implies that budget deficit is averagely correlated with the current account deficit. Also, only money supply has a negative and weak correlation of about 26 percent with current account deficit. In the same vein, the RGDP and the interest rate has a positive correlation of 50 percent and 29 percent respectively.

Table 2. Correlation Matrix

	CAD	BD	MON	RGDP	INT	RER
CAD	1.000					
BD	0.434	1.000				
MON	-0.266	-0.554	1.000			
RGDP	0.501	0.010	0.235	1.000		
INT	0.293	-0.243	-0.188	0.606	1.000	
RER	0.579	0.184	0.027	0.886	0.462	1.000

Source: Author's computation with E-Views

Where CAD is current account deficit as a percentage of GDP, BD is budget deficit as percentage of GDP, MON is money supply as percentage of GDP, RGDP is real GDP, INT is prime interest rate and RER is official exchange rate.

Unit Root Test

The next step is the determination of the time series properties of each variable based on unit root tests. This is used to determine if the time series variables under observation are stationary or not. This is because most time series data sets are often found not to be stationary and estimation with such data produces a spurious result. Various methods are often used to test for stationarity of variables, they include Dickey-Fuller (1979 & 1981), Augmented Dickey-Fuller (1979), GLS Detrended Dickey-Fuller (GLS-DF, 1996), Phillips-Perron (1998), Kwiatkowski-Phillips-Schmidt-Shin (KPSS, 1992), Ng-Perron (2001) among others. However, this study employed the Augmented Dickey-Fuller (ADF) unit root test to test for non-stationarity or otherwise of the variables. Table 3 below presents the results of the stationarity test for each of the variables.

Table 3. Augmented Dickey-Fuller (ADF) Unit Root Test

SERIES	ADF at Levels	ADF at First Difference	Order of Integration
CAD	**-3.499651****	-6.782101	I (O)
BD	**-4.013597***	-9.203227	I (O)
MON	-1.621164	**-5.885483***	I (1)
RGDP	1.975411	**-5.303351***	I (1)
INR	-1.472475	**-9.781999***	I (1)
RER	0.571636	**-5.795255***	I (1)

Source: Author's computation with E-views

Note: A variable is stationary when the ADF t-stat is greater than the critical values at a given level of significance. * and ** indicates stationarity at 1 percent and 5 percent level of significance.

From the table 3 above, it can be observed that only the budget deficit and current account were stationarity at levels at 1 percent and 5 percent level of significance respectively, the others were found not to be stationary at levels. However, all the variables became stationary after the first differencing; in other words, all the variables were integrated of order 1 that is I(1). Thus, the null hypothesis of the presence of a unit root is rejected at first difference as the absolute values of the ADF statistics were greater than the critical values at 1 percent level of significance.

Co-integration Test

Having ascertained the order of co-integration, the next step is to test for the existence of a long run relationship between budget deficit and current account deficit together with their interacting variables. The purpose of the co-integration test is to determine whether a group of non-stationary series is co-integrated or not. Engle and Granger (1987) pointed out that if the linear combination of non-stationary series exists, then the non-stationary time series are said to be co-integrated. The stationary linear combination is called the co-integrating equation and may be interpreted as a long run equilibrium relationship among the variables. In the study, the multivariate Johansen co-integration test will be used as against the Engle and Granger two-step procedure.

According to Tang (2010), the major advantage of using the multivariate co-integration approach is that it has superior properties in particular for two or more variables in a system as it is not sensitive to the choice of dependent variables as it assumes all variables to be endogenous. Also, the Johansen test is preferred to the Engle and Granger two step procedure as the latter first estimates the regression equation and test for stationarity of the residual, this can bring about the transmission of errors. In addition, the Johansen method shows the number of co-integrating equations as well as the estimation of the long run equation which is not possible with the Engle and Granger two step procedures (Arize and Melinderos, 2008).

Johansen proposes two different likelihood ratio tests of significance of theses economical correlations. These are the trace tests and the maximum eigen value tests. The trace test statistics tests the null hypothesis "there are at most r co integrating relations" against the alternative hypothesis of "m co integrating relations" (that is, the series are stationary), $r = 0, 1, 2, ..., m$-1. The maximum eigen value on the other hand test the null hypothesis "there are co-integrating relations" against the alternative hypothesis "there are r + 1 co-integrating relations". The co-integration rank test which is to test the number of co- integrating vectors was done under the assumption that the series have no deterministic trend and have intercept. This is because a number of the variables were found to have intercepts when the line graph was constructed. The results of the Johansen co-integration test is presented in table 4 and 5.

Table 4. Johansen Co-integration Test (For Trace Stat.)

Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.683006	130.3979	103.8473	0.0003
At most 1 *	0.589095	85.59187	76.97277	0.0095
At most 2	0.463455	50.90557	54.07904	0.0932
At most 3	0.350045	26.62396	35.19275	0.3082
At most 4	0.158355	9.820732	20.26184	0.6574
At most 5	0.076345	3.097264	9.164546	0.5627

Source: Author's computation with E-views.
Trace indicates 2 co-integrating equations at 0.05 level.
* denotes rejection of hypothesis at 0.05 level.

Table 5. Johansen Co-integration Test (Max-Eigen value Stat.)

Hypothesized No. of CE(s)	Eigen value	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.683006	44.80599	40.95680	0.0176
At most 1	0.589095	34.68630	34.80587	0.0517
At most 2	0.463455	24.28162	28.58808	0.1613
At most 3	0.350045	16.80322	22.29962	0.2450
At most 4	0.158355	6.723468	15.89210	0.7031
At most 5	0.076345	3.097264	9.164546	0.5627

Source: Author's computation with E-views.
Max-Eigen stats indicate 1 co-integrating equation at 0.05 level.
* denotes rejection of hypothesis at 0.05 level.

The result of the trace and maximum Eigen value summarized in Table 4 and 5

indicates the possibility of rejecting the null hypothesis that says there are no co-integrating vectors at 5 percent level of significance. This confirms the existence of long run equilibrium relationship between budget deficit and the current account deficit as the trace statistics indicates 2 co-integrating relationship while the maximum Eigen value indicates 1 co-integrating relationship, which means that they do not diverge away from each other in the long run. However, in this study, the indication of the maximum Eigen value test is followed. This is because the maximum Eigen value test is more likely to give normal result as regards the number of equations in the model that would converge towards the long run equilibrium path.

