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Measuring Changes in Liquidity Using the Bid-offer Price Proxy: Determinants of Liquidity in the United Kingdom Gilt Market

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Abstract: *Financial market liquidity is an important yardstick of value for investors and central monetary authorities. Secondary market liquidity itself cannot be observed directly and is instead measured using a number of different proxies. The most common proxy is the asset bid-off price spread. In this study we conduct time series analysis of the bid-offer spread in order to ascertain if the level of liquidity in a specified market has improved over a period of time. The market we select is the United Kingdom government bond market or gilt market. During the 1990s the UK monetary authorities introduced a number of structural reforms in the gilt market, designed to improve secondary market liquidity. We measure the success of the reforms by attempting to determine if liquidity levels improved in the post-reform period, via the examination of the bid-offer spread. We examine the determinants of this proxy measure, and estimate which of the explanatory variables carries the greatest weight in influencing liquidity levels. We conclude that a number of the independent variables that we examined, including bond issue size and maturity, are found to be significant determinants of liquidity. We conclude further that similar structural reforms should be considered by other central monetary authorities wishing to improve bond market liquidity levels, and that the determinant factors we cite should be reviewed during periods of market correction, when liquidity levels decrease.*

Keywords: financial markets, government bonds, liquidity, bid-offer spread, risk-free yield, repo, strips

Introduction

Participants in the financial markets emphasise the importance of secondary market liquidity as an indicator of value. This is also noted in the academic literature. During the late 1990s the United Kingdom (UK) central monetary authorities introduced a number of structural reforms in the sovereign bond market, designed to improve market liquidity. Liquidity itself cannot be measured directly; hence it is not possible to determine conclusively that the UK authorities succeeded in their goal. Instead it is necessary to assess changes in the level of liquidity with recourse to proxy measures. This paper attempts to measure liquidity in the UK gilt market by examining a common proxy for liquidity, the bid-offer price spread. The time period considered is the pre-reform and immediate post-reform period, to determine if these reforms succeeded in achieving their goal. We also investigate the significance of the relationship between the proxy measure of liquidity and its explanatory variables.

This work is motivated by the following factors: a desire to fill gaps in the existing literature with respect to sterling markets and UK government bonds; a response to an examination of gilt market liquidity by the sovereign issuing authority itself, which concluded with an observation that further research was required; to ascertain if results from earlier academic studies of the US Treasury market also hold in the UK market; and the wish to ascertain if the proxy liquidity measure we selected was effective in its purpose.

The time period under observation is the UK gilt market during the period 1993–2002. This period covers the timing of the structural reforms themselves, implemented during 1996–1998, as well as the period immediately before and after the implementation of the reforms. The market

reforms, which were introduced by the Bank of England (BoE), were designed to improve liquidity and accessibility of the UK gilt market; they included the introduction of new products as well as technical changes to operating processes. The reforms are described Bank of England (1995) and Debt Management Office (1998, 2000).

We examine a proxy measure of liquidity, the bid-offer price spread. We consider the relationship between this spread and a number of explanatory variables, to assess the size and significance of their effect on the spread itself and indirectly liquidity itself. We determine the significance of the selected determinants, and also observe if any significant change in the relationship has taken place during the observation period. At the end of our examination we identified the significant determinants of bid-offer proxy measure of liquidity, and concluded that they had increased in level of significance and size of coefficient during the observation period. Additional tests indicated a strong likelihood that a structural break was evident in the time series data at an expected point in the period after the market reform implementation period.

Our study makes three contributions to the existing literature: it is the first such study using the bid-offer spread proxy indicator that looks specifically at the UK gilt market; secondly, it presents results of the interaction of various explanatory variables as drivers of liquidity, which will be of value to the UK sovereign monetary authority; and thirdly it suggests that the market reforms had indeed contributed to increased liquidity in the gilt market.

This paper is organised as follows: first, we review the literature and provide a discussion of market liquidity. This is followed by the background to empirical testing, the formulation and testing of the regression model for the bid-offer price spread, the tests of structural change, and a discussion of the results. The final section presents our conclusions.

Literature review

There are a number of definitions of financial market liquidity. Commonly accepted ones in the academic and practitioner literature include the following:

- a market where buyers and sellers may transact at any time (during opening hours) in size, at no extra cost, without this transaction causing prices to move;
- a case where two-way prices are available to market participants in wholesale market size, and where there is an openness in determining asset fair value.

The first definition has been suggested by O'Hara (1995) and Fleming (2001) among others, while the second was described by Mackintosh (1995).

The academic literature on the gilt market is sparse. A general introduction to the structure of the gilt market and its trading mechanisms is given in Choudhry et al (2003). Steeley and Ahmad (2002) conducted an investigation on the behaviour of prices in the gilt market during the period 1993 to 2001. This period takes in the time of the reforms to the gilt market, as well as periods of general market correction such as the Russian debt default in 1998 and the Long Term Capital Management (LTCM) hedge fund crisis of 1999. The authors consider the information and price action efficiency of gilts, specifically (i) the characteristics of the price movements during this period, testing the null hypothesis that price movements are random, and (ii) whether any non-random behaviour in prices could have been exploited. Their conclusion is that the gilt market exhibited returns persistence during the crisis period, due to its safe-haven status.

Repo is a common feature in many government bond markets, both in developed and emerging economies, being a standard money market secured loan instrument. A basic coverage and definition of repo is given in Blake (1990). The Bank for International Settlements (BIS) study group (2000) investigated the part played by repo in the maintenance of an orderly secondary market and concluded that it was a vital tool for such purposes.

The academic literature reviews financial market liquidity in some depth. O'Hara (1995) defines liquidity as the ability to trade a security quickly and with little cost. Sundaresan (1997) defines liquidity as a market where investors can buy and sell large amounts of stock with ease, at a narrow bid-offer spread and without an adverse price reaction. Gravelle (1998) defines liquidity as being the ease with which large-size bond transactions can be effected without market prices being impacted. He also reports that the central authorities desire the maintenance of a liquid market. Borio (2000, p.38) describes a liquid market as one where "...transactions can take place rapidly and with little impact on price".

Previous research into liquidity measures has concentrated mainly on the United States (US) government bond market and US corporate markets; these included Fleming (2001), Diaz and Skinner (2001) and Moulton (2004). Other studies considered the US dollar interest-rate swap market; these included Amihud and Mendelson (1991a, 1991b), Alexander, Edwards and Ferry (2000), Hong and Warga (2000), Brown, In and Fang (2002) and Kalimipalli and Warga (2002).

For our proxy measure of liquidity we use the bid-offer spread. Studies that looked specifically at this measure in the US dollar market included Schultz (1998), Chakravarty and Sarkar (1999), Hong and Warga (2000), Ap Gwilym, Trevino and Thomas (2002) and Brown, In and Fang (2002). All these studies were undertaken on the basis that a standard measure of liquidity is the extent of the bid-offer spread, and that as liquidity increases the spread will narrow. No such study has been conducted for the UK gilt market.

Blennerhassett and Bowman (1998) studied the New Zealand stock exchange and found that the bid-offer spread became more sensitive to changes in trade size, and this effect may mean that larger-size dealers carry disproportionate costs. Naik et al (1999) studied the impact of the change from the dealership market to an order book market in the London Stock Exchange (LSE) and found that investors had benefited from the change as they now faced narrower bid-offer spreads.

A number of other proxies for liquidity have been considered. Yield spreads were investigated in Sarig and Warga (1989), Blume, Keim and Patel (1991), Warga (1992) and Crabbe and Turner (1995). Trading volume was investigated in Kamara (1994) and Alexander, Edwards and Ferri (2000). Nunn, Hill and Schneeweis (1986) used a combination of three proxies for liquidity, which were (i) the bond's age (ii) the bid-offer spread and (iii) the amount of bonds outstanding. Mackintosh (1995) proposed a liquidity score for a bond based on an aggregate liquidity rating.

Some studies have tested the hypothesis that larger size bond issues are more liquid. For example Hong and Warga (2000) observed that larger-size issues had smaller bid-offer spreads. Alexander, Edwards and Ferri (2000) examined the determinants of trading volume for corporate bonds, and concluded that the larger-size issues were more liquid. Kalimipalli and Warga (2002), Chakravarty and Sarkar (2003) and Moulton (2004) all suggest that issue size is an important determinant of liquidity. Moulton studied the US Treasury repo market however, in which large issue size must be considered the norm and by implication a prime driver of liquidity. However

Crabbe and Turner (1995) and Fridson and Garman (1998) when studying yield spreads as proxies for liquidity found no backing for the issue size hypothesis.

The importance of liquidity to the smooth functioning of financial markets is emphasised frequently in the literature. Datar, Naik and Radcliffe (1998) suggest that liquidity has an impact on asset returns. Amihud and Mendelson (1986) concluded that investors allow for lower liquidity by demanding a higher return premium, which is the trade-off required for bearing the higher cost of trading in illiquid markets. The same authors (1991) also found that the difference in bid-offer spread between US Treasury bills and Treasury securities had an impact of yield-to-maturity. Amihud, Mendelson and Lauterbach (1997) observed that asset values on the Israeli stock exchange underwent changes when the equities began to be traded on a more liquid electronic system.

McCauley and Remolona (2000) reported how a number of Organisation for Economic Cooperation and Development (OECD) governments continued to maintain gross issuance in an effort to preserve market liquidity, despite budget surpluses removing the need to issue debt. This reflects the importance of the government bond market to all market participants, including investors, traders and brokers. The authors emphasise the importance of a liquid market in government bonds.

Researchers have identified various factors that are determinants of liquidity. Alexander, Edwards and Ferri (2000) and Sarig and Warga (1989) found that corporate bonds that were issued more recently were more actively traded, implying bond age as a liquidity factor. Among numerous studies that make this observation, Babbel et al (2001) showed that benchmark or “on-the-run” US Treasury securities were more actively traded than older Treasuries. This has implications for our own research. Fleming and Remolona (1999) found that macroeconomic announcements had a significant impact on the bid-offer spread. Another factor is the outstanding amount in issue for a bond; one expects this to be an influence on liquidity and Fisher (1959) observed this in a very early study. Garman (1976), Stoll (1978), Amihud and Mendelson (1980), and Ho and Stoll (1981) found that the bid-offer spread increases with the bond price and the credit risk of the bond, and also decreased with higher levels of trading activity.

In corporate bond markets credit ratings have an impact on bond liquidity, as shown by Fridson and Garman (1998). Kamara (1994) concluded that looking only at risk-free sovereign bonds removes liquidity issues arising from credit risk, because all the bonds in the sample are credit-risk-free. The same applies to UK gilts: all bonds in a sample of gilts have uniform tax, trading and settlement issues, and zero credit risk.

Testing Determinants of the Bid-offer Spread

In the UK gilt market the bid-offer spread is quoted by market primary dealers, known as gilt-edged market makers (GEMM). This spread quote is good for what is considered “normal market size” (NMS), a standard-sized order.¹ To eliminate the quantity aspect in our study, we consider only the bid-offer spread for the NMS bargain quantity.

¹ The concept of normal market size is originally an equity market one, where live prices are displayed on electronic order boards. These prices will be good for all orders of size up to NMS quantity. Because bond markets are traded as over-the-counter (OTC) rather than on-exchange, live prices are not displayed on screens. However institutional investors assume, when obtaining a price from a GEMM, that this price is good for dealing up to a standard size,

We obtain the bid-offer spreads for the four benchmark bonds for each week of the period under study. These are market closing prices as at close of business each Friday, obtained from the Bloomberg trade system. The observation period is broken into three distinct periods:

- Period 1, the sample period before the implementation of the structural reforms (Jan 1993 – Dec 1995);
- Period 2, the period during which reforms were introduced (Jan 1996 – Jan 1998);
- Period 3, the sample period after the introduction of reforms (Feb 1998 – Dec 2002).

We assemble a database of weekly prices for each benchmark bond from price data available on Bloomberg for the period January 1993 to December 2002. Ignoring the end-year periods this is 51 weeks per year, hence a 510-week sample period.² Thus the dataset is, for each week, four benchmark bonds (the two-year, five-year, 10-year and long-bond) for each week in the sample period.

We wish to address the following key issues:

- using our proxy measure, has liquidity improved post the reform period?
- what are the determinants of the bid-offer spread?
- do any aspects of the bonds themselves influence this spread?
- how firm are the spreads themselves during the sample period, and how stable?

We consider a number of variables as determinants of the bid-offer spread. The selection of explanatory variables is influenced by the previous literature. Based on this literature, our model captures all the relevant explanatory variables except macro-level indicators. To date, with the exception of Chakravarty and Sarkar (2003), this is because previous studies have excluded macro-economic factors. Following Chakravarty and Sarkar (2003), we modify the model for a second test, which includes a macro-level factor. This is the base interest rate at each weekly observation period.³ A third model that includes an extension to test for the impact and influence of macroeconomic news announcements is also tested. Our models also follow findings from Fleming and Remonola (1999) that concluded that macroeconomic data announcements had a significant impact on the bid-offer spread. We wish to see if the explanatory variables are significant without the impact of the macro-level indicator and announcements variable, hence we test three models.

which is assumed to be the NMS quantity. This size ranges from GBP 10million to GBP 50 million depending on bond maturity.

² Note that the benchmark bond itself changes over time, as its maturity reduces and it is replaced by the new benchmark. For example the five-year benchmark during 1995 was the 8% Treasury 2000 stock, while the following year it was the 7% Treasury 2001 stock. Benchmarks are identified explicitly on Bloomberg. We use the relevant benchmark bond price for each weekly price we set up on the database.

³ We consider the UK base interest rate, set by the Bank of England (BoE), to be an indicator as well as measure of overall macroeconomic conditions. As such it can be expected to have an influence on the bid-offer spread, so we model for it here. Note that both of these premises are part of the conclusions reached in Fleming and Remolona (1999) and Chakravarty and Sarkar (2003).

Researchers into corporate bond markets have identified other factors associated with the price spread that purport to explain liquidity. Sarig and Warga (1989) and Alexander, Edwards and Ferri (2000) found that younger corporate bonds were more actively traded, while for US Treasury securities Babbal *et al* (2001) showed that benchmark (“on-the-run”) Treasuries were more liquid. Hence, *bond age* is significant to influencing the bid-offer spread. However it would not apply to our study, because we are considering *only* the relevant benchmark gilt at any one time. That is, there is only one bond being price-tested each week (one benchmark bond per maturity); there is no comparison to other bonds involved in the test. Therefore we do not need to include this variable in our analysis.

We estimate the following model:

$$Y_{bid-offerspread} = \alpha + \beta_1 C_{it} + \beta_2 M_{it} + \beta_3 I_{it} + \beta_4 V_{it} + \varepsilon_{it} \quad (1)$$

where Y is the mean weekly bid-offer spread for bond i ($i = 1, 4$ for each benchmark) for each week over the given sample period under study. The explanatory variables are:

- C the bond coupon
- M the term to maturity, the time in years from price quote date and date of maturity
- I bond issue size
- V the volatility of the bond price over the sample period.
- ε the error term.

This is applied to a pooled cross-section and time-series analysis. We use the pooling technique when applying (1), as well as a separate test for each benchmark bond. Model (1) is estimated for each bond using our week-based dataset, with data collected for each benchmark bond for each week. Volatility is measured over the week using the close of week price changes.

Table I summarises the determinants in the model that are being tested, and their expected sign ahead of the tests.

The explanatory variable directly related to the structural reforms introduced by the BoE is issue size I . The benchmark programme instituted as part of these reforms lead to higher issue sizes for the selected benchmark bonds. Note that the issue size I is also taken to be a proxy measure of liquidity, as well as a determinant of the bid-offer spread, itself a proxy measure. This might compromise interpretation of the test results. However the previous literature, including Kalimipalli and Warga (2002), Chakravarty and Sarkar (2003) and Moulton (2004), suggests that it is an important determinant and therefore we test it here for the gilt market.

We also test the following extension, which introduces the base interest rate explanatory variable:

$$Y_{bid-offerspread} = \alpha + \beta_1 C_{it} + \beta_2 M_{it} + \beta_3 I_{it} + \beta_4 V_{it} + \beta_5 R_{it} + \varepsilon_{it} \quad (2)$$

where R_i is the base interest rate at any specific point in time for bond i .

Table I: Predicted Signs of Explanatory Variables

Explanatory Variable	Predicted Sign	Reasoning
Bond coupon	Not predicted (insignificant)	The coupon on issue sets the price to par or just below; therefore should not impact subsequent liquidity as the yield should set to the equilibrium fair value rate
Term to maturity	Positive	Higher term to maturity increases interest-rate risk (modified duration), therefore wider spread
Issue size	Negative	A larger issue size suggests greater liquidity and hence smaller spread
Volatility	Positive	Greater volatility translates into greater returns uncertainty, hence wider spread
Base rate	Postitive	High relative base rates indicate an economy requiring slowing-down of activity, hence wider spreads in illiquid markets
Announcement dummy	Positive	Any unexpected or negative announcement would result in lower prices, hence wider spreads to control risk exposure of the dealer

We do not consider the trade size variable in this model, which has been used in previous literature, because we assume that the bid-offer spread on the Bloomberg price quote is good for NMS bargains. As long as the trade is at or under the NMS quote size, there will be no change in the quote spread.

Our third model considers the impact of macroeconomic announcements on market prices and consequently the bid-offer spread. We add an additional variable for each week in the sample when a macroeconomic announcement was made. An announcement is considered as worthy of inclusion if it relates to the level of employment, inflation, retail sales or industrial production.⁴ The third model incorporates the extension for the macroeconomic announcement variable:

$$Y_{bid-offerspread} = \alpha + \beta_1 C_{it} + \beta_2 M_{it} + \beta_3 I_{it} + \beta_4 V_{it} + \beta_5 R_{it} + \beta_6 A_{it} + \varepsilon_{it} \quad (3)$$

where A represents the macroeconomic announcement variable.

A acts as a dummy variable: it takes the value of 1 if there is a macroeconomic announcement that week, and 0 if there is no announcement.

Based on our initial hypotheses we expect the following results. We expect coupon to be neither positively nor negatively related to the spread. We expect issue size to have a negative relationship, and we expect maturity and volatility to be positively related. The base interest rate, if it

⁴ In the UK market, these announcements are generally made in the same week each month, so it is straightforward to isolate the price quotes that were recorded during a week of an announcement.

is at all statistically significant, is expected to have a positive relationship. We expect the announcement to have a widening impact on spread, hence a positive relationship. These sign predictions are summarised in Table I.

We conduct one additional test to determine the significance of the explanatory variables after the conclusion of the structural reforms. This adds a dummy variable for time to the model at (2), so that it becomes:

$$Y_{bid-offerspread} = \alpha + \beta_1 C_{it} + \beta_2 M_{it} + \beta_3 I_{it} + \beta_4 V_{it} + \beta_7 D_{it} + \varepsilon_{it} \quad (4)$$

where D is the dummy variable. It is given a value of 0 (pre-reform) or 1 (post-reform). Hence D is set equal to 0 for the period January 1993–January 1998 and set at 1 for February 1998–December 2002, the period after the reforms were fully implemented.

The cut-off date for the conclusion of the reforms is January 1998. The β coefficient should be positive and statistically significant in order to provide evidence that the reforms have had the desired impact on the bid-offer spread and, by implication, the level of liquidity.

Volatility

The issue of volatility is a problematic one. We have included it in the model at (1) as the previous literature cites it as an independent variable. However liquidity itself can be viewed as influencing volatility, so the relationship, rather than being a causal one, is more likely to be a two-way one. In the first instance we believe that market volatility would be linked, negatively, to market liquidity. This is because *a priori*, we may expect the bid-offer spread to be widening with volatility as the market risk faced by primary dealers would increase simultaneously. Also, an illiquid market can be slow to benefit from new price action and updated information, which would lead to sudden changes in prices and hence increased volatility. This would be an instance of low levels of liquidity leading to higher volatility.

For this reason, we do not consider market volatility of itself to be an effective proxy measure of liquidity. However we include it in the main model to test the significance of its relationship with the bid-offer spread.

Empirical Results

We calculate the bid-offer spread for each benchmark bond for the period under study, given by

$$\frac{P_{Offer} - P_{Bid}}{P_{Offer}} \times 100.$$

Table II presents summary statistics on the mean bid-offer price spread for each benchmark bond. We note that the data is not unacceptably noisy, with standard deviation of the bid-offer spread lying between 0.1 to 0.6 basis points for the two-year benchmark and between 0.4 and 1.03 basis points for the long-bond.

Figure 1 is a plot of the average daily bid-offer spreads by month for each benchmark bond. We observe a decrease in bid-offer spread from Period 1 to Period 3. The noticeable difference in spreads between the 10-year bond and long-bond in Period 3 would appear to indicate that once price quotes had moved to decimals (another market reform), the market could differentiate between the two bonds better, in terms of price spread, than when ticks were used.

The lowest maturity bond always has the narrowest bid-offer spread, which would be expected because it represents the lowest interest-rate risk (measured by basis point value (BPV)), and hence the lowest cost inventory management for gilt primary dealers. The widest spread is observed for the longer-dated benchmark, as expected.

Table II: Summary Statistics on Weekly Percentage Bid-offer Spreads (Basis points 0.01), 1993-2002

Period 1						
1993 - 1995						
Panel A: Descriptive Statistics						
Bond	Mean	Median	Standard Deviation	Lowest Spread	Highest Spread	
Two-year	3.066	3.05	0.188		2.800	4.000
Five-year	6.3	6.25	0.289		6.000	7.800
10-year	9.502	9.4	0.516		9.375	12.500
Long-bond	9.476	9.45	0.486		9.000	12.000

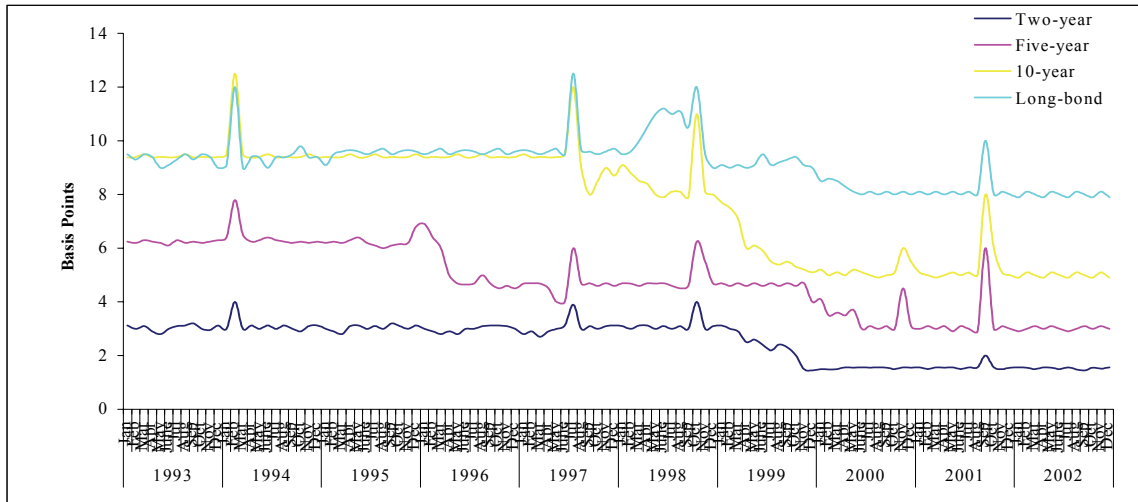
Period 2						
1996 - 1998						
Panel A: Descriptive Statistics						
Bond	Mean	Median	Standard Deviation	Lowest Spread	Highest Spread	
Two-year	3.024	3	0.2197		2.700	3.900
Five-year	4.885	4.68	0.694		4.000	6.900
10-year	9.349	9.375	0.659		8.000	12.000
Long-bond	9.706	9.6	0.586		9.500	12.500

Period 3						
1998 - 2002						
Panel A: Descriptive Statistics						
Bond	Mean	Median	Standard Deviation	Lowest Spread	Highest Spread	
Two-year	2.01	1.56	0.688		1.450	4.000
Five-year	3.82	3.5	0.896		2.900	6.250
10-year	5.96	5.1	1.422		4.900	11.000
Long-bond	8.78	8.1	1.032		7.900	12.000

Test results

We examine the empirical determinants of the bid-offer spread. Initially, this is done by considering the characteristics of each bond. We subsequently consider the influence of base interest rates and macroeconomic announcements.