Table 6. Normalized Co-integrating Coefficients (Standard Error in Parenthesis)

CAD	BD	MON	LRGDP	INT	RER	C
1.000000	0.275883	0.443051	-4.24E-06	-0.385598	-0.165482	-5.985680
	(0.42769)	(0.20966)	(1.4E-05)	(0.29101)	(0.04313)	(5.75258)

Source: Author's computation with E-views
Max-Eigen stats indicate 1 co-integrating equation at 0.05 level.
* denotes rejection of hypothesis at 0.05 level.

Furthermore, the estimates of the normalized co-integrating vector generated by the co-integration test is reported at the bottom of table 6 showing long run effect of budget deficit (BD) and the other interacting variables. The related t-statistics are reported in parenthesis below each coefficient. The existence of a unique co-integrating vector here implies that equilibrium relationship exists among the co-integrating variables and that no matter the fluctuation in the short run; these variables have a tendency to return to this equilibrium path in the long run. In other words, given an initial disequilibrium, the co-integrating variables will not wander away from one another endlessly but will eventually return to its established equilibrium path.

From the normalized co-integrating coefficients above, it can be observed that only money supply and exchange rates were found to be statistically significant given their t-statistics. Also, the budget deficit and money supply were negatively signed while the RGDP, interest rate and exchange rate were positively signed. In other words, in the long run, a 1 percent change in BD will lead to approximately a 28 percent decrease in the current account deficit but it is not significant. Also, a 1 percent change in money supply will result to about 44 percent decrease in the current account.

Multivariate Granger Causality Test

Given that the variables are not co-integrated, the ECM (using the Johansen) cannot be applied as such, we proceeded to carry out the causality test. The Granger causality test thus, helps to test the existence of causality and determine its direction. In most studies on the relationship between the budget deficit and the current account deficit, the most commonly used type of Granger causality is the bivariate framework. The Granger causality tests with the bivariate framework are said to be biased owing to the

omission of relevant variable(s) that affects the relationship between the twin deficits (Tang, 2010).

Also, the multivariate Granger causality shows how the other variables individually and jointly Granger causes the dependent variable. This is a remarkable improvement over the bivariate framework. This study employs the Vector Error Correction (VEC) Granger causality/Block Exogeneity Wald test to test for the multivariate Granger causality which shows causality among the variables of interest. The multivariate Granger causality can be performed in various ways but this study will use the Granger causality Block Wald test within the VEC model framework. The result is presented in table 7 through 12 below.

VEC Granger Causality/Block Exogeneity Wald test

Table 7. Dependent Variable; D (CAD)

Excluded	Chi-Square	df	Prob
D(BD)	1.381567	2	0.5012
D(MON)	5.089605	2	0.0785
D(RGDP)	2.220917	2	0.3294
D(INT)	1.524860	2	0.4665
D(RER)	1.117600	2	0.5719
ALL	12.78470	10	0.2360

Source: Author's computation with E-views

Table 8. Dependent Variable; D (BD)

Excluded	Chi-Square	df	Prob
D(CAD)	5.088710	2	0.0785
D(MON)	2.399733	2	0.3012
D(RGDP)	8.187262	2	0.0167
D(INT)	3.559773	2	0.1687
D(RER)	2.178612	2	0.3364
ALL	17.59277	10	0.0622

Source: Author's computation with E-views

Table 9. Dependent Variable; D (MON)

Excluded	Chi-Square	df	**Prob**
D(CAD)	1.662903	2	0.4354
D(BD)	3.195489	2	0.2024
D(RGDP)	5.180465	2	0.0750

D(INT)	1.613148	2	0.4464
D(RER)	2.191019	2	0.3344
ALL	9.580632	10	0.4780

Source: Author's computation with E-views

Table 10. Dependent Variable; D (RGDP)

Excluded	Chi-Square	df	Prob
D(CAD)	8.221225	2	0.0164
D(BD)	6.546916	2	0.0379
D(MON)	13.92505	2	0.0009
D(INT)	3.758688	2	0.1527
D(RER)	2.749333	2	0.2529
ALL	31.79899	10	0.0004

Source: Author's computation with E-views

Table 11. Dependent Variable; D (INT)

Excluded	Chi-Square	df	Prob
D(CAD)	8.401906	2	0.0150
D(BD)	0.773984	2	0.6791
D(MON)	0.626852	2	0.7309
D(RGDP)	0.984094	2	0.6114
RER	0.345336	2	0.8414
ALL	16.02099	10	0.0990

Source: Author's computation with E-views

Table 12. Dependent Variable; D (RER)

Excluded	Chi-Square	df	Prob
D(CAD)	0.161862	2	0.9223
D(BD)	0.411191	2	0.8142
D(MON)	4.550628	2	0.1028
D(RGDP)	0.611457	2	0.7366
D(INT)	2.117522	2	0.3469
ALL	7.449806	10	0.6824

Source: Author's computation with E-views

Applying the WALD test, the results from table 8 shows that the causality between budget deficit and current account deficit does not exist, but rather from current account deficit to budget deficit. The value 0.5012 is not statistically significant showing that budget deficit does not granger cause current account deficit. Only

money supply was found to granger cause the current account deficit at 5 percent level of significance even though their joint p-value was found not to be significant (0.2360). However, Table 9, the probability value of current account deficit which is 0.0785 shows that current account deficit significantly granger cause the budget deficit at 5 percent level of significance when budget deficit is the dependent variable. This result implies that only a unit-directional causality exists between the twin deficit and it flows from current account deficit to budget deficit as against the proposition of the Keynesians that the flow is from budget deficit to current account deficit. In other words, for the Nigerian economy, reverse causality is what is evident.