Figure 1: Average Bid-offer Spreads (Basis points 0.01), 1993-2002
(Price source: Bloomberg L.P.)



Note: Prices quotes were reported in "ticks" (1/32nds) before October 1998, when price format changed to basis points (0.01)
Tick prices for this period have been converted to basis points.

Durbin-Watson (*DW*) test statistics from previous literature on financial markets suggest significant serial correlation in the error terms when the regressions for models similar to (2), (3) and (4) are estimated using OLS. In fact the *DW* test results in our case are between the upper value (d_U) and $(4 - d_U)$, so we do not reject the null hypothesis; there is no evidence of autocorrelation. A Lagrange test is also conducted to assess for heteroscedasticity in the OLS error terms.⁵

If necessary, we adjust the *t*-statistic for autocorrelation using the Newey-West method.⁶ However given the sufficient degrees of freedom it is still appropriate to use standard normal critical values.

Table III Panel A shows the regression results, using the pooling technique. This is given for each of the three sample periods during 1993 – 2002. We compare the coefficient values with our predicted values (see Table I) and observe that the results in Table III are generally in line with prediction.

⁵ There is precedent for using the *DW* test in a pooled cross-section time-series analysis, most notably in Diaz and Skinner (2001).

⁶ The Newey-West (1987) variance-covariance estimator is consistent in the presence of autocorrelation as well as heteroscedasticity.

Table III: Test Regression Results: Pooled Results
Dependent Variable is the Bid-offer Spread for Benchmark Bond

Panel A

Coefficients	Period 1 (1993-95)	Period 2 (1996-98)	Period 3 (1998-2002)	Full period (1993-2002)
Intercept α	0.00785 ^a (4.16)	0.00687 ^a (3.98)	0.00754 ^a (4.12)	0.00694 ^a (3.97)
Coupon β_1	0.0086 (1.43)	0.0009 (0.48)	0.0011 (0.78)	0.002 (0.19)
Term to maturity β_2	0.021 ^b (3.23)	0.025 ^b (3.94)	0.027 ^b (2.96)	0.023 (1.99)
Issue size β_3	-0.015 (-0.32)	-0.009 (-0.57)	-0.014 (-0.54)	-0.005 (-0.64)
Volatility β_4	0.0891 ^a (4.23)	0.0945 ^a (5.42)	0.1027 ^a (4.86)	0.1253 ^a (4.33)
Base rate β_5	0.0001 ^a (6.41)	0.00004 ^a (4.67)	0.00001 ^a (5.28)	0.00001 ^a (4.82)
Macro announcement β_6	0.081 ^b (3.13)	0.075 ^b (3.72)	0.067 ^b (3.26)	0.053 ^b (3.47)
Dummy variable β_7	-	-	-	0.062 ^a (4.45)
Adjusted R^2	0.54	0.53	0.49	0.55
Adjusted R^2 (model 7.4)	0.61	0.58	0.57	0.58
D-W statistic	2.142761	2.090534	1.994753	2.013697
White test χ^2_{9df}	16.83	15.87	16.41	15.38
N	153	106	251	510

t-test in brackets, using Newey-West standard errors
^a Significant at 1% level
^b Significant at 5% level
 Number of observations is per observation period. 51 weekly observations per year

Panel B Period 1 (1993-95): Time series

Dependent variable is recorded weekly bid-offer spread for benchmark bonds

Coefficients	Two-year	Five-year	10-year	Long-bond
Intercept α	0.00741 ^a (4.39)	0.00717 ^a (4.18)	0.00619 ^a (4.37)	0.00724 ^a (3.68)
Coupon β_1	0.0075 (2.05)	0.0005 (0.58)	0.0009 (0.91)	0.008 (0.35)
Term to maturity β_2	0.031 ^b (3.41)	0.031 (2.94)	0.049 ^b (3.15)	0.053 ^b (3.95)
Issue size β_3	-0.018 (-0.67)	-0.012 (-0.61)	-0.014 (-0.45)	-0.002 (-0.56)
Volatility β_4	0.0828 ^a (4.23)	0.0961 ^a (5.42)	0.1027 ^a (4.86)	0.1253 ^a (4.33)
Base rate β_5	0.0001 ^b (3.62)	0.00001 ^b (3.71)	0.00001 ^b (3.65)	0.00001 ^b (3.47)
Macro announcement β_6	0.071 ^b (3.73)	0.062 ^b (3.22)	0.051 ^b (3.89)	0.047 (3.09)
Adjusted R^2	0.59	0.54	0.51	0.55

t-test in brackets, using Newey-West standard errors
^a Significant at 1% level
^b Significant at 5% level

Panel C Period 3 (1998-2002): Time series

Dependent variable is recorded weekly bid-offer spread for benchmark bonds

Coefficients	Two-year	Five-year	10-year	Long-bond
Intercept α	0.00811 ^a (4.85)	0.00789 ^a (5.21)	0.00723 ^a (3.97)	0.00854 ^a (3.88)
Coupon β_1	0.0064 (1.05)	0.0017 (0.61)	0.0013 (0.94)	0.005 (0.39)
Term to maturity β_2	0.042 ^b (3.91)	0.045 ^b (3.17)	0.035 (1.99)	0.042 ^b (3.15)
Issue size β_3	-0.026 (-0.73)	-0.022 (-0.34)	-0.0015 (-0.67)	-0.0019 (-0.51)
Volatility β_4	0.0921 ^b (3.86)	0.0885 ^a (4.52)	0.1137 ^b (3.69)	0.1289 ^a (3.96)
Base rate β_5	0.0001 ^b (3.57)	0.00001 ^b (3.58)	0.00001 ^b (3.95)	0.00001 ^b (3.53)
Macro announcement β_6	0.065 ^a (2.13)	0.047 ^a (3.82)	0.072 ^a (2.19)	0.059 ^a (5.09)
Adjusted R^2	0.62	0.57	0.53	0.59

t-test in brackets, using Newey-West standard errors
^a Significant at 1% level
^b Significant at 5% level

The dependent variable is the recorded weekly bid-offer price spread (per £100 par value) of the benchmark bond, calculated as shown in paragraph 7.3.3. The lower and upper 5% critical values for DW test are 1.46 and 1.63 ($T = 153, 106$ and $251; k = 4$ (model 7.2) or 5 (7.5), and the value of $(4 - d_t)$ is 2.37. The critical values of the Newey-West test are 3.96, 3.19 and 2.16 at the 1%, 5% and 10% level respectively. Note there are sufficient degrees of freedom, for example for model (7.2) for Period 1 there are 51 observations per year per bond, which is 153 observations, so $df = (n - k - 1) = 148$. For each year there is one observation per bond per week, which is 204 observations per year for all four bonds.

To check if there is any difference overall between the various benchmarks, that is, any different sign or significance according to maturity of benchmark, for Period 1 we conduct a separate test for each benchmark bond. In other words, we differentiate according to maturity date of each bond. This test means that there are a much smaller number of bonds to run the test for, for example the actual long-bond benchmark bond remained unchanged during January 1993 through to December 1995. As such, for each week the independent variables C_i and I_i remained unchanged ones for the long-bond, because the same bond is represented each week and its coupon and issue size would be unchanged.

The results for this test are shown in Table III Panel B, with the results for Period 3 given at Panel C, which also indicate that the maturity of the particular benchmark is not significant. There are some detailed differences which we discuss next, but the sign of the coefficients are the same as for the pooled results at Panel A and so we consider these results to be valid.

We apply the White (1980) test for heteroscedasticity running an auxiliary regression of (2). This has nine regressors so there are 9 degrees of freedom. The critical value of χ^2_{9df} at the 5% level is 16.9190. From Table III we see that the test statistic does not exceed the critical value for any of the observation periods. We conclude that there is no evidence of heteroscedasticity in the time series data.

Evaluation of results

In general, results observed are as expected with regard to statistical significance and magnitude, and sign of coefficient.

The intercept fluctuates around 0.007 for the entire period, thus the predicted value of the bid-offer spread in the absence of *all* other explanatory factors is 0.7 basis points. In other words, this suggests that a reasonable estimation of “fair value” in the two-way bond price spread is 0.7 basis points, the value of the spread in the absence of influence from any of the explanatory variables.

We find no significant relationship between bond coupon and bid-offer spread. However the relationship *is* significant for the two-year bond. We believe that this reflects the different price sensitivity of short-dated securities compared to longer-dated securities. When a bond becomes short-dated (deemed as such once it has two years or less remaining to maturity), it starts to trade more like a money market instrument than a capital market instrument. This change in behaviour is subtle and gradual, but in essence it results in a tighter bid-offer spread. A bond with a high coupon, which has a more sensitive “pull-to-par” effect as it approaches maturity, will be priced above par for longer and is viewed as a less liquid instrument by investors. For this reason, a high coupon may be positively related to price spread, and this is borne out by the results in Table III.

A positive relationship exists with time to maturity. This contrasts with Ap Gwilym *et al* (2002), but is similar to the findings of Hong and Warga (2000) and Chakravarty and Sarkar (2003) who reported that US government and corporate bond spreads are significantly positively related to time to maturity.

Similar to Ap Gwilym *et al* (2002) and Kalimipalli and Warga (2002) for US dollar bond markets, we found a statistically significant positive relationship between price spread and volatility. That is, a wider price spread exists for bonds with higher uncertainty of return. Volatility has the largest impact on the magnitude of the bid-offer spread.

We find a statistically significant negative relationship between spread and issue size. The sign of the coefficient is as predicted. While a bond with a small issue size would be expected to have a lower liquidity, benchmark bonds all tend to exist in large size. Hence, the result appears to suggest that where a certain issue exists in relatively smaller size, this will impact on the price spread.

The base rate is statistically significant even at the 1% level but is not *practically* significant. This confirms that as the base interest rate value for all other market rates, it has no practical impact on bid-offer spread: the implication is that it affects all bond prices, as well as other market prices, in the same manner.

The macroeconomic announcement week variable coefficient is positive and significant. The magnitude of the coefficient is large, indicating that this variable has a large practical impact on the bid-offer spread. This is perhaps surprising, because the week of the announcement is known in advance and it might be expected to be priced-in already into market makers’ deal quotes. Nevertheless the regression suggests a widening of spread during this week. This mirrors results reported by Chakravarty and Sarkar (2003).

In summary, the bond bid-ask spread increases with time to maturity, on announcement weeks, and during times of higher market volatility. The nature of the relationship of the dependent variable to the independent variables is unchanged across all three sample time periods. Note that the bid-offer spread is not considered by market practitioners to be a proxy for the credit risk or the interest-rate risk of a bond, so we do not need to consider whether the independent variables are risk factors.

The results of the additional test featuring the dummy variable D_1 are encouraging. The β value is 0.062 which is positive and the result is significant at the 5% level. This may suggest that the explanatory variables had greater significance on market prices after the reforms had been completed. The magnitude is also of practical significance, suggesting that the impact of the reforms themselves was of the order of 6 basis points in price spread, on average for all bonds during the period after the reforms were completed. The coefficient value for the D variable may be taken to be a proxy for the quantitative impact of the market reforms.

The results reported in Panels B and C can be studied to determine the possible effect on bid-offer price for specific benchmarks during the period before and after the reforms. The volatility variable V has, as expected, greater impact on the longer-dated bonds compared to the shorter-dated bonds, reflecting their increased interest-rate risk sensitivity to market movements. Conversely, the macro-announcement variable A has greater practical significance for the shorter-dated bonds, which is to be expected because news announcements have more impact in the immediate term than over the longer term. Perhaps surprisingly, the magnitude of the coefficient does not diminish in the later period (Panel C), suggesting that despite the reforms it continued to have an impact on bid-offer spread. On the other hand the intercept value increases in the later period, implying that after the reforms had been completed the impact of all of the variables, when taken together, was reduced.

Overall the results indicate a consistency in the relationships in each regression. The models for each period appear to explain over half of the variation in bid-offer spread, with adjusted R^2 lying above 50% in each case. This is satisfying; it is similar to results reported by Ap Gwilym *et al* (2002) and Chakravarty and Sarkar (2003), and contrasts favourably with the lower R^2 reported in Hong and Warga (2000). Based on the adjusted R^2 there is a slight preference for the model containing the macro announcement variable, although we note that model (4) also has an increased number of variables and hence we expect, and observe, a higher adjusted R^2 value.

The Bid-Offer Spread: Tests of Structural Change

Observation of the results suggests a change in the average bid-offer spread over the time period under observation. We wish to test if the bid-offer function has undergone a structural change at any point during the entire observation period. The tests undertaken to test for structural change in the relationships are the Chow test, the Wald test, the Quandt test and the CUSUM squares test.

Chow test: results and evaluation

The application of the F -test in tests of structural change is common in the financial economics literature, as suggested in Greene (2000). In this context it is named the Chow test after Chow (1960) for tests at a known or suspected known break date. The model we test is the one shown at equation (4). We split the sample period 1993-2002 into two sub-sample periods, which are sub-sample 1 for 1993-1997 and sub-sample 2 for 1998-2002. Thus we obtain three estimated regressions, shown in Table IV. The first regression is that shown already for the complete period in Table III Panel A.

The Chow F -statistic obtained is $F[7,496]=17.386$.

If the constant in (4) is fixed at the 5% level, the critical value $F_{7, 496}$ is 2.01. As the Chow test statistic exceeds this value, we reject the null hypothesis that the bid-offer function in both sub-sample periods is the same. Thus, there has been a structural change in the relationship between the variables, and the coefficients are indeed different in the two periods. The test statistic also exceeds the 1% critical value $F_{7, 496}$ which is 2.64. We suggest that this implies that much of the difference in the model over the two periods is explained by changes in the constant and one or more of the coefficients. This implies a break in the relationships in the period after the market reforms were introduced.

The Chow test does not indicate explicitly which coefficient (slope or intercept) is different or whether both are different in both periods. Because of this limitation with we conduct further tests.

**Table IV: Bid-offer Regression Equation: Chow Test
Sub-sample periods and Wald Statistic**

Coefficients	Full period (1993-2002)	Sub-sample period 1 (1993-1997)	Sub-sample period 2 (1998-2002)
Constant α	0.00694	0.00717	0.00753
Coupon β_1	0.002	0.0007	0.0011
Term to maturity β_2	0.023	0.021	0.028
Issue size β_3	-0.005	-0.0008	-0.0147
Volatility β_4	0.1253	0.0912	0.1024
Base rate β_5	0.00001	0.00003	0.00001
Macro announcement β_6	0.053	0.076	0.0674
Adjusted R^2	0.58	0.51	0.57
Sum of squares	0.2812	0.0153	0.0731
Wald statistic	17.987	-	-
N	510		
N_1		255	
N_2			255
k	7	7	7

Wald test

We test for possibility of a “Type I” error using the Wald test for unequal variances, valid with large sample sizes.

The Wald test statistic for the regression shown in Table IV gives a value of 17.987. The χ -squared 5% critical value for 7 degrees of freedom is 14.07. Thus under the Wald test we reject the null hypothesis that the same coefficients apply in both sub-sample periods 1 and 2.

The QLR test for break at an unknown date

When conducting the Chow test we selected the date at which to split the dataset into two as the point at which implementation of the market reforms was complete. This pre-supposes that this was the date at which the structural break occurred. More realistically, the date of the possi-

ble break could lie at any point during the period the reforms were being undertaken – a time frame of 25 months – or on a point shortly after the reform process was completed. Because we cannot state the date of a possible break with certainty, we apply a modified Chow test which is the Quandt likelihood ratio (QLR) statistic.

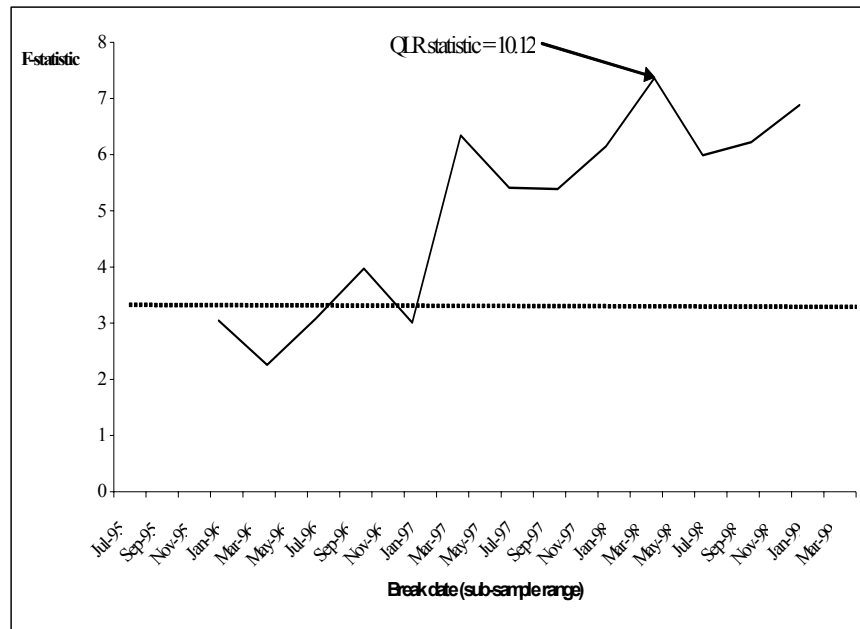
Our supposition is that the break lies during the period from the start of the reforms through to a point up to 12 months following their conclusion. We therefore apply the QLR test for breaks at all possible dates from January 1996 [t_1] to January 1999 [t_2] which is a sub-sample range within the full range t_0 to T of January 1993-December 2002.

We compute the F -statistic for possible break dates within the sub-sample range, for which we select quarterly periods in the range. The number of restrictions is 7 which is equivalent to the number of degrees of freedom in the standard F -test. Results are shown in Table V.

We observe that at the largest of the F -values on April 1998 we exceed the 5% critical value, suggesting that this is an estimator of the break date. However the value is also exceeded for the remainder of the sub-sample period suggesting that there is a gradual evolution of the regression function from this date to the end of the sub-sample period. Thus we conclude that at least one of the coefficients in model (4) has changed during this sub-sample period.

Table V: QLR Test for Break in Equation (4) during Sub-sample Period January 1996-January 1999 (F -statistics)

Date t_n	F -statistic
Jul-95	
Oct-95	
Jan-96	3.05
Apr-96	2.26
Jul-96	3.08
Oct-96	3.97
Jan-97	3.01
Apr-97	6.34
Jul-97	5.41
Oct-97	5.39
Jan-98	6.15
Apr-98	7.36
Jul-98	5.99
Oct-98	6.22
Jan-99	6.88
Apr-99	



F-statistic tests H_0 of a break in one or more of the coefficients or the intercept in Equation (7.4)

QLR statistic is the largest of the results obtained

The 5% critical value with 7 restrictions is 3.15

CUSUM of squares (CUSUMQ) test

A further test of model stability is the CUSUM test suggested by Brown, Durbin and Evans (1975). We apply the similar but alternative test CUSUM of squares (CUSUMQ) based on the cumulative sum of squared residuals. Under this technique we run the regression with no pre-determined break point, adding one period at a time, to see if the results indicate a coefficient change.

We calculate the CUSUMQ test statistic and plot this and the upper and lower confidence bounds (at the 5% significance level, with k equal to 7) against time t . The results are shown at Figure 2.

Figure 2: CUMSUM of Squares Test, Bid-offer Spread

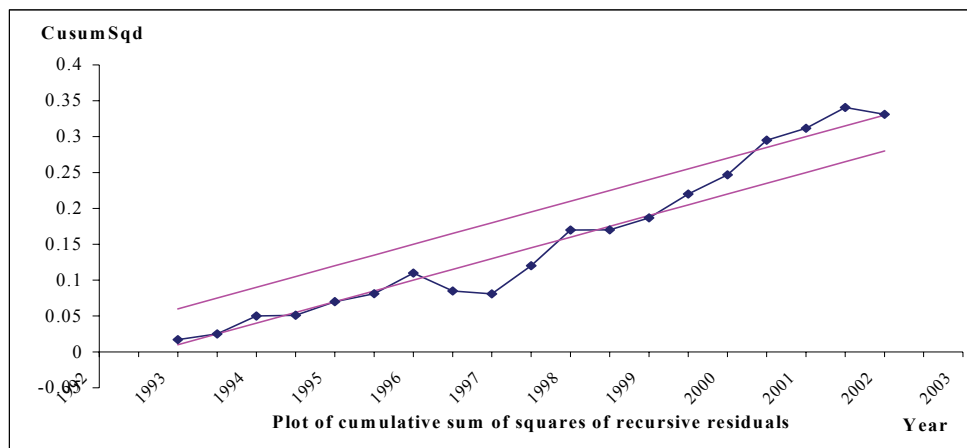


Figure 2 suggests that the model experiences instability at a number of points during the observation period, where the test statistic moves outside the confidence limits. This indicates model instability, and that we should reject the null hypothesis of parameter stability.

We note however that the test statistic indicates instability occurring both *during* the period of reforms as well as *after* their full implementation. That is, the statistic lies outside the confidence bounds during what we have labelled as “Period 2”, and then during the second half of Period 3. This is broadly consistent with the results obtained earlier, although the dates of the implied break are different. For the Chow test our selected cut-off date was January 1998; for the QLR test the time of the most significant score was April 1998; and for the CUMUSQ test the test score was significant at January 1998 but not at June 1998. It was continuously significant in the second half of Period 3.

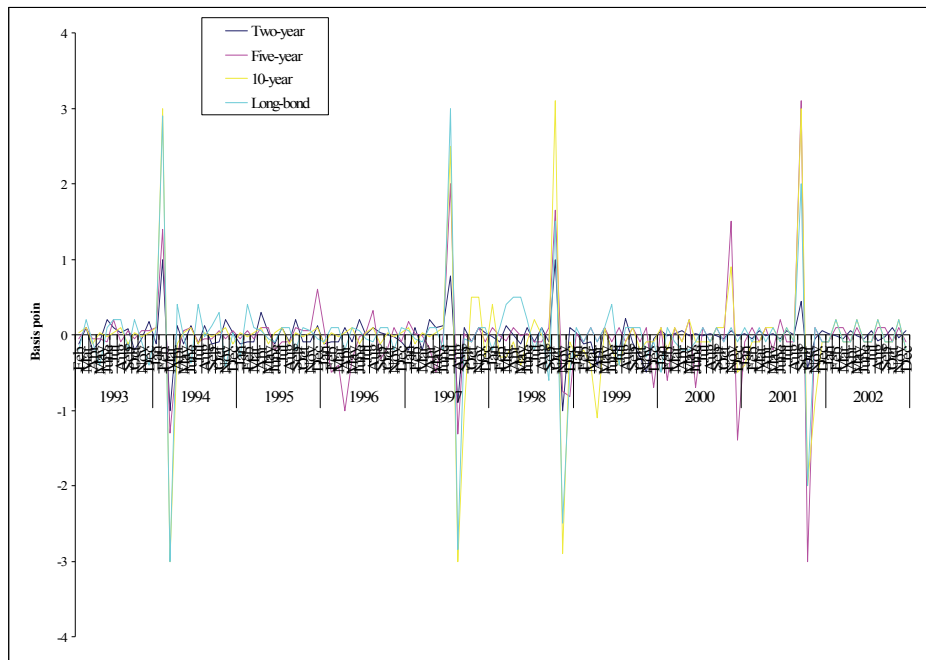
All the tests so far indicate an element of structural break in the model, but not necessarily at the same point in time. This may reflect other factors at work influencing market liquidity and the magnitude of the bid-offer spread, which are not specified in our model. It may also reflect the anticipatory effect of the BoE’s reform announcement, which has been observed elsewhere in our study.

The Bid-Offer Spread: Test for Cointegration

The econometric analysis we apply here can be relied on to give valid results if the time series data is stationary. In practice, time series that have linear and stochastic trends and are $I(1)$ are often observed to move together. This suggests that their difference is $I(0)$ or stationary; for example see Hayashi (2000). We test now for this property in our bid-offer spread time series dataset.

Gujarati (1995) and Stock and Watson (2003) suggest that visual observation of a plot of the time series is a valid initial test of cointegration. Hatanaka (1996) states that "...visual inspection of time series charts is indispensable to empirical studies as it suggests what kind of formal tests should be applied." (1996, p.9) Figure 3 shows the first-differenced bid-offer spread data. We note that the differenced data does not exhibit any trend.

Figure 3: First Differences of Bid-offer Spread



Because the original bid-offer time series is non-stationary, we conduct the Johansen test for cointegration in a multivariate environment. We ignore the A macroeconomic announcement variable, which leaves five variables in the system; that is, $g = 5$. Therefore there can be at most 4 linearly independent cointegrating vectors, so that $r \leq 4$. We use the trace statistic formula shown in Brooks (2002, p.404).

Results are shown in Table VI. Critical values are given in Osterwald-Lenum (1992). We see that the test statistic is larger than the critical value for the first two rows, so we reject the null hypothesis for $r = 0$ and $r = 1$ at the 5% level. The null cannot be rejected for higher r . Therefore we conclude that there is at least one cointegrating vector in the series. This weakly supports the conclusions reached in the previous section.

Table VI: Results of Johansen Test for Co-integration between Bid-offer Spread Explanatory Variables

<i>r</i> (number of cointegrating vectors under null hypothesis)	Test statistic	5% critical value
0	41.6	38.6
1	24.7	23.8
2	9.3	12.1
3	1.51	4.2
4	0.06	3.4

Summary and Conclusions

The test results suggest that market liquidity, as measured by the bid-offer proxy, had increased in the post-reform period. Therefore the structural reforms introduced in the UK gilt market by the BoE were associated with a period of increased liquidity in the market. Our conclusions rely on the values of the proxy measure itself over the time period under observation, the increase in magnitude and significance of the independent variables, and the evidence of a structural break in the time-series data after the reforms had been completed. We provide detailed conclusions and policy recommendations below.

Conclusions from statistical tests

In this study we report the findings of econometric testing of the explanatory variables behind a proxy measure of liquidity, the bid-offer spread, in order to determine (i) if these variables are significant, (ii) whether the relationships have changed over the time of the observation period, and (iii) whether the implied level of liquidity has increased during the time period under observation.

In the first instance we conclude that market liquidity levels had improved in the period following the introduction of the structural reforms.

We tested the determinants of the benchmark bond bid-offer spread. We observed the mean weekly bid-offer spread for each benchmark gilt for the sample period under study. Bid-offer spreads for all the benchmark bonds had narrowed during the period under study. Measured by this indicator, gilt market liquidity had improved during the time pre-reform to post-reform. We are not able to verify this with complete certainty, because other factors may also have contributed to the reduction in the quote spread, but it is a reasonable conclusion to infer.

The statistical analysis we conducted accounted for over 50% of the total variation of the price spread. We determined from model testing that the bid-offer price spread is influenced as follows:

- longer time to maturity (interest-rate risk), and higher volatility: wider bid-offer spread;
- larger issue size: narrower bid-offer spread.

One of the Bank of England's market reforms had created larger size benchmark issues, so we conclude that this reform was a key factor in improved liquidity.

Volatility was shown to be a significant causal factor, with higher volatility influencing wider price spreads and hence lower liquidity. That the *overall* level of liquidity was improving during a period of high volatility, the latter in part connected with several market crises during 1994-2001, implies a degree of success associated with the BoE reforms in helping to create a more orderly market.

We observed that there was a structural break in the bid-offer spread time series data, both during and after the reform period. This implies a change in the relationship between the variables. The results of the CUSUMQ test were strongly consistent with the earlier results and suggested that bid-offer spread experienced instability at a number of points during the observation period. We concluded that the bid-offer spread is cointegrated with four of its explanatory variables, these being bond coupon, bond term-to-maturity, bond volatility and the central bank base rate. Although they may individually exhibit a random walk feature, the evidence appears to suggest a stable long-run relationship between the bid-offer spread and the four variables.

This result suggests with a reasonable degree of certainty that market liquidity had improved during this period.

Impact of market reforms and policy recommendations

Our preliminary conclusion, that gilt market liquidity as measured by the proxy indicator had increased during the observation period, leads to a second conclusion that the market structural reforms introduced by the BoE led to improved liquidity in the gilt market. This has further implications for monetary authorities worldwide, as it suggests that they should introduce repo and strips markets, and a uniform trading infrastructure, in order to improve liquidity in their respective markets.

Our results show also that the main explanatory variables are significant determinants of the bid-offer spread, in itself a proxy measure of liquidity. This is a key measure of the effect of the reforms in market efficiency: monitoring these variables and understanding the relationship between them will assist in the maintenance of an orderly, liquid market.

One further conclusion we draw from the results is that they suggest how market liquidity can be maintained through most trading conditions. For example, we see that a relatively narrow bid-offer spread, implying a liquid market, is influenced by the level of market volatility, benchmark bond issuance and other factors. In times of market correction or instability, central banks and regulatory authorities may wish to consider these factors when addressing market policy.

Finally, the suggested increase in liquidity levels reflects positively on the value of an open repo market, the most significant of the BoE's reforms in the gilt market. Therefore sovereign debt agencies should consider introducing this reform as an aid to increasing and maintaining market liquidity.

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Impact of Electronic Tax Registers on VAT Compliance: A Study of Kenyan Private Business Firms

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Abstract: *The purpose of this study was to assess the impact of use of Electronic Tax Registers (ETRs) on Value Added Tax (VAT) compliance among private business firms in Kisumu city, Kenya. A sample of 233 private firms was selected from a population of 590 private firms using stratified sampling technique. The primary data was gathered using structured questionnaires and analysed by use of correlation and descriptive statistics. Empirical results of the study indicate that effective and regular use of ETR has a significant positive impact on the VAT compliance. The regular frequency of inspection of private businesses by the tax authorities (staff from Kenya Revenue Authority) has a slight impact on VAT compliance however; sales of Private Business Firms show insignificant relationship with VAT compliance. From these findings, the study concludes that inspection of businesses by tax authorities as well as use of ETRs are major determinants of VAT compliance among private Business Firms in Kenya.*

Keywords: Value added tax, electronic tax registers, private business firms

Introduction

Value Added Tax, (VAT) on consumer expenditure was introduced in Kenya in 1990 in order to replace sales tax, which had been in operation since 1973. It was introduced as a measure to increase government revenue through expansion of tax base, which hitherto was confined to income tax and sales tax. VAT is levied on consumption of taxable goods and services supplied in Kenya or imported into Kenya. Registered persons acting as agents of government of Kenya collect VAT at designated points and then submit to the Kenya Revenue Authority (KRA) (Simiyu 2003). Previous empirical study conducted by Moyi and Ronge (2006), indicates that VAT contribution is estimated to an average of 5.4% of GDP between the year of its introduction (1990) and the year 2005. The average of total tax contribution to GDP for the same period was 19.8%. This clearly indicates that in Kenya, VAT contributes substantially to the growth of the economy (table 1).

Another study conducted by Waris et al, (2009) reveals that despite the importance of VAT in the national budget, the period between the year 2000-2003 showed that VAT had the highest share of total tax (above 30%). However, VAT contribution trend declined to total taxes collected from the year 2003 onwards as given in table 1 which captures the composition of various taxes to total taxes in Kenya (1996-2008). This trend is worrying and calls for intervention reforms. Kenya revenue Authority (KRA) has since introduced several reforms in its revenue collection system including the introduction of Electronic Tax Registers.

ETRs were first introduced to Kenya in 2004, through a gazette notice no. 47 issued in October 22, 2004. According to this notice, ETR or printer is defined as any device approved by the

government to record and issue fiscal data of goods and services (KRA 2004). Today, the law makes it mandatory for businesses registered for VAT to issue tax invoices and/or cash sale receipts which must be ETR generated or supported by ETR receipts.

Table 1: Share of Tax Revenues in GDP 1996-2005

YEAR	Total tax (%)	VAT (%)	Income tax	Exercise Duty	Import Duty	Others
1996	24.0	5.6	9.1	4.5	4.3	0.5
1997	23.7	5.5	8.9	4.6	4.4	0.3
1998	22.4	5.6	8.0	4.1	4.1	0.6
1999	21.1	5.5	7.2	3.8	3.8	0.8
2000	17.0	5.2	5.5	2.9	3.0	0.4
2001	15.9	5.0	5.5	3.1	2.1	0.2
2002	18.6	5.6	6.6	4.2	1.9	0.3
2003	17.9	5.2	6.2	4.2	1.9	0.4
2004	16.5	4.9	6.1	3.5	1.7	0.3
2005	21.1	5.6	8.2	3.9	1.8	1.6
Average	19.8	5.4	7.1	3.9	2.9	0.5

Source: Moyi and Ronge (2006)

The VAT act Cap 476 (Laws of Kenya), requires that once a tax payer is registered, should always display VAT certificate, issue ETR generated receipts, declare correct returns and submit returns on time. Failure to adhere to these requirements attracts heavy fines and penalties. However, businesses with turnover of less than five million per annum are under no obligation to register for VAT and as such, are not legally compelled to use ETRs. For those businesses with turnover below the required VAT threshold, KRA has introduced a new tax called turnover tax (TOT) by a Finance Act 2007, through the provision of income tax Act, cap 470 which came into effect from 1st January 2008. This tax is based on gross sales and is chargeable at the rate of 3% of gross turnover.

Electronic tax registers were introduced to help KRA establish the amount of VAT payable without necessarily requiring the traders to provide records for crosschecking. There was concern that thousands of traders were undervaluing their sales in order to evade tax. The success of ETR machines in Kenya was questioned during its initial stages of implementation. According to Kathuri (2006), the gadgets had failed in 21 countries including Tanzania. There was also fear that accurate records could not be kept with the devices because there is no provision for return of goods and services.

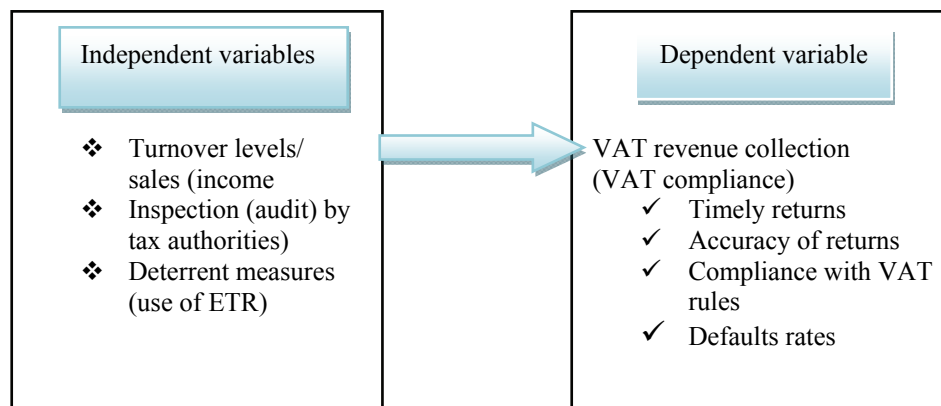
Based on the above premises, the present study was designed to assess the impact of use of Electronic Tax Registers (ETRs) on Value Added Tax (VAT) collection among private business firms in Kisumu city, Kenya. The study was guided by following specific objectives:

1. To investigate the relationship between the use of electronic tax registers and VAT compliance rates in Kisumu city.
2. To assess the extent to which income levels of private business firms affects the VAT compliance.

3. To determine whether or not frequency of inspection by the officials of revenue department (KRA) impacts on VAT compliance.

The literature on tax compliance points out, the size of income of tax payer, knowledge of tax due, frequency of audit, probability of detection by tax authorities and severity of punishment if caught as some of the important determinants of tax compliance model. Tax compliance can therefore be increased if control measures are put in place to detect non-compliers and punitive measures instigated. The use of ETR serves two purposes in this model: automatically generating knowledge of tax due, and acting as a control compliance control measure. According to Ritsema et al (2003), tax compliance decision depends on income level of an individual taxpayer, inspection (audit) by tax authorities and deterrent measures put in place. This theoretical framework has been adapted for this study since other determinants of compliance such as severity of punishment are uniform for all taxpayers. The use of ETR is likely to go hand in hand with inspection. Sales level has been included as a proxy for income. The model variables interrelationship can be conceptualised as shown in the diagram below (figure1).

Figure 1: Model Variables



Source: Ritsema, et al (2003), Adams and Webley (2001) modified

Methodology

This study adopted a survey research design. The research design was preferred for the study since it allowed the researcher to collect a large amount of data from a sizeable population in a highly economical way. According to Saunders, et al (2007) this research strategy allows collection of data through questionnaires administered to a sample. Data collected by this design can be used to suggest possible reasons for particular relationships between variables and produce models for these relationships.

This research design was therefore relevant for the study as it also enabled the researcher to take control over the research process. The target population of this study was medium and large-scale business private firms operating within Kisumu city and registered for VAT purposes. The study population comprised of a total of 590 private business firms drawn from the Kisumu municipal council registered as firms active as at 31st December 2008. Out of a total of 590 firms, 233 firms were selected a using stratified sampling technique.

Data was gathered by use of self-administered questionnaires. The questionnaire was divided into three sections: general Information, determinants of VAT compliance and impact of electronic tax registers on collection of VAT. Business related information was requested. This included, among other things, main business activity, number of staff employed, the year the business was first registered for VAT and questions, penalties for late payment of VAT and the number of times the business had been inspected by the tax authorities. Most of the perceptual responses were captured in a five-point-Likert scale. This was preferred because Likert scale is able to deal with the conceptual nature of the subject area with large number of items and difficulties in eliciting specific information from the respondents (Singh and Smith, 2006). Direct observation methodology also helped in crosschecking the respondents' answers. Businessmen were also informally interviewed to provide information on their views on the use of ETR, inspection and income and VAT compliance. This was aimed at further enhancing the consistency on their responses on the subsequent questionnaires.

A combination of techniques was utilized during the data analysis stage. VAT compliance was measured on a five-point Likert scale consistent with the dimensions suggested by Adams and Webley (2001) and Webley *et al* (2002). VAT compliance model adopted by the study is summarized below:

$$\text{VAT compliance} = X_0 + X_1 + X_2 + X_3 + \alpha \dots \dots \dots \text{Equation [1]}$$

Where,

- X_0 = Constant
- X_1 = Sales level (income of taxpayer)
- X_2 = Audit/Frequency of inspection
- X_3 = Control measures, knowledge of tax due (use of ETR)
- α = Error term.

Empirical Results of the Study

ETR and VAT Compliance

The average use of ETR was captured in three questions in the questionnaire, which were arranged in five-point scale. Further, VAT compliance was also measured on a five-point scale, with seven selected questions. Figure 1 depicts the relationship between the average use of Electronic Tax Registers and the average VAT compliance levels. The figure indicates that there is a positive relationship between the use of ETR and VAT compliance by the respondents. However, this does not reveal the cause and effect of the relationship between the variables.

The trend depicted by figure 2 is in agreement with the results of correlation as shown by the output presented in table 2. The correlation coefficient was found to be substantial and significant at 95% confidence level ($R=0.622$, $p<0.01$). This indicates that the use of Electronic Tax Registers has a significant correlation with VAT compliance. This result was consistent with the responses from the perceptual question where respondents were asked whether, they thought adoption of ETR was effective enough to curb VAT noncompliance. The majority of the re-

spondents (N=67) 52.8% (score 4 and 5 on the scale) agreed that ETR helped in reducing non-compliance to a great extent. Twenty-four (24%) of the respondents were indifferent as they took middle ground response (score 3 on the scale).

Income and VAT Compliance

Figure 3 below shows the results of VAT compliance at different sales/turnover levels of the participating firms.

Figure 3 shows that the businesses which reported low sales per year (below 25 million shillings) had high VAT compliance compared to businesses reporting average sales of 25-100 million shillings per year. The figure also indicates that businesses reporting turnover above 100 million shillings had the highest VAT compliance levels (average of 4.33 on compliance scale).

Figure 2: Use of ETR and VAT Compliance

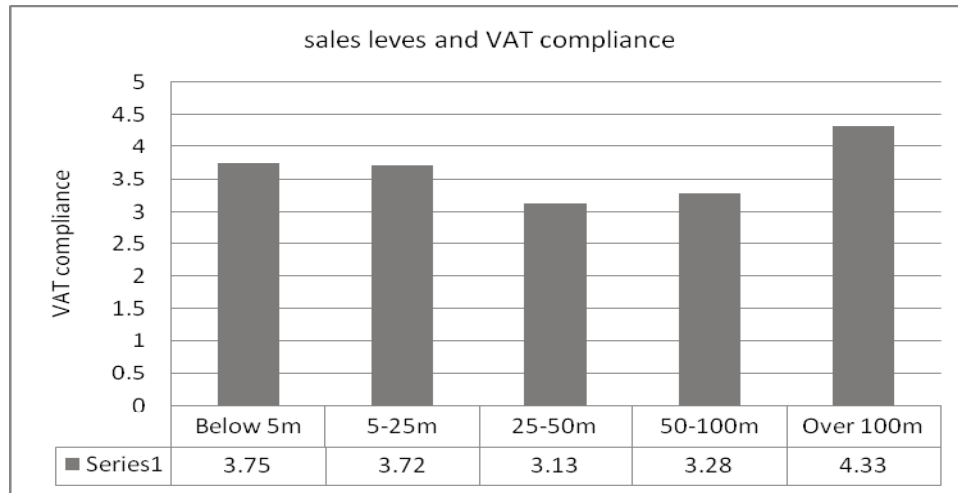


Table 2: Correlation Results (95% Significance Level)

Variable	1	2	3	4
1.VAT compliance*	1.000	(.000)		
2.Sales level	-0.077	(.351)	1.000	(.000)
3.Inspection	0.15	(0.003)	-0.197	(.247)
4.ETR use	0.622	(0.000)	-0.138	(.305)

*Dependent variable: VAT compliance

Figure 3 also indicates that VAT compliance is lowest (average 3.13 on scale among businesses reporting medium scale sales (between 25 million and 50 million shillings per annum). Within this sales range, the figure indicates a negative relationship between sales and VAT compliance.

The impact of sales volume on VAT compliance was also investigated by perceptual questions aiming at eliciting respondents views on the role of volume of sales on VAT compliance. These responses are summarized in table 3.

Figure 3: Sales Level and VAT Compliance (Series 1)

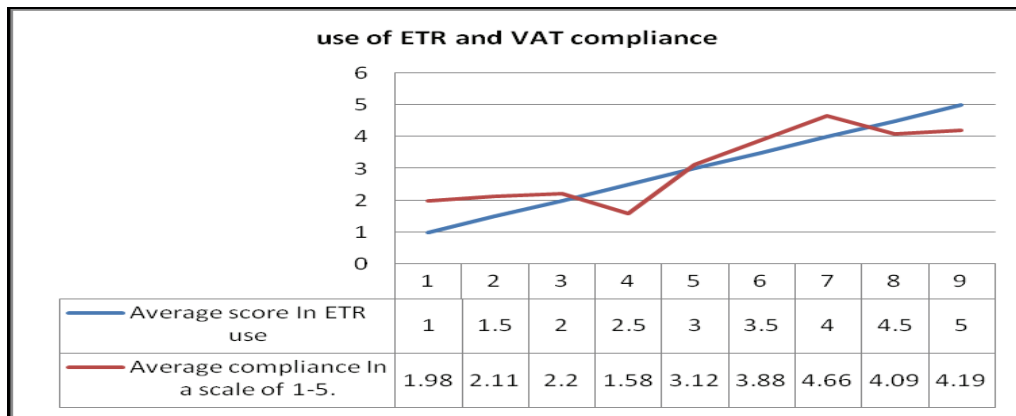


Table 3: Respondents' Perception on the Impact of Sales Level of their Businesses on their Compliance Decision

Statement	1	2	3	4	5	N	Mean
Increase in sales volume leads to poor compliance to VAT	2 (1.6%)	6 (4.8%)	13 (10.4%)	82 (65.6%)	22 (17.6%)	125	3.94
The more the VAT payable the lesser the tendency to comply	3 (2.4%)	13 (10.4%)	45 (36%)	54 (43.2%)	10 (8%)	125	3.44
Increase in size of business leads to poor compliance to VAT	2 (16.8%)	34 (27.2%)	44 (35.2%)	18 (14.45)	7 (5.6%)	124	2.625
Small businesses with small sales find it easy to comply to VAT	23 (18.4%)	25 (20%)	18 (14.4%)	42 (33.6%)	17 (13.6%)	125	3.04

Note: 1=strongly disagree, 5=strongly agree. Figures in brackets indicate the percentage of respondents for each score

Source: Research data, 2009

Table 3 indicates that on average, increase in the taxpayers' income leads to low compliance by the respondents. The majority of respondents (104 respondents representing 83.2% of all respondents) agreed (score 4 and 5 on the scale) that increase in sales volume leads to poor tax compliance. Thirteen respondents (10.4%) were unsure whether changes in income had any effect on their compliance decision. Only 6.4% of the respondents disagreed (score 1 and 2 on the scale) that increase in sales would reduce tax compliance. Increase in sales implies increase in VAT payable by the businessmen. Therefore the second perceptual question which required the respondents to state whether the amount of VAT payable would influence their compliance decision was meant to support the first question. Majority of the respondents (52.2%) agreed that increase in VAT payable would reduce their tendency to comply. When asked whether, size of business would affect their compliance decision, the majority of the respondents disagreed. 16.8% of the respondents disagreed that increase in size of business would reduce tax compliance while 27.2% agreed while 35.2% were unsure as they took the middle ground score. Only 20.05% agreed (score 4 and 5 on the scale). When the respondents were asked whether they thought small businesses making little sales could easily comply, the average compliance score was 3.04. This means that on average, the respondents were just slightly in agreement with the statement.

Frequency of Inspection and VAT Compliance

Table 4 shows the frequencies of inspection by tax authorities of the respondent’s businesses in the last five years and the average compliance levels.