A possible reason for this reverse relationship is that budget policies in Nigeria have been accompanied by substantial external trade deterioration. And given that increase in government spending is mostly transitory, it has little or no effect on the permanent income and consequently consumption plans of domestic households. Thus, when the government uses debt to finances increases in its spending, it leads to a near static increase in domestic private savings while the budget deficit incurred will have a near proportional effect on the current account. Basically, the budget deficit will lead to higher interest rates and this higher interest rates lead to the appreciation of the exchange rate and this leads to the widening of current account deficit. The results obtained though consistent with many other results may not be generalizable given that the Nigerian economy, being an oil rich country that relies much on oil revenue, may be affected by occurrences that affects the oil market and subsequently the price of oil internationally.

The result of this study confirms the earlier result from Egwaikhide, et al (2002) for Nigeria. Furthermore, it supports the findings of Kulkarmi and Erickson (2001) for Pakistan; Neaime (2008) for Lebanon; Arize and Melinderos (2008) for selected 10 African countries including Nigeria; Suchismita and Sudiptal (2011) for India and Rauf and Khan (2011) for Pakistan, among others.

Summary of Findings, Policy Implications of Result and Conclusion.

This study investigates the twin deficit relationship in an oil-dependent open economy like Nigeria where exports, government revenue and income are closely linked with oil revenue. The study attempted to prove that even in a petroleum economy, the Keynesian proposition of a long run equilibrium relationship exists between the twin deficits, but the direction of causality is reversed. The study showed that the twin deficits hypothesis was valid for the Nigerian economy as the result from the co-integration test showed the existence of long run equilibrium relationship between the budget deficit and the current account deficit. Also, the study found strong support for reverse causation also known as "current account targeting" for Nigeria. This implies that even the Mundell-Fleming model was valid for Nigeria; the direction of causality was not from budget deficit to current account deficit but rather from current account deficit to budget deficit. This can be attributed to the nature of the Nigerian economy being an oil-based and oil-dependent economy.

The economic implication of this phenomenon is very important for the Nigerian economy. The reverse causality that was found to exist for Nigerian implies that if the Nigerian government intends to reduce the "twin deficit" phenomenon in Nigeria, it must begin by reducing the current account deficits. In other words, policies showed should be geared towards controlling the deficit in the current account most especially by diversifying the export base of the economy by promoting non-oil exports. Since the current account balance of Nigeria depends on oil prices, the government should endeavour to diversify the sources of the National income by encouraging exports of non-oil products and reducing imports.

The multivariate Granger causality test which was done using the Wald/exogenueity test within the VECM framework showed a uni-directional causality flowing from the current account deficits to the budget deficits in Nigeria for the period of review by this study. The result of the Wald Test showed that the causality between budget deficit and current account does not exist, but rather the current account deficit is the one that causes the budget account deficit for the Nigerian economy. The ECM which shows the speed of adjustment back to equilibrium reflected that the model has about 59 percent adjustment to equilibrium from the long run to the short run which is a moderate adjustment. The examination of the relationship between the twin deficits has important policy implications for the economy. Firstly, persistent large deficits is believed to cause indebtedness as government will tend to resort to borrowing internally and externally which may affect the debt profile of such economy. Secondly, it imposes burden on the future generations as debt incurred by the government to finance the deficits is carried into future generations. Also, since increases in current account deficit reflect escalating government budget deficits, the current account deficit cannot be remedied by just fiscal consolidation as argued in some empirical literature. Similarly, if the causal role of the twin deficit is incorrect, then reductions in the federal budget deficit may not resolve the current account dilemma causing diversion of scarce economic resources from relevant sectors.

Based on the study's findings, it was recommended that: If government intends to reduce its "twin deficit" dilemma, it must begin by reducing its current account deficits and this can be achieved by reducing imports, increasing exports or a combination of both measures. Also, since the findings of this study showed evidence of reverse causation from current account deficits to budget deficits, adjustments in fiscal balance can only be achieved through the implementation of strong external policies. The strong found that of all the interacting variables, only money supply Granger causes current account deficits. This implies that changes in the money supply base of the Nigerian economy will impact significantly in the current account balance. So the Central Bank of Nigeria must endeavour to consciously monitor the supply of money in the economy. In reducing the current account deficit, increase in domestic savings is required which in turn requires the development of a strong financial sector.

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How Micro-Level Determinants Affect the Capital Structure Choice: Evidence from Bosnia and Herzegovina

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Abstract: *The purpose of this study is to examine two leverage ratios using a sample of non-financial companies in Bosnia and Herzegovina (BiH). It was done by taking into account the joint effect of traditional capital structure determinants and managers' personal values and aspirations. We applied hierarchical regression analysis to determine the contribution of profitability indicators, firm size indicators, assets, growth, networking, managerial strategies, managerial psychology, managerial human capital and earnings volatility to explain the variance in capital structure. The results suggest that companies with less experienced owners/managers and higher firm growth have higher financial leverage ratios. In the analysis of the balance sheet leverage, financial proxies of capital structure seem to be significant in explaining capital structure variance. Therefore, companies with lower profitability, a lower level of fixed assets and higher growth opportunities have higher balance sheet leverage ratios. The findings provide better understanding of theoretical perspectives that can best explain how companies choose their capital structure in the transition economy context. Furthermore, empirical findings should help corporate managers to make optimal capital structure decisions.*

Introduction

Although there is a universal consensus that financial theories have contributed to the understanding of capital structure decision-making, these financial theories disregard the role played by firm management in determining capital structure, especially for small and medium-sized enterprises (SMEs), where managers exert a greater influence on the financing decisions compared to larger firms (Norton, 1991; Matthews et al., 1994), as is the case in Bosnia and Herzegovina (BiH). Considering the significance of management influence in making financing decisions, management researchers have developed a variety of alternative theoretical frameworks based on diverse paradigms (as strategic management, psychology and sociology) to describe how financing decisions in SMEs are made (Barton and Matthews, 1989; Matthews et al., 1994; Romano et al., 2000; Ang et al., 2010; Hackbarth, 2008).