Table 4: Frequency of Inspection and VAT Compliance

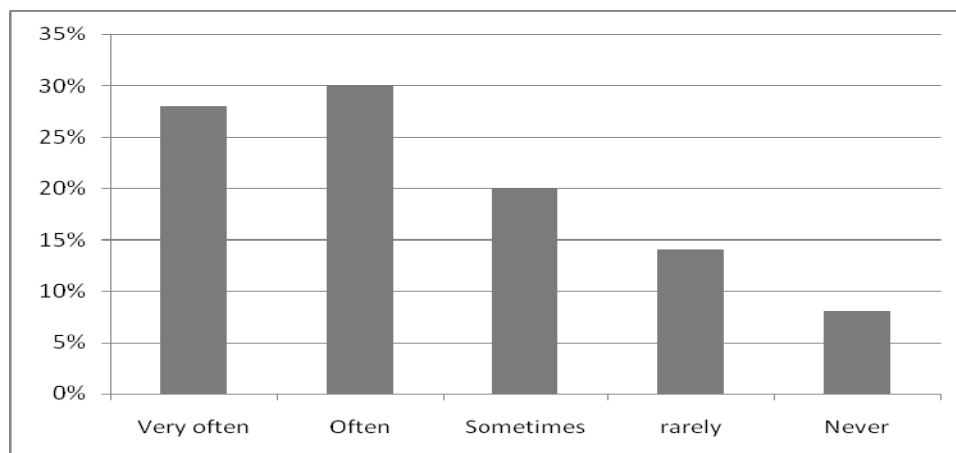
	Frequency of inspection	Frequency (N)	Percentage (%)	Average Compliance
1	<1 p.a	16	12.8	2.90
2	Once p.a	54	43.2	3.39
3	Semi-annually	35	28.0	2.83
4	Quarterly	15	12.0	3.76
5	Monthly	05	04.0	4.50
	Total	125	100.0	5.00

Source: Field Survey, 2010

Table 4 shows that, most respondents’ businesses were inspected by KRA at most quarterly per annum. The majority of the businesses (43.2%) said they were inspected once per annum, thirty-five (28%) of the respondents said they their businesses were inspected twice per year, 12.8% of the respondents said their over the past five years, their businesses have been audited less than once per annum on average. The remaining 16% said their premises were inspected by the KRA officials at least three times per year, in the last five years. Most respondents whose businesses reported more frequent inspection were drawn from medium and large scale retail outlets. The table also indicates that businesses which were most frequently inspected had high VAT compliance (monthly inspection, average compliance 4.50, compared to average compliance of 2.90 for businesses inspected less than once per annum). Respondents from large businesses generally consented that frequency of inspection have little impact on VAT compliance.

The respondents were also asked whether they thought the inspection by the income tax department were effective in checking VAT non compliance. Figure 4 summarizes the responses.

Figure 4: Respondents’ Perception on the Effect of Inspection on VAT Compliance



Further analysis of the responses of this perceptual question revealed that a substantial number of respondents (58% businessmen) agree that inspection acts as deterrent on non-compliance (score 4-5) on the scale. While some (22%) believed that frequent inspection will motivate them not to comply (score 1-2). The remaining 20% took the middle ground. There was a strong consensus that inspectors are good at detecting errors in the VAT returns 79% agreeing. In order to address the specific objectives regression analysis was run using SPSS version 12. The correlation results are shown in table 5 and the coefficients of regression are shown in table 6.

Table 5: Correlation results (95% Significance Level)

Variable	1		2		3		4	
1.VAT compliance*	1.000	(.000)						
2.Sales level	-0.077	(.351)	1.000	(.000)				
3.Inspection	0.15	(0.003)	-0.197	(.247)	1.000	(.000)		
4.ETR use	0.622	(0.000)	-0.138	(.305)	0.061	(.470)		

*Dependent variable: VAT compliance (figures in parenthesis indicate the p-values)

Table 5 above shows that there was a slight negative relationship between VAT compliance and sales ($R=-0.077$, $p>0.01$). On the other hand, the Pearson’s correlation coefficient for between VAT compliance and frequency of inspection is $R=0.15$ which indicates a slight positive correlation. However, there is a significant positive relationship between use of ETR and VAT compliance ($R=0.622$, $p<0.01$).

It was also necessary to check the possibility of presence of multi-collinearity between predictors. From the correlation matrix, there are no substantial correlations between the predictors. The highest correlation between predictors alone (ignore VAT compliance) is the correlation between the use of ETR and frequency of inspection ($R= 0.305$, $p=0.247$). This correlation is insignificant and besides, the coefficient is small. According to (Field, 2005), where the correlation between predictors is ($R<0.9$) there is an indication that the predictors are measuring different things, implying that there is no Collinearity.

Table 6: Coefficients and Collinearity Statistics

	Un-standardized Coefficients		Standardized Coefficients	F	Sig.	95% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error				Lower Bound	Upper Bound	Tolerance	VIF
Constant*	2.120	.673		3.150	.004	.728	3.512		
Sales	-.013	.097	-.022	-.136	.893	-.213	.187	.955	1.048
Inspection	.129	.111	-.196	-1.163	.257	-.359	.101	.883	1.133
Use of ETR	.553	.136	.679	4.063	.000	.272	.835	.901	1.110

Source: Research data *Dependent Variable: VAT compliance

Table 6 also shows the unique contribution of each variable to the explaining of the independent variable. This is shown by the beta values under the standardized coefficients column. Standardized coefficients assess the contribution of each variable towards the prediction of the dependent variable. This is because these values have been converted in the same scale to enable comparison. The largest beta value is 0.679, which is for ETR use. This means that this variable makes the strongest contribution to explaining the VAT compliance. This value is also shown to be statistically significant contribution to the equation (significance, p value less than 0.05). The rest of the variables (sales level and inspection) seem to have insignificant contribution. The overall equation as suggested in the theoretical framework (Equation 1) can be read from the unstandardized coefficients column in table 6 as follows:

$$\text{VAT Compliance} = 2.20 - 0.013X_1 + 0.129X_2 + 0.553X_3 + E \dots\dots\dots \text{Equation [2]}$$

This means that in a scale of 5, even without the three variables under study, the compliance is expected to stand at 2.20 (Y-intercept). In equation 4.1., X_1 is the coefficient for sales level, X_2 is the coefficient for inspection and X_3 is the coefficient for use of ETR whereas E stands for the error term.

Table 7 below summarizes the regression model. It shows the overall contribution of the variables to the dependent variable (VAT compliance). R shows the value of correlation coefficient while R^2 shows how much of the variability of the dependent variable is explained by the predictors.

Table 7 shows that the overall correlation coefficient, $R=0.649$. It also shows that the value of $R^2=0.421$. This indicates that the overall model accounts for 42.1% of the VAT compliance.

Table 7: Model Summary

R	R^2	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
				R Square Change	F Change	df1	df2	Sig. F Change
.649(a)	.421	.346	.652976	.421	29.32	3	122	.000

Predictors: (Constant), Average ETR use, Sales level, frequency of Inspection

Table 7 also shows that the value of adjusted $R^2=0.346$. The value of adjusted R^2 gives some idea of how well the model generalizes the population. The difference between adjusted R^2 and R-square for the final model is 0.075, which is too small. This shrinkage means that if the model were derived from the entire population rather than a sample, it would account approximately 0.75% less variance in outcome. Field (2005) suggests that where this shrinkage is less than 0.5, then it shows that the validity of the model is very good. The shrinkage for this study is far below this threshold indicating that the validity of the model is unquestionable.

Conclusion

The first and main objective of the study was to find out the impact of electronic tax registers on VAT compliance among private firms in Kisumu city, Kenya. This was achieved by testing

the hypothesis that the use of electronic tax registers has a positive relationship with VAT compliance.

H₁ There is a positive relationship between the use of electronic tax registers and VAT compliance in Kisumu city, Kenya.

H1 Accepted.

This hypothesis was accepted as shown by positive beta value on the correlation results (R=0.622, $p > 0.01$). Based on this finding, it can be concluded that use of ETR has a significant impact on VAT compliance in Kenya.

The second objective sought to identify the relationship between income levels of the firms and VAT compliance. To address this objective, the following hypothesis was tested:

H2 There is a direct negative relationship between income levels of private firms in Kisumu city and VAT compliance.

H2 Rejected.

This hypothesis was rejected as the correlation between the two variables was found to be insignificant at 95% level of confidence (beta = -0.77, $p > 0.05$). Further analysis was performed to check compliance levels at different income levels among the participating firms. The study revealed that VAT compliance levels were lower among taxpayers in middle level sales category (sh. 5 to 100 million shillings per year). On the other hand, the study revealed that large organizations are highly VAT compliant. Similarly, compliance was also found to be good at the lowest sales level firms. The study therefore concluded that midsize businesses reporting average sales (5-100 million shillings per year) have higher chances of not complying as compared to businesses in other categories of income.

The third objective of the study was to assess the impact frequency of inspection of businesses by tax authorities on VAT compliance. This was ascertained by testing the following hypothesis:

H₃ Frequency of inspection by the revenue department (KRA) has significant relationship with VAT compliance among private business firms in Kisumu city, Kenya.

H3 Accepted.

This hypothesis was accepted as the correlation results indicated a slight but significant positive relationship between VAT compliance and frequency of inspection by tax authorities. (R= 0.15, $p < 0.05$). Further analysis of perceptual responses revealed that the respondents from large businesses generally consented that frequency of inspection have little impact on VAT compliance. Most of these businesses were observed to be effective users of ETR gadgets and have incorporated them in their internal controls. From these finding, the study concluded that inspection of businesses by tax authorities is an important determinant of VAT compliance.

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Foreign Direct Investment Inflows, Merchandize Trade and Economic Growth in India: An Analytical Study

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Abstract: *The paper focuses on the relationship between Foreign Direct Investment (FDI) inflows, economic growth and volume of merchandize trade using a structural co-integration model with vector error correction mechanism for the period 1996-97:Q1 to 2008-09:Q3. The existence of co-integrating vector is found between the three variables, which captures the long term relationship between FDI inflows, GDP (gross domestic product) and volume of merchandize trade. Multivariate Granger Causality Test has been conducted in a VECM framework to examine the causal linkages since all the variables in the study are I(1) processes and co-integrated. Bi-directional causality has been observed between FDI inflows and economic growth. Unidirectional causality is revealed from merchandize trade to economic growth. To test the parameter stability of the variables involved in the study CUSUM and CUSUMSQ test is also performed.*

Keywords: FDI inflows, multivariate granger causality test, VECM, co-integration analysis, economic growth

Introduction

In developing countries trade and foreign direct investment are often seen as important catalyst for economic growth. FDI not only acts as an important vehicle of technology transfer but also stimulates domestic investment and facilitates improvements in human capital and institutions in the host countries. Trade also acts as an instrument of economic growth and facilitates efficient production of goods and services by shifting production to countries that have comparative advantage in producing them. Depending upon certain factors like level of human capital, domestic investment, infrastructure, macroeconomic stability, and trade policies the impact of FDI and trade on economic growth varies across countries.

India till 1985 was basically a closed economy characterized by infant industry protection, import licensing, pegged exchange rate, foreign exchange controls and limited private sector participation. After the BOP crises in 1990-91, India embarked on a structural economic reform policy, called New Economic Policy, envisioning gradual elimination of trade barriers, opening up of the real and financial sectors to foreign investments, encouragement to the private sector. Consequent upon the rationalization of tariffs and import duties as part of the NEP, there has been manifold increase in India's trade with the rest of the world. For instance, total merchandize trade has increased from \$24.6bn in 1985 to \$41.8 bn in 1990, further to \$93 bn in 2000 and \$402.7bn in 2007. The combined trade in goods and services confirms a similar trend of growth from \$30bn in 1985 to \$49.8bn in 1990, and further to \$126 bn and \$444.8 bn in 2000 and 2006 respectively, with the average growth during 2002-06 being 28.9% (Narayanan and Dash, 2010:5).

Literature Review

Michaely (1977:49) and Balassa (1978:181) have well documented the positive relationship economic growth and international trade. Feder (1983:59), Ram (1985:415), Salvatore (1991:7) and Hatcher (1991:7) in their studies have analysed the export led growth hypothesis where they

argued that exports are likely to alleviate foreign exchange constraints and thereby facilitate importation of better technologies and production methods. Balasubramanayam et al. (1996:92) found that in developing countries pursuing outward-oriented trade policies, FDI flows were associated with faster growth than in those developing countries that pursued inward oriented trade policies. Ahmad and Harnhirun (1996:413) examined causality between exports and economic growth for five countries of the Association of Southeast Asian Nations (ASEAN). Dutt and Ghosh (1996:167) studied causality between exports and economic growth for a relatively large sample of countries using the error correction model (ECM) for the countries in which they found co-integration. Then VEC model was estimated, and tests for Granger causality were performed. Borensztein, Gregorio, and Lee (1998:115) examined the role of FDI in promoting economic growth using an endogenous growth model. They analysed FDI flows from industrial countries to 69 developing countries during 1970-1989. Their results also show that FDI is an important vehicle of technology transfer, contributing more to economic growth than domestic investment. According to Goldberg and Klein (1998) direct investment may encourage export promotion, import substitution, or greater trade in intermediate inputs, especially between parent and affiliate producers. Blomstrom, Globerman and Kokko (2000) argue along the same lines that the beneficial impact of FDI is only enhanced in an environment characterized by an open trade, investment regime and macroeconomic stability where FDI can play a key role in improving the capacity of the host country to respond to the opportunities offered by global economic integration. Empirical research by Chakraborty and Basu (2002:1061) examined FDI and Trade function as engines of growth, where they concluded that as trade and FDI liberalization policies began in India in the late 1980s and were widened in the 1990s, these policy liberalizations have increased growth in India significantly. Love and Chandra (2004:483) confirmed these results and further suggested that trade and economic growth exhibits a feedback relationship.

The interrelated relationship between volume of merchandize trade and FDI inflows, and interpreting the importance of these activities towards economic growth has always been considered as an important topic for discussion since the era of import liberalization policies to the era of openness and economic growth, however the empirical work on the relationship is relatively limited. Many of the studies conducted so far do not discuss the issue of causality between the three variables and the existing literature on the Indian position in the subject matter proves to be inadequate.

Objective

The study seeks to examine the causal relationship, if any between Foreign Direct Investment (FDI) inflows, volume of India's merchandize trade and economic growth (GDP) in a Vector Auto Regressive (VAR) framework, during the post liberalization period and to ascertain the economic implications of such causal relationship.

Data

Quarter wise data of GDP (at 1999-00 market prices) and volume of merchandize trade (export + import) is taken from various publications of the Reserve Bank of India (RBI) like RBI Bulletins, RBI Annual Reports. Data relating to FDI inflows is collected from BOP statistics published by RBI. The time period of the study is 1st quarter of 1996-97 to the 3rd quarter of 2008-09, comprising of 51 data observations.

Methodology

The study has used the Granger-Causality Test in a multivariate Vector Autoregressive (VAR) framework to examine the causal links between economic growth, FDI inflows and merchandize trade over the period 1996-97:Q1 to 2008-09:Q3 (Figure 1).

Tests for Stationarity

The first step in the methodology is to test the stationarity of the variables (used as regressors in the model). Augmented Dickey Fuller (ADF) (1979:423), Phillips-Perron (PP) (1988:335) and Kwiatkowski, Phillips, Schmidt and Shin (KPSS) (1992:159) Tests have been conducted to investigate into the stationarity property of the series.

Tests for Cointegration

Cointegration Test is conducted to determine the long-run economic relationship between the variables (Thomas, 1993). In this study, the Error-correction Cointegration technique of Johansen (1988:231) and Johansen and Juselius (1990:169) has been applied to identify the cointegration relationship between the variables. This approach to the number of co-integrating vectors is applicable only if two variables are I(1).

According to Johansen (1988), a p-dimensional VAR model, involving up to k-lags can be specified as below.

$$Z_t = \alpha + \Pi_1 Z_{t-1} + \Pi_2 Z_{t-2} + \dots + \Pi_k Z_{t-k} + \varepsilon_t \quad \dots(1)$$

where Z_t is a $(p \times 1)$ vector of p potential endogenous variables and each of the Π_i is a $(p \times p)$ matrix of parameters and ε_t is the white noise term. Equation (1) can be formulated into an Error Correction Model (ECM) form as below.

$$\Delta Z_t = \alpha + \Pi_k Z_{t-k} + \sum_{i=1}^{k-1} \theta_i \Delta Z_{t-i} + \varepsilon_t \quad \dots(2)$$

where Δ is the first difference operator, and Π and θ are p by p matrices of unknown parameters and k is the order of the VAR translated into a lag of $k-1$ in the ECM, and ε_t is the white noise term. Π is a vector which represents a matrix of long-run co-efficients and it is of paramount interest. The long-run co-efficients are defined as product of two $(p \times r)$ vectors, α and β' , and hence $\Pi = \alpha\beta'$, where α is a vector of the loading matrices and denotes the speed of adjustment from disequilibrium, while β' is a matrix of long-run co-efficients so that the term $\beta'Z_{t-1}$ in equation (2) represents up to $(p-1)$ cointegration relationships in the Cointegrating Model. Evidence of the existence of cointegration is the same as evidence of the rank (r) for the Π matrix. Johansen and Juselius (1990) showed that the rank of r of Π in equation (2) is equal to the number of cointegrating vectors in the system. If it has full rank i.e. $r = p$ (in the present study if $\Pi = 2$) it is said that there are p cointegrating relationships and that all variables are I(0). If the rank $r = 0$ than it implies that the sequences are unit root processes and there is no cointegration and the appropriate model is a VAR in the first differences involving no long run element. If the rank is reduced [$1 \leq Rank\Pi \leq (p-1)$], even if all the variables are individually I(1), the level based long run component would be stationary. The appropriate modelling methodology here is the Vector-Error Correction Model (VECM).

Johansen and Juselius (1990) developed two Likelihood Ratio Tests. The first test is the Likelihood Ratio Test based on the maximal Eigen value, which evaluates the null hypothesis of ‘r’ cointegrating vector(s) against the alternative of ‘r+1’ cointegrating vectors. The second test is the Likelihood Ratio Test based on the Trace Test, which evaluates the null hypothesis of, at most, ‘r’ cointegrating vector(s) against the alternative hypothesis of more than ‘r’ cointegrating vectors. If the two variables are I(1), but cointegrated, the Granger Causality Test will be applied in the framework of ECM in which long-run components of the variables obey equilibrium constraints while the short-run components have a flexible dynamic specification.

Test for Granger Causality with VECM

In order to examine the causal linkages between the variables, the Granger Causality Test has been conducted. The direction of the impact of each of the variables is also determined from the analysis. In order to capture the impact of variables observed in the past time period in explaining the future performance, the optimal lag length p (which is 4 in the present study) is chosen (see Table 1) and the criterion used in selecting the VAR model and optimal lag length require the combination of information criterion (minimum of AIC or SIC or HQIC or FPE value).

If the variables contain cointegrating vector, causality exists in at least one direction. According to Engle and Granger (1987:251), if two series, say X and Y, are integrated of order one [i.e. I(1)] and cointegrated, then there is possibility of a causal relationship in at least one direction. The direction of a causal relationship can be detected in the VECM. In the presence of cointegration, there always exists a corresponding error-correction representation, captured by the error-correction term (ECT). This means that changes in the dependent variable are a function of the level of disequilibrium in the cointegrating relationship as well as changes in other explanatory variable(s). The ECT captures the long-run adjustment of cointegration variables. As such, in addition to the direction of causality, the incorporation of ECT in the VECM allows to detect both short- and long-run causal relationships between the variables. The VECM is specified as below:

$$\Delta \text{LnFDI}_t = \sum_{j=1}^{p-1} \beta_{11} \Delta \text{LnFDI}_{t-j} + \sum_{j=1}^{p-1} \beta_{12} \Delta \text{LnGDP}_{t-j} + \sum_{j=1}^{p-1} \beta_{13} \Delta \text{LnMERTRADE}_{t-j} + \alpha_1 \text{ECT}_{t-1} + \varepsilon_{1t} \dots \dots \dots (3)$$

$$\Delta \text{LnGDP}_t = \sum_{j=1}^{p-1} \beta_{21} \Delta \text{LnGDP}_{t-j} + \sum_{j=1}^{p-1} \beta_{22} \Delta \text{LnFDI}_{t-j} + \sum_{j=1}^{p-1} \beta_{23} \Delta \text{LnMERTRADE}_{t-j} + \alpha_2 \text{ECT}_{t-2} + \varepsilon_{2t} \dots \dots \dots (4)$$

$$\Delta \text{LnMERTRADE}_t = \sum_{j=1}^{p-1} \beta_{31} \Delta \text{LnMERTRADE}_{t-j} + \sum_{j=1}^{p-1} \beta_{32} \Delta \text{LnFDI}_{t-j} + \sum_{j=1}^{p-1} \beta_{33} \Delta \text{LnGDP}_{t-j} + \alpha_3 \text{ECT}_{t-3} + \varepsilon_{3t} \dots \dots \dots (5)$$

where Δ is the first difference operator and $\varepsilon_{1t}, \varepsilon_{2t}, \varepsilon_{3t}$ are white noise. ECT is the error correction term, and p is the order of the VAR, which is translated to lag of $p - 1$ in the ECM. $\alpha_1, \alpha_2, \alpha_3$ represent the speed of adjustment after the GDP, FDI inflows and merchandize trade deviate from the long run equilibrium in period t-1. In equation (3), the co-efficients of lagged value $\beta_{12,j}$ for $j = 1, \dots, p - 1$ represent short-run effects of GDP on FDI inflows, the co-efficients of lagged value $\beta_{13,j}$ for $j = 1, \dots, p - 1$ represent short-run effects of merchandize trade on FDI inflows. In equation (4) the co-efficients of lagged value $\beta_{22,j}$ for $j = 1, \dots, p - 1$ represent short-run effects

of FDI inflows on GDP, the co-efficients of lagged value $\beta_{23,j}$ for $j = 1, \dots, p-1$ represent short-run effects of merchandize trade on GDP. In equation (5) the co-efficients of lagged value $\beta_{32,j}$ for $j = 1, \dots, p-1$ represent short-run effects of FDI on merchandize trade, the co-efficients of lagged value $\beta_{33,j}$ for $j = 1, \dots, p-1$ represent short-run effects of GDP on merchandize trade.

Parameter Stability Tests

CUSUM test and CUSUM of squares test are used to check whether the parameters of the model are stable or not. The CUSUM test (Brown, Durbin and Evans, 1975:49) is based on the cumulative sum of the recursive residuals. This option plots the cumulative sum together with the 5% critical lines. The test finds parameter instability if the cumulative sum goes outside the area between the two critical lines. In case of CUSUM of squares test, similar to CUSUM test, movement outside the critical lines is suggestive of parameter or variance instability. If the cumulative sum of squares is outside the 5% significance lines, it would suggest that the residual variance is somewhat unstable.

FINDINGS

Table 2 reports the results of the *ADF*, *PP* and *KPSS Tests* of unit root by lag length chosen based on minimum values of *SBC* or *SIC*. The tests are performed on both the level and first differences of the lagged variables.

The variable FDI inflows are stationary in the first difference form according to the *ADF Test* (where the null hypothesis of unit root can be rejected at the 1% level of significance). The *PP Test* (where the null hypothesis of unit root can be rejected at the 1% level of significance) also confirms that the variable is stationary in first difference form. The *KPSS Test* also gives the same result and confirms that the FDI inflows variable is an I(1) process and the null hypothesis cannot be rejected at the 1% level of significance. The variable GDP is stationary in the first difference form according to *ADF Test* (where the null hypothesis of unit root can be rejected at the 10% level of significance). The *PP Test* (where the null hypothesis of unit root can be rejected at the 1% level of significance) also confirms that the variable is stationary in first difference form. The *KPSS Test* also gives the same result and confirms that the GDP variable is an I(1) process and the null hypothesis cannot be rejected at the 1% level of significance. The variable merchandize trade is an I(1) process according to *ADF Test* (where the null hypothesis of unit root can be rejected at the 1% level of significance). The *PP Test* (where the null hypothesis of unit root can be rejected at the 1% level of significance) also confirms that the variable is stationary in first difference form. The *KPSS Test* also gives the same result and confirms that merchandize trade variable is an I(1) process and the null hypothesis cannot be rejected at the 1% level of significance.

Johansen Cointegration Test

Johansen Cointegration Test results for the cointegration rank r have been presented in Table 3. Going by the results of the *ADF test* it has been observed that the variables have the same order of integration, i.e., I(1) and the *Johansen Cointegration Test* has been employed to find out the cointegration rank and the number of cointegrating vectors. The null hypothesis is rejected in the cases of both the Trace statistic and Max-Eigen value statistic. The null hypothesis of $r = 0$ (i.e., there is no cointegration) is rejected against the alternative hypothesis of $r = 1$ at the 5% level of

significance in case of the Max-Eigen value statistic. Similarly, going by the result of the Trace statistic, the null hypothesis of $r = 0$ is rejected against the alternative hypothesis of $r \geq 1$.

To test whether each co-efficient in a cointegrating equation was statistically zero and can be excluded from the set of co-integrating relations, restrictions can be imposed on the cointegrating vector (elements of the β matrix). The number of rows of the β matrix corresponds to the number of selected co-integration equations. Restrictions can be placed on the co-efficients $\beta(r, k)$ of the r th co-integrating relation:

$$\beta(r,1)LnFDI + \beta(r,2)LnGDP + \beta(r,3)LnMerTrade$$

The statistical significance of these restrictions is provided by the Chi-square statistic, with degrees of freedom equal to the number of restrictions. In Table (4a), the null hypothesis that co-efficient of LnFDI is not significantly different from zero can be rejected because of the low probability value of 0.000700. In Table 4(b), the null hypothesis that co-efficient of LnGDP is not significantly different from zero can be rejected because of the low probability value of 0.022422. In Table 4(c), the null hypothesis that co-efficient of LnMertrade is not significantly different from zero can also be rejected because of the low probability value of 0.000243.

From the above observations, it can be said that the restriction imposed on LnFDI, LnGDP, LnMertrade can be rejected by using the LR test statistic. The test result suggests that the linear combination of all variables is co-integrated, and are equally influential.

Analysis of VECM

The variables under study stand in a long-run relationship among them as revealed by Johansen's λ_{\max} and λ_{trace} statistics (as per Table 3), thus justifying the use of ECM for showing short-run dynamics. Going by the definition of cointegration, the Granger Representation Theorem (Engle and Granger, 1987) states that if a set of variables is cointegrated, then there exists a valid error correction representation of the data. In Table 5 below, the cointegrating equations are given along with the equation for changes in FDI (*first* column), changes in GDP (*second* column), changes in merchandize trade (*third* column). The co-efficients of ECT contain information about whether the past values affect the current values of the variable under study. A significant co-efficient implies that past equilibrium errors play a role in determining the current outcomes. The information obtained from the ECM is related to the speed of adjustment of the system towards long-run equilibrium. The short-run dynamics are captured through the individual co-efficients of the difference terms. The adjustment co-efficients on ECT_{t-2} in equation (4) is negative and statistically significant at the 1% level of significance indicating that, when deviating from the long-term equilibrium, error correction term has an opposite adjustment effect and the deviation degree is reduced. The significant error term also supports the existence of long-term relationship between the independent variables and economic growth in the long term. The lagged co-efficients of ΔFDI_{t-1} in equation (4) is positive and statistically significant at 1 % level of significance indicating higher FDI inflows has a positive effect on economic growth in the short run. The lagged co-efficients of $\Delta MERTRADE_{t-1}$, $\Delta MERTRADE_{t-3}$, $\Delta MERTRADE_{t-4}$ are negative and statistically significant at 1% level of significance and $\Delta MERTRADE_{t-2}$ is negative at 5% level of significance implying that higher merchandize trade has a negative effect on economic growth in the short run. The lagged co-efficients of ΔGDP_{t-1} , ΔGDP_{t-3} are positive and

statistically significant at 5% level of significance and ΔGDP_{t-4} is positive and statistically significant at 10% level of significance in equation (5) implying that higher GDP has a positive impact on merchandize trade in the short run.

Causality Test with VECM

Causality Test with VECM is detailed in Table 6. The null hypothesis that LnGDP, LnMERTRADE do not Granger cause LnFDI is tested using changes in FDI Inflows (ΔLnFDI), changes in merchandize trade ($\Delta \text{LnMERTRADE}$) and changes in gross domestic product (ΔLnGDP) when all of them are stationary in their first difference form in Standard Granger causality regression. The null hypothesis is accepted or rejected based on “chi-squared test based on Wald criterion” to determine the joint significance of the restrictions under the null hypothesis. The lag length is justified by a minimum Final Prediction error (FPE), Schwarz Information Criterion (SIC) and likelihood ratio test statistics. The test result suggests lag order of 4 as optimal lag. The p value (0.0958) (Table 6) indicates that the coefficients of LnGDP are not jointly zero in the equation for LnFDI. In this case the null hypothesis that GDP does not Granger cause FDI Inflows can be rejected and an unidirectional causality is observed from gross domestic product to FDI Inflows.

The null hypothesis that LnFDI, LnMERTRADE do not Granger cause LnGDP is tested using changes in FDI Inflows (ΔLnFDI), changes in merchandize trade ($\Delta \text{LnMERTRADE}$) and changes in gross domestic product (ΔLnGDP) when all of them are stationary in their first difference form in Standard Granger causality regression. The p value (0.0052) (Table 6) indicates that the coefficients of LnFDI are not jointly zero in the equation for LnGDP. In this case the null hypothesis that LnFDI does not Granger cause GDP can be rejected and an unidirectional causality is observed from FDI Inflows to gross domestic product. The p value (0.0001) (Table 6) indicates that the coefficients of LnMERTRADE are not jointly zero in the equation for LnGDP. In this case the null hypothesis that LnMERTRADE does not Granger cause GDP can be rejected and a unidirectional causality is observed from merchandize trade to gross domestic product.

It is observed that there is existence of a long-run relationship between GDP and FDI inflows i.e. presence of bi-directional causality among the two variables. A unidirectional causality is also observed from merchandize trade to economic growth.

Parameter Stability Tests

The null hypothesis of parameter stability cannot be rejected at the 5% level of significance as the cumulated sum stays inside the 95% confidence band in case of both CUSUM and CUSUMSQ tests. The CUSUM test indicates stability in the equation during the sample period because the line (blue) lies within the 5% critical lines (Figure 2). The CUSUM of squares test shows that the cumulative sum of the squares is within the 5% significance lines, suggesting that the residual variance is stable (Figure 3).

Conclusion

Bi-directional causality is observed between economic growth and foreign direct investment inflow. The inflow of FDI is likely to further accelerate with the government planning more liberalization measures across a broad range of sectors. The improved sentiment for the country's economic outlook backed by strong political mandate and fiscal reforms is expected to help India

enhance its overall share in capital flows marked for emerging markets. This is evinced from the fact that despite the global slowdown, India has managed to display resilience and attract good investments.

In the Indian context, FDI is encouraging the adoption of new technology in the production process through capital spill over. Moreover it is also stimulating knowledge transfers both in terms of labour training and skill acquisition and by introducing alternative management practices and better organizational arrangements. The results reveal that FDI is growth enhancing in the same way as domestic investment and a statistically significant effect exist in the sense that a higher ratio of FDI in the gross capital formation has a positive effects on level of GDP and hence on growth. It can be concluded that India's capacity to progress on economic development will depend to a certain extent on the country's performance in attracting foreign capital.

A unidirectional causality is observed from merchandize trade to economic growth which shows that dynamism of merchandize trade will faster economic growth in the country. It is seen that India promoted exporting as a way to enhance economic growth, alongside a struggle to reform domestically, remove or simplify import restrictions, ensure political stability, encourage investment and alleviate poverty, which should also improve output and lead, in time, to further exporting. It is also observed that exporting, investment, trade shocks and output are intricately linked with each other and that export promotion is only one arm of economic development- investment, political and macroeconomic stability, internal reforms and other domestic policies are equally crucial as well.

Various trade policy measures have been taken by the government and the RBI to mitigate the adverse impact of the global recession on the Indian economy and on checking inflation. Many measures were taken including three stimulus packages announced in 2008-09, as for example the measures by RBI and the Government in the Union Budget 2009-10 and the Foreign Trade Policy (2009-14) to help the export sector in general and employment intensive sectors affected by the world recession in particular. In the Indian case, while short term relief and stimulus measures have worked, some fundamental policy changes are needed and India needs to take bold steps towards reforms as it did in 1991 on the balance of payment crises and thus force the wavering leaders of liberalization and globalisation not to backtrack.

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Appendices

Figure 1: Logarithmic values of Foreign Direct Investment, Gross Domestic Product and Merchandize Trade

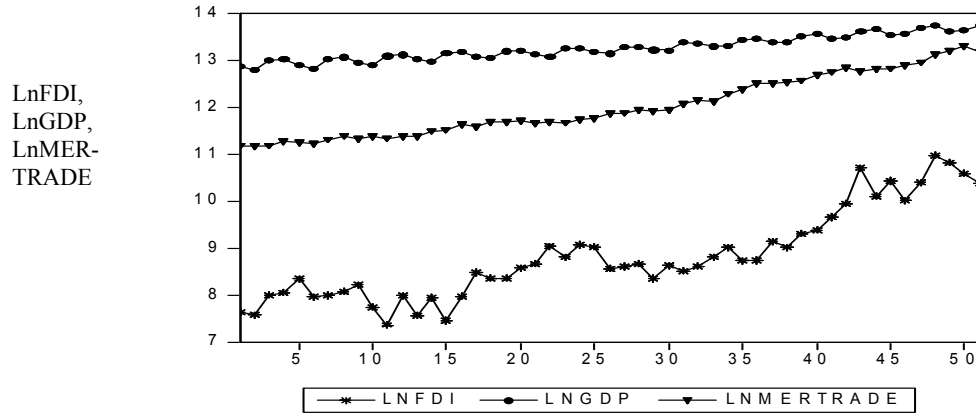


Figure 2: Diagrammatic Representation of CUSUM Test

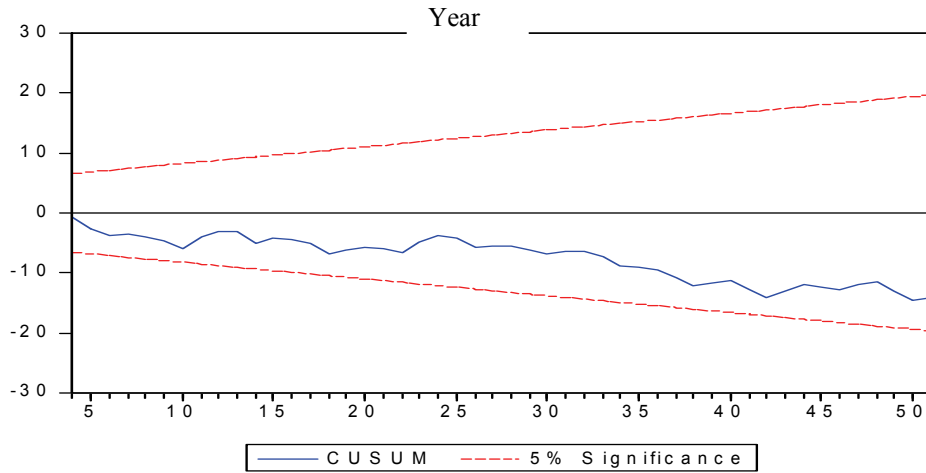


Figure 3: Diagrammatic Representation of CUSUMSQ Test

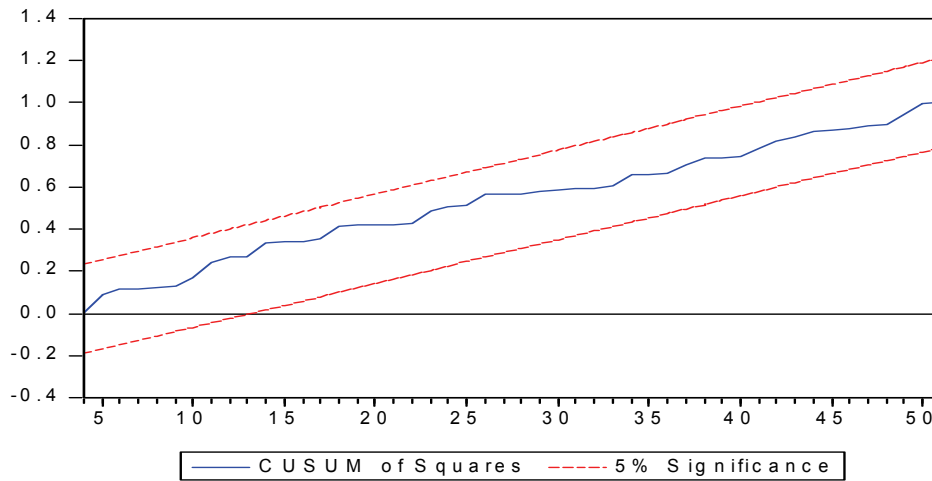


Table 1: VAR Lag Order Selection (D.LnGDP, D.LnFDI, D.MERTRADE)

Lag	LL	LR	FPE	AIC	SIC	HQIC
0	90.07	NA	4.55e-06	-3.78	-3.66	-3.74
1	99.31	16.87	4.51e-06	-3.79	-3.31	-3.61
2	141.51	71.55	1.07e-06	-5.23	-4.40	-4.92
3	177.46	56.26	3.37e-07	-6.41	-5.21	-5.96
4	197.86	29.26*	2.11e-07*	-6.90*	-5.35*	-6.32*

* indicates lag order selected by the criterion.

D represents the first difference of logarithmic values of the concerned variables.

Table 2: Test of Unit Root Test Hypothesis (1996-97 Q1 –2008-09 Q3) without Trend

		ADF test		KPSS test		PP test	
Series		Test Statistic	Lags	Test Statistic	Lags	Test Statistic	Lags
LnFDI	Level	-0.556990	1	2.17745***	1	-0.588801	1
	First Difference	-9.669834***	0	0.0397989	0	-9.669834***	0
LnGDP	Level	0.799034	4	1.10956***	4	1.790374	4
	First Difference	-2.677785*	3	0.401592**	3	-57.75647***	3
LnMER TRADE	Level	1.745733	3	1.33599***	3	1.892267	3
	First Difference	-4.591866***	2	0.269179	2	-8.686469***	2

(a) The critical values are those of McKinnon (1991:267).

1 % ADF-Critical Value = -3.571310 in case of LnFDI and its first difference.

1 % ADF-Critical Value = -3.581152; 5% ADF-Critical Value = -2.926622; 10% ADF- Critical Value = -2.601424 in case of LnGDP (logarithmic value of GDP) and its first difference.

1 % ADF-Critical Value = -3.577723 in case of LnMERTRADE and its first difference.

1 % PP-Critical Value = -3.568308; 5% PP-Critical Value = -2.921175; 10% PP-Critical Value = -2.598551 in case of LnFDI, LnGDP, LnMERTRADE.

1 % PP-Critical Value = -3.571310; 5% PP-Critical Value = -2.922449; 10% PP-Critical Value = -2.599224 in case of first difference of LnFDI, LnGDP, LnMERTRADE.

1 % KPSS-Critical Value = 0.739; 5% KPSS-Critical Value = 0.463; 10% KPSS-Critical Value = 0.347 in case of LnFDI, LnGDP, LnMERTRADE and its first difference.

(b)***, ** and * represent the rejection of null hypothesis at the 1%, 5% and 10% level of significance respectively.

**Table 3: Johansen -Juselius Co-integration Test Results
[No deterministic trend (restricted constant)]**

H ₀	H ₁	λ_{trace}	$CV_{(trace,5\%)}$
$r = 0$	$r \geq 1$	48.45703**	35.19275
$r \leq 1$	$r \geq 2$	15.22533	20.26184
H ₀	H ₁	λ_{max}	$CV_{(max,5\%)}$
$r = 0$	$r = 1$	32.23170**	22.29962
$r \leq 1$	$r = 2$	9.655222	15.89210

(a) r is the number of cointegrating vectors.

(b)** denotes rejection of the null hypothesis at the 5% level of significance

(e)The critical values (i.e., CVs) are taken from Mackinnon-Haug-Michelis (1999:563).

Table (4a): VEC Coefficient Restrictions

Restrictions:				
B(1,1) = 0				
Tests of Cointegration restrictions:				
Hypothesized No. of CE(s)	Restricted Log-likelihood	LR Statistic	df	Probability
1	204.2606	11.48838	1	0.000700
2	214.8324	NA	NA	NA
NA indicates that restriction is not binding.				

Table (4b): VEC Coefficient Restrictions

Restrictions:				
B(1,2) = 0				
Tests of Cointegration restrictions:				
Hypothesized No. of CE(s)	Restricted Log-likelihood	LR Statistic	df	Probability
1	207.3984	5.212713	1	0.022422
2	214.8324	NA	NA	NA
NA indicates that restriction is not binding.				

Table (4c): VEC Coefficient Restrictions

Restrictions:				
B(1,3) = 0				
Tests of Cointegration restrictions:				
Hypothesized No. of CE(s)	Restricted Log-likelihood	LR Statistic	df	Probability
1	203.2717	13.46617	1	0.000243
2	214.8324	NA	NA	NA
NA indicates that restriction is not binding.				

**Table 5: Vector Error Correction Estimates
(Included observations: 46 after adjustments)**

Cointegrating Eq:	CointEq1		
LnFDI(-1)	1.000000		
LnGDP(-1)	7.705567		
	(3.17466)		
	[2.42721]		
LnMERTRADE(-1)	-5.099875		
	(1.25403)		
	[-4.06678]		
C	-51.64092		
	(27.2865)		
	[-1.89254]		
Error Correction:	D(LnFDI)	D(LnGDP)	D(LnMERTRADE)
CointEq1	-0.166225	-0.026871	0.003565
	(0.13436)	(0.00551)	(0.02650)
	[-1.23721]	[-4.87349]***	[0.13454]
D(LnFDI(-1))	-0.266692	0.025381	0.021807
	(0.19319)	(0.00793)	(0.03810)
	[-1.38043]	[3.20125]***	[0.57232]
D(LnFDI(-2))	0.024041	0.007994	0.007192
	(0.20079)	(0.00824)	(0.03960)
	[0.11973]	[0.97011]	[0.18161]
D(LnFDI(-3))	-0.096498	-0.011330	-0.052041
	(0.17747)	(0.00728)	(0.03500)
	[-0.54375]	[-1.55578]	[-1.48687]
D(LnFDI(-4))	-0.192272	-0.012186	-0.031420
	(0.16772)	(0.00688)	(0.03308)
	[-1.14642]	[-1.77052]	[-0.94990]
D(LnGDP(-1))	0.476091	-0.303642	1.127774
	(2.42555)	(0.09954)	(0.47838)
	[0.19628]	[3.05046]***	[2.35750]**
D(LnGDP(-2))	-1.534941	-0.384102	0.818868
	(2.66377)	(0.10932)	(0.52536)
	[-0.57623]	[-3.51369]***	[1.55867]

D(LnGDP(-3))	-1.381547	-0.398808	1.086733
	(2.77191)	(0.11375)	(0.54669)
	[-0.49841]	[-3.50589]***	[1.98785]**
D(LnGDP(-4))	-2.379704	0.515317	1.025229
	(2.97725)	(0.12218)	(0.58719)
	[-0.79930]	[4.21768]***	[1.74600]*
D(LnMERTRADE(-1))	-0.961538	-0.199651	-0.172257
	(1.11013)	(0.04556)	(0.21894)
	[-0.86615]	[-4.38240]***	[-0.78676]
D(LnMERTRADE(-2))	-0.372090	-0.098644	0.134077
	(1.11036)	(0.04557)	(0.21899)
	[-0.33511]	[-2.16481]**	[0.61225]
D(LnMERTRADE(-3))	-0.607445	-0.150275	-0.332390
	(1.11799)	(0.04588)	(0.22049)
	[-0.54334]	[-3.27538]***	[-1.50748]
D(LnMERTRADE(-4))	-1.112693	-0.127880	-0.011670
	(1.09245)	(0.04483)	(0.21546)
	[-1.01853]	[-2.85243]***	[-0.05416]
R-squared	0.332400	0.985373	0.341268
Adj. R-squared	0.089637	0.980055	0.101729
F-statistic	1.369236	185.2636	1.424685

(a) ***, ** and * denotes statistical significance at 1%,5% and 10% level of significance respectively.

(b) Standard errors in () & t-statistics in []

Table 6: VEC Granger Causality/Block Exogeneity Wald Tests (Sample: 1 to 51)

Dependent variable: D(LnFDI)			
Excluded	Chi-square	df	Probability
D(LnGDP)	7.887390	4	0.0958
D (LnMERTRADE)	1.302826	4	0.8609
All	9.468667	8	0.3043

D(LnGDP) → D(LnFDI)

Dependent variable: D(LnGDP)			
Excluded	Chi-square	df	Probability
D(LnFDI)	14.78668	4	0.0052
D (LnMERTRADE)	25.00712	4	0.0001
All	33.15953	8	0.0001

D(LnFDI) → D(LnGDP)
D(LnMERTRADE) → D(LnGDP)

Dependent variable: D(LnMERTRADE)			
Excluded	Chi-square	df	Probability
D(LnFDI)	3.129596	4	0.5364
D (LnGDP)	7.284207	4	0.1216
All	11.22467	8	0.1893

Extension of Technology Adoption Model (TAM) Intention to Use Internet Banking: Evidence from India

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Abstract: *The youth have been at the forefront of the technology revolution in India. It becomes useful and important therefore to study their attitude towards new technology based products and services. Banks in India, from the early nineties have been consistently at the forefront of providing services extensively using technology. Progressively, the dependence on technology by Banks has only been increasing. This paper studies the behaviour among Postgraduate management students in India towards Internet Banking. The framework for this paper is the Technology Adoption Model (TAM) in an extended form. This paper explains the factors influencing management postgraduate students in their intention to use Internet Banking.*

The model employs perceived usefulness (PU) and perceived ease of use (PEOU), the two the constructs of the TAM model. The remaining are new constructs included in the extended version of the TAM model. The results suggest that PU and Security & Privacy (SP) had a significant relationship with behavioural intention to use Internet Banking. The paper provides useful insights into the TAM model and its extension in the Indian context.