This group of different management-based theories required an overall theoretical framework until Van Auken's (2005) launch of a model illustrating the dynamics of SMEs capital acquisition decisions, which recognized the primary determinants influencing the decisions on capital acquisition as being built on managerial characteristics and attitudes. This model incorporates a number of managerial factors which may affect the capital structure choice such as experience, risk preference, growth intentions and networking. Using the theoretical structure of Van Auken's (2005), we identify managers' influences on capital structure as consisting of managerial features (managerial network ties, education and experience) and attitudes (managerial aversion to external control, risk-taking propensity and growth intentions). Within this framework, we also consider firm-level characteristics such as size, profitability, asset structure, growth opportunity and earnings volatility, proposed by the conventional capital structure theories, to determine the extent to which managerial factors in conjunction with firm-level characteristics influence the capital structure choice of SMEs.

The objective of this paper is to examine the importance of manager traits and attitudes in explaining the decisions made regarding capital structure in companies in developing economies/economies in transition, while using a sample of FBiH[i] enterprises. Our findings should provide deeper understanding of theoretical perspectives which best explain how companies choose their capital structure in the developing context. In particular, we contend that extending traditional capital structure theory to account for these managerial traits can decrease some important gaps between the known theoretical predictions and the unresolved empirical facts. In particular, financial executives in developing countries may hold different attitudes than their counterparts in developed countries. On the other hand, although there is some evidence (Booth et al., 2001) that developing countries have similar capital structures to those in developed countries, the firm variables have a relatively low effect on the structures. The reason for the poor cause and effect relationship may be due to institutional factors and management preferences. Therefore, this study brings together research on financial and strategic management, decision making, as well as social psychology in order to develop a conceptual model for understanding capital structure decision-making in privately held firms.

Literature Review

Growth intentions and profit maximization are two managerial objectives that have gained the most attention in the literature with regards to their relationship to capital structure. Berggren et al. (2000) assert that decision-makers whose leading aim is business growth will tend to be less control averse and more active in searching for external sources of finance when internally originated funds are insufficient. Although limited empirical work has been conducted on how the manager's intentions to maximize profit influence financing decisions, it is suspected that firms with intentions to maximize profits in the short-term will seek higher levels of short-term financing to take advantage of economic opportunities that present themselves. Such firms, however, should therefore be less reliant on long-term financing in their capital structure. Barton & Matthews (1989) and Matthews et al. (1994) were the first to emphasize that the risk propensity and control aversion of decision-makers may be significant determinants of capital structure in SMEs. The preceding empirical work performed on SMEs in Western economies validates that some managers prefer internal sources of funds, fearing that dependence on external sources of finance might lead to a loss of control over the firm and restrict the authority of owners to make decisions autonomously (Berger and Udell, 1998; Harvey & Evans, 1995; Hutchinson, 1995). In China and in many other emerging and developing economies, a weak institutional environment reinforces agency problems and leads to greater mistrust between managers and external capital providers (Young et al., 2008). Barton and Matthews (1989) and Matthews et al. (1994) suggest that the risk-taking propensity of SME manager will influence the debt level they are willing to adopt. In general, managers with risk perception bias believe their company is less risky than it actually is and therefore less likely to experience financial distress. Because of a weak institutional environment, risk-taking propensity might be expected to have an even bigger influence on the financing choices of SMEs in emerging and developing economies.

Human capital may affect the capital structure of SMEs in a number of ways. The value of a manager's human capital, defined here as the knowledge and diverse skills of the SMEs managers (Hatch and Dyer, 2004), depends on the firm's business strategy. Some studies suggest that human capital is positively linked to the use of debt in SMEs (Bates, 1990; Zhang, 2008) while others find no or a negative relationship (Scherr et al., 1993; Romano et al., 2000; Cassar, 2004). For example, Scherr et al., (1993) observe a negative and statistically significant relationship between the age, managerial experience and education level of the manager and the use of debt in the capital structures of SMEs. However, research conducted by Zhang in 2008 on the sample of SMEs in China showed that companies whose managers are more highly educated are more likely to rely on formal debt financing. This positive relationship could be attributed to the fact that managers holding college degrees and/or graduate degrees are assumed to have the additional knowledge required for better decision-making and consequently may be more competent than managers without those degrees. Additionally, their educational background might be an indication to outside investors about the firm's human capital quality and influence the creditor's willingness

to approve the loan. As far as managers' experience is concerned, experienced managers should have the capability to better perform risk assessment (Ozgen and Baron, 2007). The owner's/manager's background and experience are assets that contribute to the decision-making regarding access to resources – including financial resources - and consequently signal the competitive advantage of that company (Schutjens and Wever, 2005). It is important to note that the human capital immanent in the manager's prior experience plays a more important role in decreasing the asymmetric information between the firm and external investors in developing economies than is the case in developed economies. Generally, research studies performed in developed economies show a negative relationship or no relationship between the age of the manager and the company's reliance on external financial sources (Scherr et al., 1994; Romano et al., 2000). Scherr et al. (1994) offer the possible reasons for such findings: the unwillingness of financiers to lend to older people because of shorter anticipated time of their ownership, the fact that older owners/managers are more risk averse in comparison to those younger, but also having in mind that older owners/managers are wealthier than the younger ones, which allows them to use more of their personal wealth to finance their business operations. Applications for bank loans are also influenced by the social capital, i.e. the actual and potential resources reachable through an actor's network of relationships (NahapietandGhosal, 1998). Because of the lack of publicly-available data on SMEs, financiers often depend on their informal contacts with managers at other firms to assess the creditworthiness of a loan applicant and the feasibility of their business proposals (Nguyen et al., 2006). In this study, we use Wu's and Leung's (2005), definition of network ties. Despite a growing amount of work on the role played by network ties in the financing behavior of firms, limited work has examined how network ties might influence the capital structure of companies.

Empirical Framework

This study is an attempt to give a comprehensive and robust analysis of the determinants of the capital structure of FBiH firms. The conceptualization of corporate structure choice employed in this research adds firm-level characteristics proposed by traditional financing theories to the managerial factors influencing the capital structure choice, to propose and test a new theoretical model (Figure 1). Using Van Auken's (2005) structure, we identify manager influences on capital structure as consisting of managerial characteristics (managerial network ties, education and experience) and attitudes (managerial aversion to external control, risk-taking propensity and growth intentions). We seek to determine the extent to which each of the proposed factors influences the capital structure of FBiH companies, when pooled together. The research results will provide the following information: (1) To what extent the existing capital structure theories from the finance paradigm can adequately explain the financial behavior of firms in the developing economy context? (2) To what extent the managerial strategy, psychology, human capital and network ties influence the capital structure of firms in FBiH?