Keywords: Internet banking, TAM, management postgraduate students, intention to use internet banking

Introduction

From the early nineties, Banks in India have emphasized the use of technology in their operations. After the first step of computerization came the extensive promotion of Automated Teller Machines (ATM) and core banking (linking all the branches of the Bank with the customer becoming a customer of the Bank rather than of the specific branch associated where she/he maintained the accounts). As Banks constantly searched for new ways to offer convenient solutions to the customers and at the same time cut their operational costs, Internet Banking emerged as a new delivery channel. Internet banking is increasingly being promoted by the Banks operating in India in view of its cost effectiveness (nearly one tenth the cost of branch banking) for the Banks and convenience to the customers. From the initial stage of merely providing information on its web sites, Banks in India are now enabling monetary transactions. However, the studies related to Internet Banking in India have been only a handful. Mahil Carr, V.Ravi et al. (2006) have profiled the characteristics of an Internet Banking user. Hardly any study has been done to understand the intention of the postgraduate students to use Internet Banking despite the fact that the youth have been at the forefront of the IT revolution in India. In general, Indians have been slow

to adopt Internet Banking even though it offers a very convenient alternative to Branch Banking due to many reasons. Internet Banking requires computer literacy. Also, without a proper understanding and knowledge of the system, individuals are hesitant to try, experiment and utilize this delivery channel. Moreover, Internet Banking involves a cost for the customer. It comprises of the costs such as needing personal computer or laptop and its maintenance, an internet-connection or going to the nearest Internet Browsing centre and paying a fee to access the Internet. Due to a few frauds that have occurred through online transactions, security and privacy have become important factors in determining whether to use this channel or not. Therefore, for Internet Banking to really take off, a few elementary conditions need to be created. To begin with basic computer literacy is a must. Also, it is important to create confidence among individuals about the system by providing the required information before use. Perhaps in the future, Banks should aim at providing self service kiosks within or adjacent to their physical branches to promote the use of the Internet Banking and provide adequate assistance in case the customers get stuck in the middle of an operation. Such self-service kiosks could also be provided in the areas where there are no Bank branches. By this step, the reach of banking services can be further improved and it could be developed as tool for financial inclusion in unbanked areas. Additionally, adequate training should be given to customers to make them aware and believe about the usefulness of the system as also to guard them against possible misuse. All these steps if implemented meticulously could bring out the power of Internet Banking. Customers not too happy with the restricted hours of the timings or with the services of the Bank branch can really find Internet Banking to be highly beneficial. Executives on the move, hard pressed to visit their Banks would also find Internet Banking to be a real boon. This paper's aim is to explain the factors influencing postgraduate management students' intention to use internet banking in India. Thus, the theoretical framework of the paper is based on an extended model of Technology Acceptance Model (TAM). TAM helps to understand the relationship between the five important dimensions of the study, namely Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Security and Privacy (SP), Access to the computer and internet (ACCESS) and Intention to Use (ITU) better. TAM, more than any other model is acclaimed for its parsimony and predictive power which make it easy to apply in different situations (Venkatesh and Morris, 2000). Most fundamentally, perceived ease of use and perceived usefulness are addressed as the most important constructs in predicting information system acceptance (Cheong and Park, 2005). In addition to this, this study proposed Security and Privacy (SP) and Access to Computer and Internet (ACCESS) in order to further delve into the factors determining the postgraduate management students' intention to use Internet Banking.

Review of Literature

It is estimated that the cost of servicing a customer through Internet Banking is estimated to be just one-tenth of that through a teller in a physical Bank Branch (Jayawardhena, C. and Foley, P., 2000). Hence it makes tremendous sense cost wise for Banks to promote Internet Banking. Moreover, the customer can access the services of the Bank on a 24/7 basis anywhere instead of getting restricted by the timings of the physical branch.

Many previous studies have illustrated the importance of TAM. TAM has received better empirical support in information technology research by many research studies regardless the country concerned (i.e. Wang et al., 2003; Ramayah and Ling, 2002; and Venkatesh and Morris,

2000). A modification of TAM is felt necessary since TAM was created for a general explanation of the determinants of acceptance of information systems rather than focusing on the specific topic of intention to use Internet Banking. This study highlights the original constructs of TAM namely PU and PEOU, followed by SP and ACCESS and their linkage to the Intention to use (ITU) Internet Banking. These constructs are discussed below:

Perceived Usefulness

Perceived usefulness is defined as the degree to which a person believes that using a particular system would enhance his or her performance (Davis, 1989).

There have been many studies, which provide evidence of the significant effect of perceived usefulness on the intention to use (Chen and Barnes, 2007, Venkatesh and Morris, 2000; and Venkatesh and Davis, 1996 to name a few).

In other studies, Wang et al. (2003) found that perceived usefulness has a positive effect on behavioural intention to use the Internet banking. In simple words, perceived usefulness is significantly related with behavioural intention. Guriting and Ndubisi (2006) found that perceived usefulness significantly determines behavioural intention. Hence, the following hypothesis is proposed:

H1: Perceived usefulness has a positive effect on behavioural intention to use Internet banking.

Perceived ease of use

Perceived ease of use (PEOU) indicates the degree to which a person believes that using a particular system would be free of effort (Davis 1989) or in other words an application if perceived to be easy to use would have more acceptance. Research over the past decade provides evidence of the significant effect of perceived ease of use on intention to use (Venkatesh and Morris, 2000; Davis et al, 1989). By extending these study results, the author proposes the following hypotheses for Internet banking adoption among young Indian postgraduate management students

H2: Perceived ease of use has a positive effect on behavioural intention to use the Internet Banking.

Security and Privacy

According to Wang et al. (2003), security and privacy had a significant positive effect on behavioural intention. Also, Ramayah and Ling (2002) found that Internet banking users are very concerned about security and majority of them are using Internet banking for just for balance enquiry only due to the credibility concern. These study results are supported by Sathye (1999) who found that security and privacy were significant obstacles to the growth of Internet Banking in Australia. Daniel (1999), O' Connel (1996) discovered that security is an important factor affecting acceptance and adoption of new technology or innovation. Based on these studies results, the following hypothesis is proposed to observe the relationship between Security and Privacy and behavioural intention to use Internet Banking from the viewpoint of young Indian postgraduate students.

H3: Security and Privacy have a positive effect on behavioural intention to use Internet banking.

Access to Computers and Internet

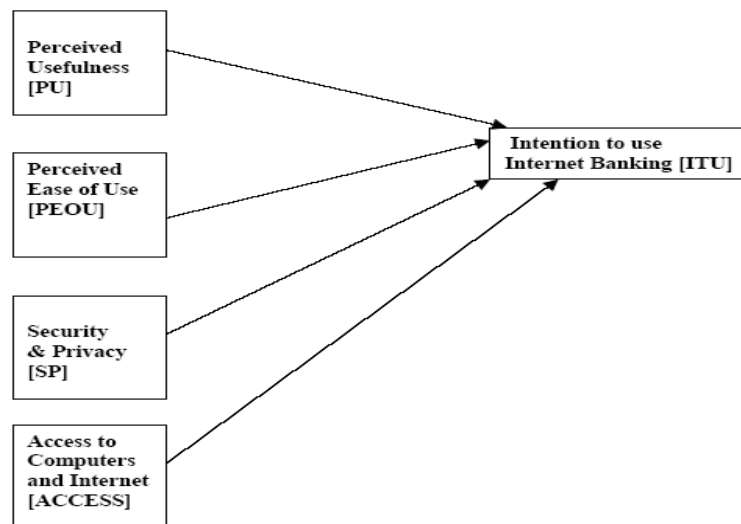
In developing economies, where infrastructure is not highly developed, access to the computer to perform transactions is an important factor determining the Internet Banking usage. Moreover, the computer needs to have a quality Internet connection in order to enable the user to access Internet Banking, which in turn requires broadband/dial up infrastructure. In the absence of the above, at the minimum level at least an internet browsing centre should be available nearby to

access Internet Banking. Additionally, to use the Internet Banking delivery channel, there are the costs of operating a computer with an Internet connection. Ahmad Al Sukkar and Helen Hassan (2005) have argued the case for adequate infrastructure in developing countries for Internet Banking to gain acceptance. Sathye (1999) proposed Internet access as a factor affecting adoption of Internet Banking. Pikkarainen et al (2004) proposed that without a good quality internet connection, it is not possible to do Internet Banking. It is therefore proposed that H4: Access to Computers and Internet have a positive effect on the behavioural intention to use Internet Banking.

Research Model

The model of the study is presented below. The model was adapted from the previous studies done by Guriting and Ndubisi (2006), Pikkarainen et al. (2004), Wang et al. (2003), Venkatesh (2000) and Davis (1989). The model is applied to study the sample of young Indian postgraduate management students in order to explain the Indian youth's Intention to use Internet Banking.

Figure 1: Research Model for Intention to Use Internet Banking



Methodology

Data for this study was collected by means of a survey conducted among the postgraduate management students of the Institute for Technology & Management (ITM) Business School, Chennai, India. Out of 155 questionnaires given, 112 questionnaires were finally usable indicating a success rate of 72.2%. The respondents were students specializing in the areas of marketing, finance and human resources apart from undergoing core courses in different areas of management as also just graduated students. All the respondents had to undergo compulsorily a few courses on computers as part of their programme and therefore were aware of the convenience and power of computer based operations. All the respondents had an elementary awareness of Internet Banking though not in depth.

Table 1: Profile of Respondents

Sl.No.	Item	No. of respondents	Percentage
1	Male	85	75.90%
2	Female	27	24.10%
3	Age Group -20-24 years	93	83.04%
4	Age Group – 25-29 years	19	16.96%
5	Nationality – Indian	112	100%

Female respondents formed nearly a quarter of the sample comprising of 24.10% of the sample. The age group of the majority of the respondents fell in the age bracket of 20-25 years (83.04%) while a few were in the age group of 25-29 years (16.96%). The entire sample comprised of Indian nationals.

The data for the study was collected via a structured questionnaire. The questionnaire was designed in two sections. The first section attempts to measure the agreement by respondents over their acceptance of Internet banking. The measures constructed range from Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Security and Privacy (SP) and Access to Computers and Internet (ACCESS). These measures are tested in order to observe their effect towards the behavioural intention to use Internet Banking (ITU). The items in the questionnaire are adapted from the studies done by Davis (1989), Wang et al (2003) and Pikkarainen et al. (2004). The second section attempts to verify the personal profile of the respondents. In the questionnaire, all concepts are measured using Likert’s five-point scales ranging from “strongly disagree” (1) to “strongly agree” (5).

The questionnaire was tested on a few fellow academics for its suitability, before going ahead with the study

Analysis and Results

The research instrument was first tested for its reliability using Cronbach’s alpha coefficient of reliability

Table 2: Cronbach’s Alpha Coefficient of Reliability

Determinants	No. of Items	Sample Reliability
PU	3	0.710
PEOU	4	0.717
SP	2	0.750
ACCESS	2	0.800
ITU	2	0.717

As it can be observed from table 2, the values of Cronbach’s alpha values range from 0.710 to 0.80. This exceeds the minimum alpha value of 0.6 (Hair et al., 1998). It can therefore be concluded that the determinants of the research instrument are treated as reliable.

Factor Analysis

To ascertain the convergent validity of the scales, factor analysis was undertaken using Principal Component Analysis (PCA). The Kaiser-Meyer-Olkin test for Sampling Adequacy revealed a figure of 0.641. As the value is above 0.5, the variables meet the condition for factor analysis (Hair et al., 1998) and the same was accepted. The values obtained were as per the table 3.

Table 3: Factor Loadings

Perceived Usefulness (PU)	
PU1	0.708
PU2	0.631
PU3	0.621
Perceived Ease of Use (PEOU)	
PEOU1	0.664
PEOU2	0.620
PEOU3	0.554
PEOU4	0.581
Security and Privacy (SP)	
SP1	0.806
SP2	0.683
Access to Computer and Internet (ACCESS)	
ACCESS1	0.850
ACCESS2	0.820
Intention to Use	
ITU1	0.883
ITU2	0.879

Each of the above factors had an Eigen value of more than 1 and could explain 64.24% of the total variance.

To have construct validity (Nunally, 1978) has proposed a factor loading of 0.6. According to this table, almost all the factor loading values except two have exceeded the value of 0.6. Even these two cases are very close to 0.6. Thus, each group of statements in the instrument is able to extract a suitable factor. Also, as discussed previously, the reliability scores for the factors are also above the acceptable level of 0.7.

Correlation

The correlation of the different variables in relation to the Intention to use (ITU) was determined as below:

Table 4: Correlation of Different Variables with Intention to Use (ITU)

Variable	PU	PEOU	SP	ACCESS
ITU R	0.49 **	0.23 *	0.22 *	0.15 *

** - 1% significance and * - 5% significance levels

The correlation procedure was performed at two levels – highly significant ($p < 0.01$) and significant ($p < 0.05$) statistically.

All the variables namely Perceived Usefulness, Perceived Ease of Use, Security and Privacy and Access were found to be positively correlated with the Intention to use either highly significantly ($p < 0.01$) or significantly ($p < 0.05$) with Access having the least correlation value.

Regression Analysis

Regression analysis is performed on the data to study the association of the different variables with the Intention to Use (ITU) as the dependent variable. The results of this analysis are summarized in Table 5.

Table 5: Regression Analysis

	Constant	PU	PEOU	SP	ACCESS
Coefficient	1.217	.536	.083	.310	.043
Standard Error	.590	.120	.104	.086	.060
t-statistics	2.063	5.158	.687	2.967	.713
P-value	.042	.000	.499	.048	.478

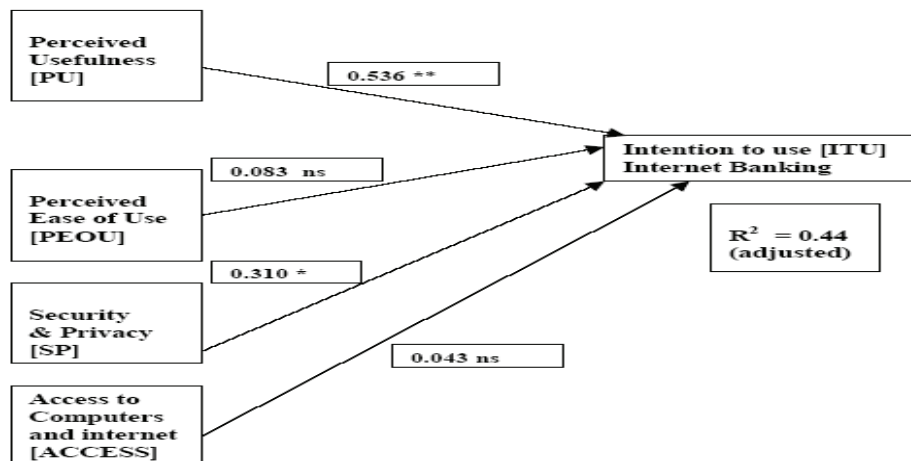
R^2 (Adj.) = 0.44 F = 19.73

Regression Analysis R^2 (Adj.) = 0.44 implies that it is a statistically significant model. From the table it is clear that Perceived Usefulness (PU) (t=5.158, p<0.01) is significantly associated with the Intention to use Internet Banking thereby proving Hypothesis H1. This is in tune with the studies done previously by different researchers in the field. Security and Privacy (SP) (t=2.967, p<0.05) is significantly associated with the Intention to use Internet Banking thereby proving H3. However, as per table 5 Perceived Ease of Use (PEOU) is not significantly associated with the Intention to Use Internet Banking thereby leading to a rejection of H2. This agrees with the result obtained by Pikkarainen et al (2004) as also with other TAM studies, which found that PEOU has less impact on technology acceptance than PU. Similarly, as per table 5 ACCESS is not significantly associated with the Intention to Use Internet Banking thereby leading to a rejection of H4.

Findings of the Study

The research model after the above analysis is obtained as below:

Figure 2: Research Model for Intention to Use Internet banking



ns = not significant; **significant at 1% level; * significant at 5% level

The educated urban youth of India have easy access to a computer and an internet connection. They are comfortable using computers and browsing internet. Access to both the computer and therein the Internet is not a big issue for this category of youth. This category of youth also believes that Internet Banking is a very useful delivery channel for them. Hence the logical conclusion is they would be inclined to use Internet Banking. However, this category of youth has also made it clear that Security and Privacy are important concerns for them while using Internet Banking. This is a very important factor to be kept in mind by Banks while promoting Internet Banking as a delivery channel. Periodic reports of frauds happening through this delivery channel have made security and privacy concerns a significant factor in determining the intention to use Internet Banking. Banks need to take all the steps possible to make Internet Banking safe by making their web sites totally secure. They should be able to build the confidence in the minds of the user from the security viewpoint of Internet Banking.

Considering that it costs only one-tenth for a Bank to service an Internet Banking customer as compared to servicing them physically at the Branch, Banks should go all out to promote Internet Banking. Banks should try and tap the educated youth of the country who perceive this delivery channel to be useful. Banks should further try to make the channel more useful by adding more services through this channel. Banks can look at migrating more and more of their customers to Internet Banking if the above steps are implemented systematically and thereby reduce their servicing costs in the process.

Limitations of the Study

The study has been confined to the professional student segment in a single metropolitan city of India which has comparatively easier access to computer and Internet. Therefore, the authors are of the opinion that in the rural and semi-urban areas, the access to computer and internet in a developing country like India would be an important factor in determining the intention to use Internet Banking. Perhaps a study involving students from the rural and semi-urban areas of India would be able to throw better light on the ease of access to computer and internet. Additionally, constraints of time and resources impinged on the sample size.

Conclusion

To sum up, Internet Banking has been documented as a cost effective channel for Banks with its costs of serving the customer just being one-tenth of that of Branch banking. Similarly its convenience is unparalleled as customers can log into their accounts and transact from anywhere in the world throughout the year without any time restrictions. In view of the advantages accruing to both the Banks and the customers, Banks are eager to migrate more and more customers to this low cost delivery channel. The youth segment of the Indian population has been at the forefront of the IT revolution and therefore at ease with the computer and its advancements. This segment of the population is also comfortable with doing transactions online which is the major requirement for realizing the full power of Internet Banking. This study was therefore an attempt to find out whether the youth population would adapt Internet Banking or not. The results of the study have been encouraging as the Indian youth perceived Internet Banking to be a useful delivery channel. Banks should take the cue from the study and try to target Internet Banking promotions at this segment. Internet Banking apart from balance enquiry function now offers a range of services like funds transfer, bill payments, insurance premium payments to name a few. To pro-

ceed beyond the function of balance enquiry and to utilize the full range of services offered by Internet Banking, it is imperative that the Security and Privacy concerns of the youth are addressed, which has been made clear. The different online frauds occurring periodically have heightened the concerns. Therefore, the Banks have to ensure that they develop and communicate a strong security and privacy framework to both its current and prospective Internet Bank customers. A few Banks have taken the lead in this direction by opting for security certificates offered by reputed companies, using Security Socket Layer (SSL) technology to prevent any interception of data, use of virtual keyboard for entering passwords, requirement of multiple passwords for authenticating transactions among other measures. Provision of security and privacy measures in a manner that is able to convince the youth would be one of the determining factors in attracting the young Indian population to Internet Banking.

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Assessment of the Impact of Financial Risk and Market Variables on Expert Investment Preferences in Colombo Stock Exchange

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Abstract: *The purpose of this research is analyse the expert investors have a rational based on their advice to the ordinary investors and to develop a decision making criteria for ordinary investors. According to the Modigliani-Miller theorem, the factors, which affected dividend decision, and the factors, which affected to capital gain could influence investors. The regression analysis was used to identify the factors, which influence the decision making on shares of the companies. The P/E ratio, dividend yield, return on equity ratio and rate of retention of profit are the financial indicators which affected on experts' advice. The market performance indicators of the return Sort, volatility of shares have a significant impact on perfect investment decision. The aggregated expected preference score (P') provides decision-making criteria to buying/selling shares. The company with highest P' score is the most preferred stocks to invest and provides a non-traditional way of evaluation for effective and economical decision-making. We fundamentally disagree with the argument of Modigliani-Miller theorem in terms of ordinary investor's point of view. Because, behaviour of ordinary investors in emerging CSE is prefer on low risk stable dividend than future capital gains.*

Keywords: Colombo stock exchange, expert investors, investment criteria, financial market

Introduction

Share trading in Sri Lanka commenced in 1896 under the Colombo Share Brokers Association and the Colombo Stock Exchange (CSE) was established in 1985. The CSE was selected as a member of the World Federation of Exchanges in 1998, and it was the first exchange in the South Asian Region to obtain membership and CSE is the first fully computerized stock market¹. Since its inception in 1985, the CSE is one of the rapid growing emerging capital markets. In 1989, the daily volume was totalled to US\$ 10,000 and it reached to US\$ 500,000 in 1990. The CSE computerized its operations in 1992 and by January 1994 its daily turnover jumped up to record US\$ 3.2 million. The CSE showed significant overall improvement in 1997 and it has emerged as one of the best stock markets in Asia despite the financial crisis, which affected the region. The 1997 performance is reflected by appreciation of All Share Price Indexes (ASPI) by 16 per cent and Sensitive Price Index (SPI) by 19 per cent (Abysekera, 2001). According to media reports, the CSE consistently showed as one of the best performing markets since 2002 and

the CSE had recorded consistent annual growth of over 30 percent in the ASPI for the previous 3 years. The 41.6 percent ASPI growth was achieved in 2006 and the CSE recorded highest point of Milanka Price Index (MPI) in the history on 26th February 2007². Two hundred and thirty six companies are currently listed on the CSE, representing twenty business sectors with a market capitalization approximately US\$ 7.6 billion. The CSE was the second best performing market in the world in 2009 and its annual growth is 125.3 percent³. The largest foreign inflow of US\$ 139 million was recorded for 2008⁴ in the CSE. Jaleel and Smarakoon (2009) pointed out that stock market in Sri Lanka is one of the most liberalized markets in Asia. The market was liberalized for foreign investors in 1990 and it made stock market more attractive to investors. The arrival of foreign investors enhanced the confidence of local investors, enabling the domestic investors to engage in more active participation and there were more listings on the CSE.

Foreign institutions and individuals, including non-resident Sri Lankans are permitted to buy and/or sell shares in the most listed company up to 100% of the issued capital⁵. Income from investments such as interest, dividends and profit realized from such investments are not subject to Exchange Control Regulations. However, investors can buy and/or sell shares only through Stock Broker companies or fund management firms⁶. There are 15 stock brokering companies registered and they advise investors for their buy and/or sell decision and execute their buying and selling orders. There is only one fund management firm that operates and provides guaranteed return for their investment in Sri Lanka⁷. Abeysekera (2001) found that stock trade in CSE does not behave in a manner of weak form of the efficient market hypothesis and market price of stock reflects the relevant information. The CSE has experienced tremendous changes in its operations, changes of organizational and technological and mass media involvement of distribution of information, and therefore, it is reasonable to expect the CSE has high level of information efficiency. Further, he found that there is the day-of-the-week-effect and a month-of-the-year-effect on the CSE. Robbani and Anantharaman (2002) found that emerging stock market of CSE is a semi-strong efficiency market. The public information reflects stock price in semi-strong efficient capital market. The CSE is one of the liberalized, high performing and semi-strong efficient emerging stock market in Asia. The capital market of Sri Lanka has satisfied that financial and market factors reflect future price of shares and investors show positive feedback trading in CSE. Hence, capital market of Sri Lanka was selected to study the behaviour of expert investors and their logical and scientific base for advising ordinary investors⁸. Falkenstein (1996) showed that mutual fund managers exhibit preferences for certain stock characteristics. There might also be several reasons why fund managers exhibit preferences for such stock characteristics. He argues that in the light of capital market frictions, mutual fund managers are more likely to trade in stocks in which they have a competitive advantage, vis-à-vis their ability to reduce information search costs. Therefore, if active managers have preferences for specific stock characteristics, then these same stock characteristics should be important determinants of the abnormal returns accruing to manage trades. The characteristic preferences of active investment managers are also likely to be a function of investment manager style. Therefore, the fund managers, stock analysts and stockbrokers are in a better position to analyze companies and market situations than ordinary investors and they are called expert investors.

Most of the ordinary investors in emerging economies do not follow scientific methods for investment decision making and ordinary investors of Sri Lanka also face same problem, when they purchase shares in CSE. They use very limited criteria for their decisions and the ordinary

investors buy shares in listed companies based on subjective judgment of stockbrokers and comparison of Price Earning of the short listed companies. This existing evaluation system is inadequate for effective and economical decision-making. Therefore, ordinary investors need to identify other important criteria, which facilitate investors' decision making in CSE. The objective of this study is to identify sound decision-making criteria for ordinary investors through evaluating the responses of expert investors on certain key financial performance, risk and market performance indicators. The purpose of this study is to analyse the expert investors have a rational based on their advice to the ordinary investors and to develop a decision making criteria for ordinary investors for effective and economical decision making. This study mainly focuses on long-term investors who seek long-term benefits. The speculators cannot use this model to select best companies for their decision making since it is beyond the scope of this study.