Figure 1. Conceptual Framework of Capital Structure Choice

Capital structure	Manager's level determinants	Manager's characteristics	Managerial strategy
			Managerial psychology
		Manager's attitudes	Managerial human capital
			Network ties
	Firm's level determinants	Firm size	
		Profitability	
		Growth opportunity	
		Asset tangibility	
		Risk	

Source: Framework proposed by authors

The main research hypothesis of the study is as follows:

• Personal characteristics and attitudes (latent factors: managerial strategy, managerial psychology, managerial human capital and network ties) coupled with traditional capital structure determinants (latent factors: assets, firm's size, asset tangibility, and growth opportunities with earnings volatility as the observed variable) are determinants of the capital structure.

Based on the literature review provided above, assumptions about the influence of managerial characteristics on capital can be articulated through the following hypotheses: 1) the growth intentions of the manager are positively correlated to leverage, 2) the intention of the manager to maximize profit is positively correlated to leverage, 3) the aversion to external control of the manager is negatively correlated to leverage, 4) the manager's risk-taking propensity is positively correlated to leverage, 5) the educational level of the manager is positively correlated to leverage, 6) the managerial experience of the manager is positively correlated to leverage, 7) the age of the manager is negatively correlated to leverage and 8) manager's personal network ties with other companies, government officers and banks will be positively correlated to the leverage.

Data Collection and Sampling

The variables we use for the analysis are taken partly from financial statements and partly from a survey. While surveys have limitations (e.g., non- respondent bias), at least they give a window into executive thinking on capital structure. They try to find the hidden motivation behind the financing choice and have the advantage that they can question difficult to measure and complex factors.

Due to the financial statements data availability, this study will focus on one entity, the Federation of BiH (FBiH). We used the AFIP (Agency for the Financial, IT and Intermediary Services) dataset for the 2012 that maintains a comprehensive financial database of all companies operating in the FBiH, containing 19,446 firm-year observations. The AFIP database is made available for commercial use by "*Tron Systems*". This database contains the balance sheets and income statements of all companies obliged to submit their reports to the AFIP, under the law. After collecting the data, but before running the main data analyses, we performed a dataset screening process for ungrouped data (Tabachnik and Fidell, 2013). After initial screening, our dataset contained a total of 18,393 firm-year observations, where the limited liability company is the dominant legal form of organization accounting for over 97.5% of the sample analyzed in the observed year. Having in mind that fact, owners will be very often also the managers of their companies.

The focus of our empirical enquiry/study is capital structure decision of joint stock (JSC) as limited liability companies (Ltd), stratified by 16 different industries. In order to better understand the characteristics of the homogenous subsets (Albright, Winston, and Zappe, 2006), we had to exclude a certain number of enterprises from the population data. In particular, we eliminated the companies legally organized as neither JSC nor Ltd. Furthermore, banks, financial companies, and insurance companies were also removed from the sample because of their specific financial structure. Investment companies were neither included, because their income mainly results from the value of their holding portfolios. This value depends on the financial structure and business conditions of the firms whose stocks are included in the portfolio rather than the financial structure of the investment companies. This restriction is necessary because banks, as well as insurance and investment companies are subject to rigorous regulations concerning their capital structure and financing decisions and are additionally severely affected by exogenous factors (Rajan and Zingales, 1995).

Additionally, out of the entire sample of companies present in 2012, a random selection of 450 companies among different industries was made in order to apply an online questionnaire ensuring additional data on managerial psychology, managerial strategies, managerial, human capital and network ties. The questionnaire was distributed to the sample of enterprises from the dataset used in the first research stage, selected from the sampling frame using: (i) random number tables and (ii) random number generator, such as Research Randomizer (2008). This sampling technique was possible as the sampling frame was vast enough. We applied a questionnaire used in past research on firm financing decisions, including Van Auken (2005) and Carter and Van Auken (2005). The respondents were asked to identify characteristics of their firms, ownership structure, number of employees and the size of market served. The second section asked respondents to rank perceptions (1=strongly disagree to 5=strongly agree) of 25 issues related to network resources, business objectives and external financing. In the third section, we asked them questions about the personal characteristics of the managing director. Pretesting was conducted in order to test for clarity, after which the questionnaire was slightly revised. The main changes were made to the formulation of questions.

We received 242 questionnaires that satisfied the recommended sample size gained via sample power analysis performed using G*Power 3.1.7. of 205. But the response ratio of 53.78% cannot be ignored, and we needed to check whether there was a presence of *non-response bias*. We applied the Mann – Whitney U test to see whether there was a statistically significant difference between the values of variables from the financial statements of companies that participated in the survey and companies that did not. Out of the 15 variables from financial statements used in further analysis only two variables[ii] showed a significant difference between the companies who responded and the companies that did not respond to the survey. Furthermore, we followed up by conducting another mini survey with the sample selected randomly from the non-respondents (those who did not participate in the actual survey). However, the follow-up survey was done using a different method of soliciting and data collection, to ensure that differences observed were not due to the survey method's effects. We conducted telephone interviews with 15 non-respondents asking them to complete the survey over the phone. When this was done, the researchers compared the responses between the respondents and the non-respondents on the key variables from the survey. We found no differences and therefore, we believe that the responses to our survey are non-response biased.

Results and Discussion

Since the main research objective in this paper is to assess contribution of underlying manager's personal characteristics and attitudes with traditional capital structure determinants in explaining the firm's capital structure choices, we have employed standard and hierarchical regression analysis.