Literature Review

Theoretical Background

People invest their money in company shares in order to obtain a maximum return on their investment as a dividend or capital gain. The dividend can be defined as a part of profit of a company, which is distributed among the shareholders, and it can be done by using current profit or general reserve. Shapiro (1990) points out that dividend have proved very relevant in eyes of investors for behavioural reasons and it can influence their decision on investment in a particular company. The risk-averse investors look for dividends due to the reasons of (i) dividend reduces uncertainty compared to capital gains (ii) indication of financial strength of firm (iii) provides regular income.

The capital gain is the difference between the current market price and the purchased price of a share. The capital gain rises when market value of share increases. The factors, which influence on buying and selling of shares (market factors) affect price fluctuations of a share equally. Therefore, factors which affect dividend policy of companies and factors, which affect market factors, can influence on investing decisions on company shares. Droms (1990) found that investors benefited from retained profit and investment on earning generating activities can be seen in the residual dividend policy theory. It would help for future corporate growth and increase market price of share, which allows for capital gain. Dickens (2002) also pointed out that factors explaining dividends are important due to the market value of share is the present value of its future dividends.

The motivation behind the dividend policy is limited to the controversy resulting between management of the firm and investors. It reduces the agency costs by forcing the management of the firm to seek external financing and thereby be subject to critical public evaluation. Gomes (1998) and Zweibal (1996) explained that dividend is an important tool for reducing agency problem between insiders of the firm and the outsiders. Outside investors always prefer dividends over retain earnings because they fear that retain earnings might be used by the insiders for their own benefits against the interest of outside investors. Mahmoud et al. (1995) pointed out that distribution of cash dividend compels managers to find external capital, which encourage them to lower agency cost as they are exposed to the capital market. The maximum level of dividend payout minimizes the agency cost compared to generating required funds.

The Modigliani-Miller (M-M) theorem indicates that investors are financially unaffected by the decision whether retain profit within the company or distribute profit to investors as a divi-

dend. This theorem states that investors are indifferent over receiving dividends and capital gains due to they are concerned with total return and not with the composition of total return. Therefore, shareholder wealth is unchanged by receiving the dividend or capital gains. The dividend policy can influence the tempore pattern of cash flows and it does not affect value of the firm because, investors can change the tempore pattern of cash flows by buying or selling shares. The M-M theorem is based on certain assumptions. The capital gains are equivalent to dividends in perfect market without tax and transaction costs. The dividend policy of a firm gives a positive signal to financial market and an increase in dividend can act as a positive signal for performance of the firm. Baker et al. (2001) pointed out that firm's decision on dividend seems that without taking any notice of academic reasoning provided by M-M theorem (1961), and dividend payment can impact firm value via a change of market price of share. Baker and Powell (1999) found that M-M theorem holds little importance in real world and management of firm places substantial value on dividends as they are believed to affect the value of firm. Parks (1996) pointed out that if there is no tax difference between dividend and capital gain, the investors could await dividend receipts at the end of the year and it is an equivalent rise on the market price of share by the end of year. He treats capital gain the same as the receipt of dividend income.

Kania and Bacon (2005) and Shapiro (1990) pointed out that dividends limit the firm's external financing cost and associated floatation costs and investor concerns which can result. Further, stable dividend which helps to reduce the transaction cost of investor when a fluctuation or zero dividend can result in selling or buying decision to compensate for the deviation from need current income.

All above theories and concepts emphasized that investors' decision is influenced by the dividend income and the capital gain and therefore, the factors, which affect dividend payment decision of a firm, and the factors which affected rise on market price of share could influence investor's decision.

Kahnemen and Tversky (1976) have developed a psychological realistic alternative to expected utility theory and this theory allows to ones to describe how people make decision among alternatives with involve risk. The theory describes how individual evaluates potential losses and gains. The possible outcomes of decision are order for optimum solution. According to the theory, individual decide which outcomes they see as identical and they make reference point for their decision. Individual considers lower outcomes give less preference and higher outcomes give high preferences. The preferences are measured in terms of Utility value and the utility value is based on potential outcomes and their respective probabilities. The people select the alternative with a higher utility. McDermott et al. (2008) explains that origin and function of context dependents risk aversion and risk seeking behaviour and the theory is called as the risk sensitive optimal foraging theory. There is ample evidence that feelings do significantly influence decision-making, especially when the decision involves conditions of risk and/or uncertainty (Zajonc, 1980; Forgas, 1995; Loewenstein et al., 2001). Therefore, decision-making on shares of companies can be measured as expected preference ranking of companies.

Stock Portfolio Evaluation Measurements

The study of Falkenstein (1996) showed that market capitalization, book-to-market and momentum are all important factors for risk-adjusted returns to trading. Gallagher and Looi (2006) used the book-to-market ratio as proxies for the degree to which the value of the stock is related

to future projected growth and compare to current tangible assets. Accordingly, value stocks are stocks that have high ratios of book value to market value, indicating that a high proportion of firm value is associated with tangible assets. However, growth stocks are securities that have low book-to-market ratios. Muresan and Wolitzer (2001) pointed out that the P/E Ratio is normally used to determine whether a stock is expensive or cheap. This indicates that a company's common stock prices based on the company's ability to generate earnings. Karan (1996) studied investment strategy results in more return and found that long-term investment strategy based on Price Earning ratio than year end price to sales and market value to book value ratios. Hence, P/E ratio uses as best stock portfolio evaluation measurement in this study.

Shapiro (1990) stated that most investors are risk-averse and a predictable return through dividend is often preferred to uncertain returns from capital gains, which result from re-invested, retain earnings. Shefrin and Belotti (2001) found that investors' reliance on the representativeness heuristic is one of the key reasons why they expect high return from safe stock. Investors judge that stocks of good companies will associate with both safe and high future return. Scholes and Williams (1977) developed a model for measuring market risk and Beta measures the risk level of the company at the stock market. Beta is a statistical measurement of the relationship between two time series and it has been used to compare security data with benchmark data to measure risk in financial data analysis. Bandara and Abeyrathne (1999) found that Beta was more prevalent at the individual company level where the results indicated that the normal beta measures substantially underestimated the market risk faced by companies compared with Scholes-Williams beta. Fonseka et al. (2002) found that liquidity, management efficiency ratios and profitability are key financial indicators and beta is one of the market indicator impacted for preferred investment criteria in plantation sector in the CSE. Shefrin (1999) found that the return expectations of survey respondents were negatively correlated with the risk. The respondents appear to expect that riskier stocks produced lower return than the safer shares. It is robust and same result was found by Ganzach (2000).

Fernandez et al. (2000) used the variables such as profit, increase of profit compared to last year, Beta and volatility of company shares, return of shares for develop a model of investment on the Spanish stock exchange. They found that the factor, which mostly influences investment preference, was company profit and it was 70% of respondents. Profits, Beta and volatility were significant factors for investment preferences. Gunawardana (2007), neural network approach was used to predict the future prices of shares and to advice for the potential investors for their best investments in the CSE. The total number of shares trading, price earning ratio and dividend yield are most significant factors for decision-making. Shapiro (1999) pointed out that the level of stock price depends on dividend raise or cut, amount of firm's earnings and future growth potentials. Miller and Rock (1985) and Ambarish et al. (1987) found that dividend payment is a signal of future growth prospect of a firm in stock market and it is a best indicator for future share price of the firm.

Accounting profitability of value and growth portfolios, measured by portfolio-level return on equity (ROE), on the two components of the market return estimated by Campbell and Vuolteenaho (2004). He was lengthening the horizon to emphasize longer-term trends rather than short-term fluctuations in profitability. This emphasize long-term trend is more important for investors and they are more focuses on dividend than capital gain. Aivazian et al. (2003) pointed out that both return on equity and profitability positively correlated with dividend payments and

firm debt ratio negatively related to the dividend payment. Dickens et al. (2002) found that dividend depicts value-related information about firm earnings and other financial performance factors and firm profitability has affected dividend payment. However, earning (sales) has less impact on dividend. The dividend payout ratio of the company was the most preferred factor for profitable investment. Polk et al. (2003) and Lamont (1998), the dividend payout ratio included as a variable and it directly forecasts the equation for stock returns. The study of Kania and Bacon (2005) revealed that profitability, risk (beta) and liquidity (current ratio) have significant impact on dividend payment and financial leverage (Debt to equity) also significant and positively related to dividend decision of a firm.

Sabri (2004) concludes that trading volume is one of the most predicting variables and the least predicting variable is emerging stock price volatility for future share price. Gallagher and Looi (2006) pointed out that trading in low volatile stocks might be less profitable because the cost of gathering information for small stocks is likely to be greater than that of large stocks. The results regarding stock size suggested that the ability to provide abnormal returns varies according to stock size. Stock volatility rises after stock prices fall (Black, 1976; Christie, 1982; French et al., 1987; and Cheung and Ng, 1992). Jaleel and Smarakoon (2009) found that positive return stocks caused more volatility than negative stocks indicating no leverage affects in the CSE. Sri Lankan companies use low level of debts and this reflects lack of leverage effect. Further, he points out both information and trading behaviour affect on increasing stock volatility. The study of Samerakoon (2009) finds that purchases are strongly positive related with the past returns and he is suggesting that investors show positive feedback trading behaviour in the CSE.

Gallagher and Looi (2006) results also showed that active equity managers are able to successfully pursue momentum-based strategies. He pointed out that, the positive abnormal returns following purchases subsequent to price rises, and the negative abnormal returns following sales subsequent to price falls. Girard and Biswas (2006) found that compared to developed markets, emerging markets show a greater response to large information shocks and exhibit greater sensitivity to unexpected volume. Poon and Granger (2003) pointed out that volume-volatility research might lead to a new and better way for modelling returns distributions. The result is suggested that differences in investor opinions and expectations are the sources of changes in trading volume and volatility and such differences explain the dynamics between volume and volatility. Wang (1994) develops one such “rational expectations” model and he finds a positive relation between trading volume and absolute changes in stock prices.

Kania and Bacon (2005) points out that tax cost associated with the dividend, agency cost and opportunity cost to reinvest are negatively associated with paying dividend to shareholders. The tax cost on dividend has same rate to all companies and agency cost and opportunity cost to reinvest are hard to quantify and verify the difference cross the firms. Therefore, these factors are excluded in this study. Baker and Powell (1999) noted that there is no statistical difference between industries on dividend payment decision and dividend payment is a market-wide concern faced in similar fashions. Dempsey et al. (1993) found that dividend payment factors are more firm specific than industry-wide characteristics. Therefore, we focus more on firm specific financial and stock market characteristics than industry-wide in this research. Baker et al. (2001) determined that the management of a firm pays considerable attention on the selection of their dividend policy and firms often review their dividend policy annually. Therefore, we limit the study for one fiscal period and cross sectional data was used.

Conceptual Framework and Hypotheses

This section presents the conceptual framework and hypothesis of the study. The study investigates what are the financial and share market characteristics of a company that can motivate the expert investors' preference on shares at CSE. Further, it denotes whether expert investors have rational on which their advices are based to ordinary investors. The conceptual framework of this study depicts in figure 1.

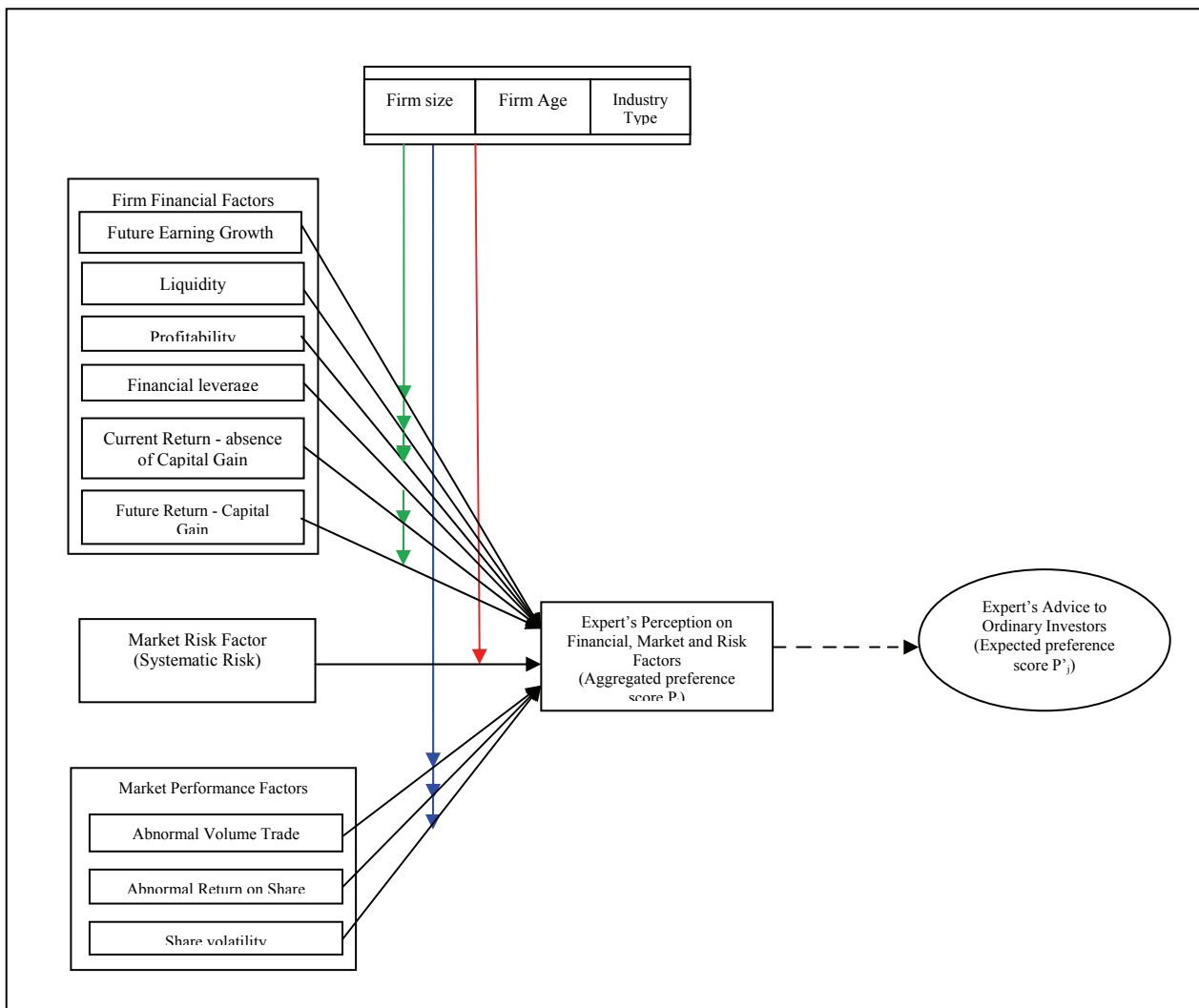
The hypotheses are as follows;

Hypothesis 1: The higher the P/E of the company, the greater the likelihood that expert will prefer on that company shares and advice to buy *vice-versa* advice to sell.

Hypothesis 2: The higher the current ratio of the company, the greater the likelihood that expert will prefer on that company shares and advice to buy *vice-versa* advice to sell.

Hypothesis 3: The higher the return on equity of the company, the greater the likelihood that expert will prefer on that company shares and advice to buy *vice-versa* advice to sell.

Figure 1: Antecedents of Financial and Market Factors and Outcome of Expert's Perception and Expert's Advice on Ordinary Investors in Emerging CSE



Hypothesis 4: The lower the debt to equity of the company, the greater the likelihood that expert will prefer on that company shares and advice to buy *vice-versa* advice to sell.

Hypothesis 5: The higher the dividend yield of the company, the greater the likelihood that expert will prefer on that company shares and advice to buy *vice-versa* advice to sell.

Hypothesis 6: The higher the profit retained (retention rate) in the company, the greater the likelihood that expert will prefer on that company shares and advice to buy *vice-versa* advice to sell.

Hypothesis 7: The higher the volume sort of the company, the greater the likelihood that expert will prefer on that company shares and advice to buy *vice-versa* advice to sell.

Hypothesis 8: The higher the return sort of the company, the greater the likelihood that expert will prefer on that company shares and advice to buy *vice-versa* advice to sell.

Hypothesis 9: The higher the share volatility of the company, the greater the likelihood that expert will prefer on that company shares and advice to buy *vice-versa* advice to sell.

Hypothesis 10: The lower the market risk (Beta) of the company, the greater the likelihood that expert will prefer on that company shares and advice to buy *vice-versa* advice to sell.

Research Methodology

Population

All listed public companies were used as the population. At present 235 companies are listed and belonged to 20 sectors in the CSE.

Sample Formation

Random stratified sampling technique was used to select the sample from the population. The stratification was done by the CSE based on the nature of the business. Gallagher and Looi (2006) pointed out that trading in low volatile stocks might be less profitable because the cost of gathering information for small stocks is likely to be greater than that of large stocks. High volatile eight sectors were selected based on highest sector indexes contribution to ASPI. There are 8 non-overlapping strata namely plantation, diversified holding, manufacturing, trading, stores and supplies, beverage food and tobacco, chemicals and pharmaceuticals, banks, finance and insurance. 50% of companies in each sector were randomly selected into the sample. Fifty-three companies were represented in the sample.

The Time period

The study was carried out during the period from 1st April 2007 to 31st March 2008.

Data and Data Collection

Both primary data and secondary data were used for this study. P/E ratios, current ratio, return on equity ratio, debt to equity ratio and rate of retained profit were calculated by using secondary data from the annual reports of selected companies. ASPI, MPI and SIs and share price of the selected companies and other stock market data were obtained from the monthly stock report in the CSE. Primary data were collected from the expert investors' survey by using pre-tested questionnaire. The questionnaire includes both open-ended question as well as close ended question. There are two panels of questions in the questionnaire. The panel one questions consists of descriptive details of respondent's information and it helps to judge their professionalism about capital market. Second panel of questions helps to collect respondent's preference ranking of portfolios. It provides expert investor's ranking of investment preferences on companies, which based on financial and market performance indicators of the sample companies. The questionnaire was distributed through face-to-face meeting with expert investors and explained how to

answer for the question. We emphasized that ranking of sample companies must be done based on considered financial and market characteristics. The financial and market performance indicators of the sample companies were provided as a collaborative supporting information which enclosed to the questionnaire.

Financial Performance Indicators

The questionnaire form consists of the tables which are calculated for company's P/E ratio (C₁)⁹, current ratio (C₂)¹⁰, return on equity ratio (C₃)¹¹, financial leverage (C₄)¹², current dividend yield (C₅)¹³ and rate of retention of profit (C₆)¹⁴ for the year ended 31st March 2008.

Market performance indicators

Volume Sort (C₇)

On the days when a stock experiences an abnormally heavy volume, it is likely that investors may pay more attention to it than usual. It must sort stocks on the basis of abnormal trading volume. Abnormal trading volume for stock i on day t, AV_{it} to be:

$$AV_{it} = \frac{V_{it}}{\bar{V}_{it}} \quad [1]$$

Where, V_{it} is the rupee volume for stock i traded on the day t as reported in the CSE.

$$\bar{V}_{it} = \sum_{d=t-260}^{t-1} \frac{V_{id}}{260} \quad [2]$$

Return Sort (C₈)

Return sort (C₈) which gives share have extreme one day returns (big price change of the company). The value of return sort is presented on or close to the 31st march 2008 such big price changes reported.

Volatility (C₉)

Number of share trading in the CSE per trading day is measured as volatility.

Market Risk (C₁₀)

To determine the market risk of the selected companies in the CSE, the market model (Scholes, M., and J. Willms, 1977) was conducted. Fonseka et al. (2002) used the market model to calculate the systematic risk of plantation companies listed at CSE. Beta of an asset indicates the degree to which an asset's return moves that of the overall market. Beta can be defined as follows,

$$\beta_s = \text{Cov}(r_s, r_m) / \text{Var}(r_m) \quad [3]$$

Beta (β) of the each company is calculated by running simple regression.

$$r_s = \alpha_s + \beta_s r_m + \epsilon_s \quad [4]$$

Where

- rm = the return on the market (ASPI) rs = the return on shares (share price)
- αs = the regression constant term. βs = regression slope

εs = regression error term

Control Variables

Firm size, firm's age and 8 industry dummy variables are included as control variables. Firm size was measured as log value of net book value of total fixed assets.

Analysis of Data

The multiple regression technique was used to analyze the preferences of the experts' investors. It assigned the 53 stocks T_j aggregated preference score P_j reflecting the expert preference ordering and at the same time obtained the weights X_i reflecting the importance of the criteria C_i in their evaluations. The basis of the choices of most preferred stock T_{53} (k) and least preferred stock T_{53} (k) is the i^{th} choice of each of the stock T_j by C_{ij}

$$P_j = \sum_{i=1}^{10} X_i C_{ij} \quad [5]$$

A multiple regression was conducted for each P_j (Preference for J^{th} Company) as dependent variable and financial, risk and market performance indicators of that company as independent variables for the period from 1st April 2007 to 31st March 2008. Fernandez *et al.* (2004) also used regression analysis techniques for their general market preferences of the experts' model.

$$P_j = \beta_0 + \beta_1 C_1 + \beta_2 C_2 + \beta_3 C_3 + \beta_4 C_4 + \beta_5 C_5 + \beta_6 C_6 + \beta_7 C_7 + \beta_8 C_8 + \beta_9 C_9 + \beta_{10} C_{10} + \varepsilon \quad [6]$$

Where,

P_j = Aggregated preference score of j^{th} company β_0 to β_9 = Partial coefficients

C_1 to C_9 = Financial / market performance indicators ε = Error term

Then, the aggregate expected preferences score (P'_j) for each company was calculated only using coefficients of significant variables of the financial and market indicators of the companies. Finally, all companies in the sample were ranked according to their P'_j . This order of ranking provides a based for decision-making on shares of the companies.

Result and Discussion

An investment preference questionnaire was sent to 65 professional experts and out of them only 48 professionals replied. There were 40 properly filled up questionnaires and they were used for this analysis. These collaborative experts belong to the CSE, venture capital firm and stockbroker firms. Age range of the respondents was from 21 to 41 years. Fifty Seven point five percent (57.5 %) of males and 42.5% of females were represented the professional experts. Considering respondent's educational level, 60% of them were in graduate level and the rest, 40% came under the high school qualification. Further, all professionals have obtained professional certificate on security trading from Sri Lanka Security Exchange commission. The kind of job they are working represented that 57.5% of brokers, 30% of market analysts and 7.5% of fund managers. Five percent (5%) are belonged to the other job categories in related field of stock market (appendix 1).

Each expert investor ranked every sample companies according to the factors considered in this study. Highest score i.e. 53 was assigned to the most preferred company and lowest score i.e. 1 was assigned to the least preferred company. Therefore, each expert investor provided 53 numbers of cases and there are 40 replies.

The capital market in Sri Lanka is a small to medium size and there are only one fund management and 15 stock brokering firms. It was one of the key limitations for this study. However, there are number of small and medium size stock market in the world. Therefore, these findings have significant practical application and implication on other small and medium size capital

market in the world. This study was focused on long-term investment rather than short-term speculations.

Preferences for Financial and Market Performance Indicators

Table 1 shows the correlation coefficients of the variables included in the regression analyses. Except P/E ratio (C₁), all other variables are significant in regression analysis are also significant in the correlation matrix. However, correlation between P/E ratio (C₁) and preference score (P_j) is positively related, which is also basically consistent with our argument in hypothesis 1. There is significant negative correlation between rate of retention of profit (C₆) preference score (P_j), which is serious violation of our hypothesis 6. However, it is supported the result of regression and more details are given under regression results. The correlation between market risk (C₁₀) and preference score (P_j) is positive which is also different from our expected sing. However, regression result shows that market risk (C₁₀) gives the same sing as correlation and it is insignificant in the model.