Leverage was measured by two variables (Welch, 2011): the financial-debt-to-capital ratio (***financial leverage***) that does not consider non-financial liabilities as debt [PCS1], and the total-liabilities-to assets ratio *(**balance sheet leverage**)* that treats financial and non-financial liabilities alike [PCS2]. Empirical capital structure research also faces another key question, which is whether to use book leverage or market leverage (book registered debt is divided by the sum of the registered debt plus the equity market value). We do not have that choice simply because we do not have the data on market values. The normality of distribution of almost all variables is violated before the data are transformed using natural logarithm. Only variables related to company size, balance-sheet leverage (total liabilities to assets ratio) and the age of the general manager meet the assumption of normality. Regression models are developed for each leverage dependent variable respectively.

The paper proposes capital structure determinants listed in Table 1. In order to run regression analysis with determinants that are having significant correlation with capital structure indicators, correlation between capital structure and determinants are presented.

Table 1. Correlation between Determinants and Capital Structure

Determinant	Code	r Financial Leverage	r Balance-Sheet Leverage
Natural logarithm of total assets	[FSA]	.054	-.112
Natural logarithm of total revenues	[FSR]	.021	-.123
Natural logarithm of employees number	[FSE]	.069	-.122
The ratio of earnings before interest, taxes and depreciation to total assets	[PP1]	.072	-.084
The ratio of net income to the total assets	[PP2]	-.029	-.136[*]
The ratio of tangible fixed assets to the total assets	[PA1]	.023	-.167[*]
The ratio of intangible assets to total assets	[PA2]	.051	-.021
The ratio of inventories to total assets	[PA3]	.161[*]	.144[*]
The ratio of receivables to total assets	[PA4]	-.054	-.006
The ratio of difference in the book value of total asset between $year_{t-1}$ and $year_t$ divided by the book value of the total assets in $year_{t-1}$	[PG1]	.010	-.065
The ratio of difference in total revenues between $year_{t-1}$ and $year_t$ divided by total revenues in $year_{t-1}$	[PG2]	.083	.070
Regression of book value over the total assets over ten years on a time trend ; coefficient of the trend, scaled by the book value of the total assets, as proxy for growth	[PG3]	.164[*]	.198[**]
Growth intensions	[PMS1]	.094	-.004
Profit maximization intensions	[PMS2]	.069	.045
Control aversion	[PMP1]	-.071	-.067
Risk propensity	[PMP2]	.026	.035

Age of the manager	[MHC1]	-.057	-.127
Experience of the manager	[MHC2]	-.142*	-.135*
Educational level of the manager	[MHC3]	-.070	-.141*
Networking with other firms	[PN1]	.067	.044
Networking with Government officials	[PN2]	.073	.047
Networking with Banks	[PN3]	-.066	-.104
Earning Volatility	[PE]	-.072	-.076

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Analysis of correlations between proposed determinants and capital structure indicators shows that statistically significant correlations with financial leverage have the ratios of inventories to total assets [PA3], regression of book value [PG3] and experience of the manager [MHC2]. Companies with higher financial leverage have less experienced manager and with higher ratio of inventories to total assets and higher regression of book value as proxy of growth.

Balance-sheet leverage has statistically significant correlations with the ratio of net income to the total assets [PP2], the ratio of tangible fixed assets to the total assets [PA1], the ratio of inventories to total assets [PA3], the regression of book value [PG3], the experience of the manager [MHC2] and educational level of the manager [MHC3]. Companies with higher balance-sheet leverage have less ratio of net income and fixed assets to the total assets, higher ratio of inventories to total assets, higher regression of book value, less experienced manager and lower educational level of the owner and manager.

All statistically significant correlations between proposed determinants and capital structure indicators are low (below .20). Total contribution of determinants explaining capital structure will be calculated using linear regression model including only determinants with statistically significant correlations. The model for financial leverage will differ from model for balance sheet leverage considering that balance sheet leverage has more determinants with statistically significant correlations.

Regression model with determinants of financial leverage

Independent variables in the model are:

- [PA3]The ratio of inventories to total assets
- [PG3] Regression of book value of the total assets over ten years on a time trend; coefficient of the trend, scaled by the book value of the total assets
- [MHC2] Experience of the manager

The ratio of inventories to total assets, regression of book value and experience of the manager explains about 6% of variance of financial leverage. Explained variance is statistically significant (F=6.093; P=0.001) and differs from expected random guess. Even though the model has statistically significant prediction, predictive power is rather low.

Table 2. Model Summary for Financial Leverage

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.274[a]	.075	.063	.2759008

The collinearity statistics parameters indicate that there are no issues with multicollinearity among independentt variables (all VIF lower than 2). The ratio of inventories to total assets and regression book of value have significant contribution to explanation of financial leverage variance while experience of the manager does not have significant contribution (chances for random contribution are over 5% but less than 6%).

Table 3. Coefficients for Financial Leverage

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.388	.064		6.110	.000		
	PA3	.174	.064	.175	2.716	.007	.986	1.014
	PG3	.176	.064	.176	2.736	.007	.984	1.016
	MHC2	-.132	.068	-.125	-1.948	.053	.995	1.005

Before concluding on significant determinants of financial leverage we run hierarchical regression analysis with first block of independent variables being set to the ratio of inventories to the total assets and regression book of values while in second block all other determinants (from Table 1). In such case (amended regression model) experience of the manager and both profitability indicators (the ratio of earnings before interest, taxes and depreciation to total assets and the ratio of net income to the total assets) have additional contribution to financial leverage variance. Hierarchical regression model is rerun with experience and profitability determinants being in the second block of independent variables.

Adding second block of determinants improve predictions by 3.1% (adjusted R square) that is statistically significant.

Table 4. Amended Model Summary for Financial Leverage

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.244[a]	.059	.051	.2775929	.059	7.155	2	227	.001
2	.337[b]	.113	.094	.2713040	.054	4.549	3	224	.004

The ratio of inventories to the total assets, regression book of values, experience of the manager, the ratio of earnings before interest, taxes and depreciation to total assets and the ratio of net income to the total assets are all significantly contributing to explanation of financial leverage variance. Higher financial leverage have companies with higher ratio of inventories to the total assets, higher regression book of values, higher ratio of earnings before interest, taxes and depreciation to total assets, lower experience of the manager and lower ratio of net income to the total assets.

Table 5. Amended Model for Financial Leverage Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF	
1	(Constant)	.315	.052		6.108	.000		
	PA3	.180	.064	.181	2.792	.006	.988	1.012
	PG3	.184	.065	.184	2.841	.005	.988	1.012
2	(Constant)	.406	.066		6.164	.000		
	PA3	.175	.063	.176	2.785	.006	.986	1.014
	PG3	.189	.068	.189	2.783	.006	.855	1.169
	MHC2	-.147	.067	-.139	-2.186	.030	.985	1.015
	PP1	.325	.117	.327	2.787	.006	.287	3.480
	PP2	-.360	.117	-.362	-3.086	.002	.288	3.472

Third set of independent variables are entered in the regression analysis to check for possible additional contribution of remaining variables from original model, however none of them had additional statistically significant contribution to explanation of financial leverage variance.

Among independent variables that are having significant contribution explaining financial leverage significant positive correlations are between profitability indicators (the ratio of earnings before interest, taxes and depreciation to total assets and the ratio of net income to the total assets), and between regression book of values and both profitability indicators. Correlation between profitability indicators is quite high (over 0.80) while correlations between regression book of values and profitability indicators are smaller (app. 0.35).

Table 6. Pearson Correlation between Independet Variables with Significant Predictive Validity of Financial Leverage

	PA3	PG3	MHC2	PP1	PP2
PA3	1	-.109	-.040	-.045	-.039
PG3	-.109	1	-.056	.345**	.349**
MHC2	-.040	-.056	1	.058	.012
PP1	-.045	.345**	.058	1	.841**
PP2	-.039	.349**	.012	.841**	1

**. Correlation is significant at the 0.01 level (2-tailed).

Regression model with determinants of balance-sheet leverage

Independent variables in the model are:

- [PP2]The ratio of net income to the total assets
- [PA1]The ratio of tangible fixed assets to the total assets
- [PA3] The ratio of inventories to total assets
- [PG3] Regression of book value of the total assets over ten years on a time trend; coefficient of the trend, scaled by the book value of the total assets
- [MHC2] Experience of the manager
- [MHC3]Educational level of the manager

Independent variables explain about 13.5% of variance of balance-sheet leverage. Explained variance is statistically significant (F=6.970; P=0.000) and differs from expected random guess. Predictive power for balance sheet leverage is about 7.5% higher than for the finance leverage.

Table 7. Model Summary for Balance-sheet Leverage

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.397[a]	.158	.135	.27656

The collinearity statistics parameters indicate that there are no issues with multicollinearity among independent variables (all VIF lower than 2). The ratio of net income to the total assets, the ratio of tangible fixed assets to the total assets, the ratio

of inventories to total assets and regression book of value have significant contribution to explanation of balance-sheetleverage variance while experience of the managerand the education level of the managerdo not have significant contribution.

Table 8. Coefficients for Balance-sheet Leverage

Model B	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	Std. Error	Beta				Tolerance	VIF
1 (Constant)	.673	.084		7.975	.000		
PP2	-.238	.069	-.229	-3.460	.001	.860	1.163
PA1	-.145	.065	-.139	-2.214	.028	.952	1.050
PA3	.148	.065	.143	2.271	.024	.953	1.049
PG3	.282	.069	.270	4.066	.000	.855	1.169
MHC2	-.114	.068	-.103	-1.673	.096	.991	1.009
MHC3	-.113	.065	-.108	-1.746	.082	.981	1.020

Before concluding on significant determinants of balance-sheet leverage we run hierarchical regression analysis with first block of independent variables being set to the ratio of net income to the total assets, the ratio of tangible fixed assets to the total assets, the ratio of inventories to total assets and regression book of value while in second block all other determinants (from Table 1). In such case, (amended regression model) none of the independent variables have additional statistically significant contribution to explanation of balance-sheet variance. Adding second block of determinants does not improve predictions.

Higher balance-sheet leverage have companies with lower ratio of net income to the total assets, and lower ratio of tangible fixed assets to the total assets while having higher ratio of inventories to total assets and higher regression book of value. Revised regression model including only these four independent variables explains about 11.9% of balance-sheet variance (adjusted R square).

Among independent variables that are having significant contribution explaining balance-sheet leverage significant correlations are between profitability indicators (the ratio of net income to the total assets) and regression of book value, and between the ration of tangible fixed assets to the total assets and the ration of inventories to the total assets. While there is positive correlation between profitability indicator and growth indicators there is negative correlation between assets indicators.

Table 9. Pearson Correlation between Independet Variables with Significant Predictive Validity of Balance-sheet Leverage

	PP2	PA1	PA3	PG3	MHC2	MHC3
PP2	1	-.111	-.039	.349[**]	.012	.091
PA1	-.111	1	-.162[*]	-.100	.014	.015
PA3	-.039	-.162[*]	1	-.109	-.040	.046
PG3	.349[**]	-.100	-.109	1	-.056	-.039
MHC2	.012	.014	-.040	-.056	1	.056
MHC3	.091	.015	.046	-.039	.056	1

The results in FBiH show a positive relationship between the firm's capital structure choice and the firm' growth opportunities. That is contrary to the findings of Titman and Wessels (1988), who concluded that growth has significant negative relationship with the capital structure. Myers and Majluf (1984) argue that the assets owned do affect capital structure and the results in FBiH indicate that the ratio of tangible assets to total assets has a negative relationship with the balance-sheet leverage. Some studies suggest that earnings volatility affects the capital structure; however, their results are inconsistent (Bradley, Jarrell, and Kim, 1984). The results on the sample of FBiH companies show that the earnings volatility within the capital structure model defined in this paper does not significantly contribute to the overall prediction.

Newman (2010) investigated the determinants of the capital structure of companies in China. He confirmed that the firm size and age are positively related to leverage (short term, long term and total) and that there is no relationship between the asset structure and leverage He also found that profitability is negatively related to capital structure choice. The results for FBiH show that balance-sheet leverage is negatively related to the firm' assets and profitability but positively related to the firm' growth. The firm size in FBiH companies was not related to leverage as in China's companies, while assets show negative relationship with leverage, which was not proven in the China's case. Harris and Raviv (1991) summarized the results of several studies on capital structure. They found that leverage in general increases with fixed assets, non-debt tax shields, growth opportunities and firm size and decreases with the volatility, advertising expenditures, research and development expenditures, bankruptcy probability, profitability and uniqueness. Some of their determinants are part of the capital structure model in this paper. We find that only higher growth opportunities relates to increased leverage, while the remaining relationships are not proved.

Several authors tested the capital structure structural equation model with contradicting results (Titman and Wessels, 1988). Their structural models in entirety prove to be weak, but the results on the relationships between growth and assets with leverage are

in line with our findings. The results further indicated that only one factor related to managerial-level variables influenced the capital structure of sampled firms. The human capital of owners/managers measured by their experience was found to be negatively related to the leverage of sampled firms. In particular, the data analysis revealed that firms run by a manager with a longer experience tended to have a lower financial leverage than those with less experienced owners/managers. This is in line with previous studies that found a negative influence of managerial experience on the leverage of SMEs (Scherr et al., 1993; Coleman andCohn, 2000; Cassar, 2004). Furthermore, these findings suggest that financiers place greater emphasis on the experience of owners/managers when making lending decisions than on their educational background. They might also be partly explained by the fact that more experienced owners/managers tend to be more control averse than those with less experience.

Conclusions

This study is an attempt to identify determinants of capital structure, and develop a plausible model that efficiently discriminates companies with a high and low leverage. The intention was to integrate classical financial theories of the capital structure and personal proxies' theories in order to create a model that combines the companies' characteristics with those of decision makers. Both firm and managerial level determinants can be divided into three groups: those which influence *the willingness* of decision makers to take on debt (risk propensity, control aversion, length of experience), those which influence *the firm's need* for debt (profitability, manager's growth/profit maximization intentions) and those which influence *the ability* of the firm to take on external debt (length of manager's experience, managerial network ties, firm-level variables) (Newman, 2010). The study is based on two alternative leverage ratios, the financial leverage ratio and balance-sheet leverage ratio.

The findings show that the financial leverage is significantly explained by two independent variables. One of them comes from the traditional financial proxies of capital structure and the other from new theories of personal traits. Companies with a less experienced manager and higher firm growth have a higher financial leverage ratio. Therefore, the level of financial leverage depends on the factors influencing the ability of the firm to access external debt, but also on the factors that influence the firm's willingness to take on external debt. The collateral value of the assets, return-on-assets (ROA) as a profitability indicator, and firm growth opportunities are statistically significant predictors of the balance sheet leverage. The financial proxies of capital structure seem to be significant in explaining the capital structure variance in analyzing the balance sheet leverage. Its level depends on the factors influencing the demand for external debt as well as the factors influencing the firm's ability to access external debt. Therefore, companies with lower profitability, lower level of fixed assets and higher growth opportunities have higher balance sheet leverage ratios. The results prove that both financial proxies and personal traits are statistically significant predictors of the capital structure.

In other words, this suggests that certain commonly observed micro-leveldeterminants that are relevant for explaining capital structure in the developed economies are also relevant in the FBiH. This means that some of the insights from the modern finance theory are applicable to our country despite profound institutional differences that exist between the FBiH and those developed countries. Furthermore, based on the findings we could develop path models for prediction of financial and balance sheet leverage that will probably yield covariance matrices in line with the observed covariance matrices. Such proposed models are presented below.

Figure 2. Path Model for Financial and Balance-sheet Leverage
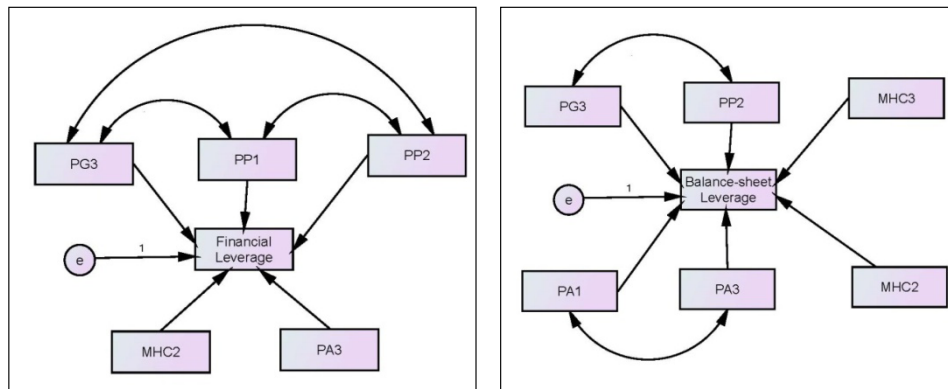
In order to verify the model they should be tested in a follow up study. However, explanatory power of the proposed model is expected to be low. We have found a difference between the results achieved when the leverage is defined by total liabilities instead of only financial debt. The determinants within the model related to the balance-sheet leverage can explain a higher percentage of capital structure variance (13.5%) than the determinants explaining the financial leverage (6%). Second, the achieved low explanatory power of leverage determinants is in line with previous studies in transition economies (Joeveer, 2006; Delcoure, 2007). They identified that a number of core determinants are able to explain only about 8% of the variation in leverage if the majority of firms in the sample are unlisted. For the listed firms, about 22% of the variation in leverage is explained by traditional determinants. Of course, the variation explained by traditional determinants in transition economies is lower than in developed economies. This is not surprising because the information asymmetryis higher and observable firm-specific characteristics are not fully reliable from a financial institution' point of view.

Due to the complex number of forces that influence firm relations and managerial activity, capital structure decision is not simply a matter of deterministic, prescriptive principles, but it is, rather, an art, despite all the innovations in financial engineering and changes in the competitive context. It cannot be separated from the intellectual skill of "good" financial managers. Managerial behavioral factors therefore also provide ample opportunities for future research.

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[i] Bosnia and Herzegovina (BiH) consists of the two entities and one dictrict: the Federation of BiH (FBiH) and the Republika Srpska (RS), as well as of the Brčko District.
[ii] Firmsizebytotalrevenues (ln) and Firmsizebyaveragenumberof employees (ln)

LIST OF REVIEWERS FOR THIS ISSUE