Table 2 shows that the results of regression analysis which give the company financial, risk and market indicators that influence the investment decision on shares of the companies. The overall model for preference score (P_j) of a company (T_j) was significant at the probability of 0.0001. All factors, except rate of retention of profit (C₅), volume sort (C₇) and market risk (C₁₀) are agreed with the hypotheses. The rate of retention of profit (C₅) is expected to have positive relation with the expert investor preferences. It means that investors are considered future return

Table 1: Pearson Correlation Matrix of Regression Variables

Variable	Pj	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	firm Size	age
pj	1.00												
C1	0.02	1.00											
C2	0.05***	0.50*	1.00										
C3	0.20*	-0.26*	-0.24*	1.00									
C4	0.04#	-0.22*	-0.29*	0.35*	1.00								
C5	0.25*	-0.22*	-0.05***	0.53*	0.00	1.00							
C6	-0.21*	-0.36**	-0.55*	0.09*	0.34*	-0.32*	1.00						
C7	0.07**	-0.02	0.00	-0.03	-0.08*	0.16*	-0.14*	1.00					
C8	0.12*	0.13*	0.07**	-0.07**	-0.20*	-0.01	-0.30*	0.17*	1.00				
C9	0.27*	0.42*	0.13*	-0.06**	-0.14*	-0.09*	-0.10**	-0.06**	-0.13*	1.00			
C10	0.05**	0.12*	0.06**	0.08*	0.03	-0.05***	0.19*	-0.11*	-0.27*	0.29*	1.00		
firm Size	0.34*	-0.12*	-0.09*	0.09*	0.27*	0.19*	0.01*	0.17*	0.03	0.29*	0.25*	1.00	
age	0.07**	0.01	0.37*	-0.14*	-0.19*	-0.07**	-0.38*	0.04#	0.42*	-0.17*	-0.06**	0.06**	1.00
#P<0.1		*** P<0.05		** P<0.01		*P<0.001							

on shares through capital gain. According to the M-M theorem, investors are indifferent over receiving dividends and capital gains due to they are concerned with total return and they do not worry about the composition of total return. However, result shows that expert investors have negative perception on the rate of retention of profit (C₅). The ordinary investors would like to have stable dividend income than unexpected future capital gain. Therefore, expert's view on future return on shares (rate of retain of profit) has a rational based. Volume sort (C₇) measures

abnormal volume of share trading and it is expected to have a positive sign. Although, it is not statistically significant, it gives negative sign. Abnormal volume of share trading has a negative impact on ordinary investors' buying decision. Abnormal high volume of share trading can be happen due to the ownership change or/and institutional investors attract on certain company's shares or/and high foreign participation for a short period of time. Abnormal volume of share trading gives a short-term gain to speculators and it is less affect ordinary investors. Investors prefer higher turn safe shares than risky shares. However, result of market risk (C_{10}) shows that expert investors have high-risk attitude and they behave as a risk taker. This behaviour can occur due to two reasons. The expert investors such as stock analysts, stockbrokers act as advisers' role than agents. They provide information and facilitate share transaction to the ordinary investors. Further, actual risk takers are the ordinary investors. Other reason is that they have more experiences in the market and experts have high confidence on their analysis. Therefore, they encourage ordinary investors for high risk taking behaviour.

According to the results of regression analysis, future earning growth (P/E ratio), current return on shares (dividend yield), future return on shares (rate of retention of profit) and firm profitability (return on equity) are statistically impact variables among financial indicators. The share volatility, return sort among market indicators is significantly impact on experts' perception. The dividend yield, return on equity, rate of retain of profit, return sort and volatility are significant at 0.001 probability level, while price earning ratio was significant at 0.05 probability level. The coefficient of dividend yield has highest value and dividend is absolutely vital for long-run return from the companies. The return sort and share volatility directly affect capital gain and it is important for future return. According to the result, current ratio and volume sort of a company are not significant impact (Table 2). The dividend decision of the company' is mainly dependent on current year profit and retained earnings of the firm. Liquidity (current ratio) of the firm does not affect dividend decision of the firm and dividend can be made from the reserves and share options such as bonus and right issues. Firm leverage (debt to equity ratio) is one important factor for firm's dividend making decision. However, it is not deciding factor for expert's buying advice shares for ordinary investors. Because, the leverage of firm in CSE is comparatively lower than other stock markets and it agrees with the finding of Samarakoon (2009). The volume sort is an indicator for an abnormal volume trade of a company and it does not have certain pattern. These results indicated that expert investors have rational based on their decision and advices given to ordinary investors.

Table 2: Results of the Multiple Linear Regression

Variable	Coefficient	Std. Error	t value	Significance
Independent				
C1	0.008	0.003	2.51	0.012**
C2	0.059	0.286	0.20	0.838
C3	9.898	2.684	3.69	0.001*
C4	-0.095	0.113	-0.84	0.399
C5	72.098	18.060	3.99	0.001*
C6	-5.387	1.186	-4.54	0.001*

C7	-0.005	0.012	-0.37	0.714
C8	0.049	0.010	4.60	0.001*
C9	0.0001	0.000	9.44	0.001*
C10	0.218	0.764	0.29	0.776
firm size	1.466	0.267	5.48	0.001*
age	-0.011	0.015	-0.72	0.473
constant	5.323	3.540	1.50	0.133
R ² = 0.262		R ² (Adj) = 0.256		Prob > F= 0.001
*P< 0.001		**P< 0.05 level		n= 2220

Firm size is significantly moderate the expert's perception on buying decision share of companies and it has positive effect. Age of a firm is negatively relationship with the expert perception on buying decision share of companies and it is not significant due to most of listed companies are matured firm in Sri Lanka. Average age of a firm is 38 years and the range of firm age varies from 9 to 143 years (appendix 2). The Durbin-Watson statistic indicated that there was not serial correlation of error terms for adjacent cases. Variance inflation factor (VIF) showed that all variables indicated very low level of multicollinearity (appendix 3). The aggregated expected preference score (P_j) for each company computed by using coefficients of six significant explanatory variables and corresponding value of the company's P/E ratio, dividend yield, return on equity, rate of retention profit, share volatility and return sort. The sampled companies were ranked according to the value of P_j and top 10 sample companies for buying decision and top 10 sample companies for selling decision at CSE are given in the Table 3.

Table 3: Top Ten Buying and Selling Listed Sample Companies According to the Experts

Top 10 sample companies for buying decision			Top 10 sample companies for selling decision	
No.	Company Name	PJ'	Company Name	PJ'
1	Nestle Lanka Ltd	21.201	Asia Capital Ltd	-5.606
2	John keels Holdings Ltd	18.998	Udapussallawa plantations Ltd	-5.324
3	Millers Ltd	12.372	Richard pieris exports Ltd	-5.097
4	Brown & Company PLC	11.817	Hapugastanne plantations Ltd	-4.771
5	National Development Bank	10.580	Haycarb Ltd	-4.761
6	Distilleries Co. of Sri Lanka Ltd	10.520	Lee Hedges & Co. Ltd	-4.540
7	Tess agro Ltd	7.073	Hayley's Exports Ltd	-4.537
8	Eagle Insurance Co Ltd	6.315	Pan Asia Banking Corporation Ltd	-3.883
9	Chemical Industries (Colombo) Ltd	6.236	Elpitiya Plantations Ltd	-3.813
10	Printcare (Ceylon)Ltd	6.201	Eastern Merchants Ltd	-3.551

These criteria can be used for the investment decision-making such as selection of companies at the CSE, amount to be invested. This model can be further developed other factors, which do not consider for this study.

Contributions and Future Research Directions

Contributions

The objective of this study was to identify sound decision-making criteria for ordinary investors through evaluating the responses of expert investors. We believe that we have achieved our objectives in a considerable manner and we focused on most important broad factors namely firm's financial, risk (Beta) and market factors. Expert investors prefer on high-risk stock portfolios. They advise to ordinary investors for risk taking behaviour. However, ordinary investors are like on long-term benefit to hold certain shares. They prefer stable return on safe stock, because, current return (dividend yield) and future prospect of return (rate of retention of profit) both are significant. But, future prospect of return (rate of retention of profit) has negatively influenced and it indicates safe dividend income is more prominent than uncertain capital gain. There is no doubt that M-M theorem has made a significant contribution by articulating that investors are financially unaffected by the decision whether retain profit within the company or distribute profit to investors as a dividend. They are indifferent over receiving dividends and capital gains due to they are concerned with total return and do not consider the composition of total return. Therefore, shareholder wealth is unchanged by receiving the dividend or capital gains. However, in all respect, we fundamentally disagree with this broad argument mentioned above. Because, ordinary investors in emerging CSE are preferred on stable dividend than future capital gains, which result from, retain profit within the company. Baker and Powell (1999), and Baker et al. (2001), found that M-M theorem holds little importance in real world and management of firm places substantial value on dividends, as they are believed to affect the value of firm. Baker and Powell (1999) and Baker et al. (2001) made above conclusion by studying dividend policy decision of firm and our study also draw the same finding by studying the expert investor preference behaviour for investing decision of ordinary investors. Parks (1996) found that if there is no tax difference between dividend and capital gain, the investors could wait for dividend receipts at the end of year and it is an equivalent rise on the market price of share by the end of year. He treats capital gain the same as the receipt of dividend income. However, there is no tax on capital gain in emerging stock market in Sri Lanka¹⁵. Although, expert investors' advice and ordinary investors prefer on dividend due to the dividend is more safe and stable return if companies follow smoothed residual or constant payout residual dividend policies.

Future Research Directions

At least four limitations of this study need to be acknowledged, which lead a number of future research directions. First, our approach provides only 8 industry sectors, which include high volatile industries that have high contribution to ASPI of CSE. It may affect the ordinary investors' decision. However, comprehensive study will include all the sectors at CSE. Hence, there is a future research on comprehensive study about this direction in emerging CSE. Second, this study considered only certain financial factors of firm and market factors. There are other firm level factors such as corporate governance, earning management and ownership may be influenced on expert advice on ordinary investors' decision. This is also another fruitful future research on this direction. Third, our study was focused expert investor's perception and behaviour on firms financial and market characteristics and their advice on ordinary investors' buying/selling decision. Future researchers can study institutional investor behaviour and they may wish to address same issues and application of M-M theorem might be different on institutional investor behaviour. Further, conclusion can differ from ordinary investor behaviour due to institutional investors

have better knowledge and they have their own analysis for decision-making. Fourth, this research carried out using cross-sectional data for one year. In a future research, it is expected to improve this study by using quarterly published longitudinal data and using data from other context mainly countries who have emerging semi-strong small and medium size stock markets.

Conclusion

This paper analysed that whether the expert investors have a rational base for their advices to the ordinary investors, develop a decision-making criteria for ordinary investors for effective and economical decision-making. The experts were significantly concerned on P/E ratio, dividend yield, return on equity and rate of retention of profit as financial indicators. Rate of retention of profit negatively affect the decision to purchase of shares. The return sort and share volatility had been highlighted by the experts as their significant importance factors of the market performance indicators. P_j score gives the level of suitability on purchasing shares of a company over other company. This study consider only certain financial factors of company and market factors, which affect company dividend decision and raise market price of shares. Other factors such as general states of economy, ownership structures of company, corporate governance is not taken into account in this research. Hence, the objective of the paper is limited to suggesting a more reasonable investment model for ordinary investors. However, this provides sound criteria for considered factors and this model can further develop adding other significant factors. The findings of this study can be applied to the semi-strong efficient, liberalize and small and medium size other stock markets. This research will eye opener to other researchers for future study on behaviour of stock brokers, stock analysts, fund manager and other experts who attached to stock market to different stock portfolio evaluation measurements and investigate their rational based towards advising ordinary investors.

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Notes

1. Colombo Stock Exchange, 2006 Fact book, Colombo Stock Exchange, Colombo, Sri Lanka
2. Daily News, January 13, 1998
3. Sri Lanka Stocks at fresh peak after doubling 2009, Reuters, January 4, 2010
4. Colombo Stock Exchange broke several records in 2009, The Sunday Times, January 10, 2010
5. Certain restrictions have been imposed in the case of few companies. General permission is not apply for the a company proposing to carry on or carrying a business of Money lending, Pawn brokering, Retail trade capital less than one Million US\$ and Coastal fishing.
6. ‘A guide for share investment in Sri Lanka’ published by Government of Sri Lanka 1992.
7. www.cse.lk accessed on 15th March 2009
8. The ordinary investors include individuals who buying shares from CSE and mainly interest on long-term return and institutional investors and speculators are not belonged to this category. Long-term means that period of time is one year or more.
9. Price earning ratio (P/E) has been calculated as $(C_1) = \text{Price per Share} / \text{Annual earning per Share}$
10. Current ratio (C_2) was measured value of current assets to current liabilities
11. Return on equity (C_3) was calculated as $\text{Net Profit After tax (NPAT)} / \text{Shareholders Equity}$
12. Financial leverage (C_4) was measured as ratio of total liabilities to shareholders equity
13. Current dividend yield (C_5)^{has} been calculated as $= \text{Full year dividend} / \text{Current Share Price}$
14. Rate of retention of profit (C_6) has been calculated as $= 1 - (\text{Dividend} / \text{NPAT})$
15. Dividend income is tax at 10% uniform rate and capital gain is exempted for tax in Sri Lanka

Appendices

Appendix 1
Table 1: Descriptive Statistics of Survey Respondents

Parameters	Frequency	Percentage (%)
Sex		
Male	23	57.5
Female	17	42.5
Age		
18-25 yrs	6	15
26-30 yrs	18	45
31-35 yrs	9	22.5
36-40 yrs	5	12.5
Over 40 yrs	2	5
Educational Level		

High School	16	40
Graduate	24	60
Kind of Job		
Market Analysts	12	30
Fund Manager	3	7.5
Broker		57.5
Others	2	5

Souse: Survey data (2008)

Appendix 2

Table 1: Descriptive Statistics of Sample Companies

Variable	Mean	SD	Min	Max
C1	61.30	173.09	2.11	1200.00
C2	1.47	1.59	0.07	9.07
C3	0.16	0.16	0.01	0.97
C4	3.46	4.04	0.01	15.53
C5	0.02	0.03	0.00	0.14
C6	0.62	0.46	-1.25	1.00
C7	21.79	35.46	0.00	189.46
C8	20.14	42.03	0.00	206.00
C9	35162.55	80165.02	24.00	398279.00
C10	0.90	0.53	-0.02	2.00
Fixed Assets	8852484	24500000	32564	167000000
Firm size	14.30	1.88	10.39	18.93
Firm Age	37.92	27.60	9.00	142.00

Souse: Survey data (2008)

Appendix 3

Table 1: Multicollinearity Test Result

Variable	VIF	SQRT VIF	Tolerance	R-Squared
C1	1.81	1.34	0.553	0.447
C2	1.89	1.37	0.529	0.470
C3	1.83	1.35	0.546	0.454
C4	1.36	1.17	0.736	0.264
C5	2.05	1.43	0.489	0.511
C6	2.34	1.53	0.427	0.573
C7	1.08	1.04	0.929	0.071
C8	1.29	1.14	0.776	0.224
C9	1.38	1.18	0.724	0.276
C10	1.26	1.12	0.791	0.208

Assessing the Impact of Microfinance Institutions on Financial Development within the West African Monetary and Economic Union

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Abstract: *This paper attempted to assess the impact microfinance institutions had on the development of financial systems in the West African Economic and Monetary Union from 1993 to 2004. The theoretical model identifies their outreach, financial structure, financial efficiency performances, and also the country's macroeconomic and socio-economic performances as the determining factors of that impact. Based on the size of the impact exerted on the mutation of the financial system, Microfinance Institutions are ranked by country from the highest impact to the lowest as follows: Benin, Niger, Senegal, Togo, Cote d'Ivoire, Burkina, and Mali. Globally, there is evidence that microfinance institutions influence the development of national financial systems.*

Keywords: impact, financial development, financial efficiency, outreach

Introduction

Financial reform policies often target sections of a financial system (banking industry, financial market, insurance companies, microfinance institutions, and etc.) based on their relative sizes and/or market shares but not on their capacities to boost the dynamism and efficiency of the system. Policy makers should rather account for each section's capacity to transfer to the entire system the stimuli it receives exogenously in which case, the availability of such information becomes critical.

This paper falls into that analytical perspective by trying to assess the impact Microfinance Institutions (MFI) had on the mutation of the financial systems in the West African Economic and Monetary Union (WAEMU) over the period 1993-2004. It focuses on these specific institutions because of the rapid expansion they have experienced the last two decades. For, it (i) reviews their performances in each selected member country, (ii) identifies the determinants of the impacts they had on the financial systems, and (iii) computes the sizes of these impacts. The results obtained from the regressions of the impact equation identify the country's overtime socio-economic performance as the most frequently significant determinant followed successively by its overtime macroeconomic performance and MFIs overtime outreach, financial efficiency, and financial structure performances. Based on the sizes of the impacts they exerted on the mutation of the financial systems, MFIs are ranked by country from the highest impact to the lowest as follows: Benin, Niger, Senegal, Togo, Cote d'Ivoire, Burkina, and Mali.

Review of Literature

Economic literature offers outreach-based evidence that microfinance matters for the functioning of local economies and very poor countries. It also increases the probability for them to get out of poverty [Wright (1999); McGuire & Conroy (2000), Khandker (2003); Navajas & al (2000)]. Outreach is not simply a question of number of clients as reflected in the six types of

definition suggested by Gonzalez-Vega: (i) quality, (ii) cost, (iii) depth, (iv) breadth, (v) length, and (vi) variety [McGuire & Conroy (2000)]. Yet, outreach is not a sufficient criterion and is often used to complement the financial self-sustainability criterion, which raises questions of efficiency and arouses an ongoing debate over what should be MFIs primary target. Should they target financial efficiency and thus defeat their poverty alleviation mission in which case, their motivation will become the same as banks (i.e., profit maximization) and their performances rigorously based on commonly used financial criteria? Financial self-sustainability requires MFIs to cover all administrative costs, loan losses and financing costs from operating income, after adjusting for inflation and subsidies and treating all funding as if they had a commercial cost [McGuire & Conroy (2000)].

Some researchers responded with the “win-win” proposition that advocates a simultaneous targeting of both financial efficiency and outreach. Hulme (2000) stated that if both outreach and sustainability have been enhanced then a MFI’s intervention has a beneficial impact as it has widened the financial market in a sustainable fashion. Luzzi & Weber (2006), suggested that, once set up a MFI should be able to generate win-win outcome, i.e., provide financial services to the poor (outreach) and cover their costs in order to avoid bankruptcy (sustainability). Inversely, opponents suggest that the “win-win” scenario may be overly simplistic and emphasis on institutional sustainability seems incompatible with the poverty reduction of the extreme poor [Rogaly (1996)]. Morduch (2000) advanced that institutions that are financially self-sufficient tend to be those that do not serve the poorest borrowers.

These conflicting views have prompted the investigation of a possible link between outreach and sustainability. Using factor analysis, Luzzi and Weber (2006) found no strong evidence of a trade-off between the financial and outreach dimensions of MFIs performance. Their results revealed a low correlation between them, thus confirming initial findings by Conning (1999). Others have concentrated on their analysis on MFIs financial performance and sustainability [Schreiner (1996); Lafourcade & al (2005)]. Attention is being paid to aspects such as regulation and supervision of MFIs [Andah (2005)]. Yet, the nature and sizes of the various impacts MFIs exert on beneficiary groups and the economy as a whole remain unknown.

So far, MFIs impact studies have generally targeted the social and development dimensions of microfinance. Sebstad & Chen (1996) conducted a review of 32 early MFIs impact studies of which twenty-six focused on enterprises and eighteen on households. Most of the studies in the first category found that credit had a positive impact on enterprise income and output with increased access to loans, asset accumulation and employment in some cases. Most of the studies in the second category found that microfinance had a positive impact on household incomes or expenditures while the signs of its impact on health and nutrition and on children’s education were mixed. As Sebstad & Chen cautioned against the lack of rigor in many of the studies they reviewed, it became necessary to refer to David Hulme’s (2000) paper on the methodological options for the impact assessment of microfinance. The author first operated a thorough review of past impact studies from (i) those supporting that microfinance has very beneficial economic and social impacts [Hossain (1988); Khandker (1998)], and (ii) those cautioning against such optimism to (iii) those supporting the adverse view [Adams & von Pischke (1992); Buckley (1997); Rogaly (1996)]. Then, it examined the choice of conceptual frameworks and presented three paradigms of impact assessment. In terms of conceptual frameworks, the author distinguished between two main schools of thought with regard to which link(s) in the chain they focus on. They

are termed the "intended beneficiary" school and the "intermediary" school. The "intended beneficiary" school, building on the ideas of conventional evaluation, seeks to get as far down the impact chain as is feasible (in terms of budgets and techniques) and to assess the impact on intended beneficiaries (individuals or households). The "intermediary school" focuses purely on the beginning of the chain and in particular on changes in the MFI and its operations." In term of paradigms of impact assessment, he distinguished the (i) scientific method, (ii) the humanities tradition and the (iii) participatory learning and action. The first is the conventional scientific method with its origins in the natural sciences. The second has its roots in the humanities and focuses on making a reasoned argument supported by theory and specific pieces of evidence. The third enables beneficiaries to identify their own indicators, establish their own participatory baselines, monitor change, and evaluate causality. The author noted that, in recent practice many studies have woven elements of these approaches together.

Nevertheless, the dimensions investigated by MFIs impact studies and the beneficiaries groups targeted varied widely [Chen & Dunn, (1996)]. Hartaska (2005) stands as a rare researcher to have investigated the determination of MFIs performance in a multidimensional context. Others generally focus on a specific dimension: (i) community wealth [Woller & Parsons (2002)], (ii) self-employment profits [McKernan (2002)], (iii) social capital [Rankin (2002); Anderson & al. (2002)], and (iv) politics of development [Rankin (2002).] While most MFIs impact studies targeted households, enterprises or communities. In the same way, this paper sets to assess the impacts MFIs exert on the development of financial systems.

Methodology

Our model is based on the case of a small country where financial assets are transacted mainly through commercial banks, MFIs, and informal financial settings but very marginally through capital markets. MFIs play a dual intermediary role by (i) collecting and allocating small savings directly and (ii) channelling external funds from banks and other institutions to low-income populations. By so doing, they influence the mutation of the financial system through the functional relation:

$$I_t = I_t(M_t, E_t) \quad (1)$$

I_t represents the performance of the financial system, M_t the overall performance of MFIs, and E_t economic factors that influence directly and independently the performance of the financial system. A change in the performance of the financial system is caused by exogenous changes in the independent variables as:

$$\Delta I_t = \alpha_0 + \alpha_1 \Delta M_t + \alpha_2 \Delta E_t + \varepsilon_{1t} \quad (2)$$

It is assumed that changes in MFIs overall performance should be sustained overtime to effectively affect the performance of the whole financial system. Hence, a change in MFIs performance at (t) is the cumulated sum of all partial changes that have occurred at each previous time following an exogenous shock generated at (t-i). The sizes of these partial changes are assumed to vary at an arithmetic rate from one period to the other so that the actual total change occurring at (t) is:

$$\Delta M_t = (1 + \Phi)^i \Delta M_{t-i} \quad (3)$$

Φ is the average growth rate of the size of each partial change between (t) and (t-i).

Dividing Equation (2) by Equation (3) leads to Equation (4):

$$\frac{\Delta I_t}{\Delta M_t} = \frac{1}{(1 + \Phi)^i} \left[\alpha_1 \frac{\Delta M_t}{\Delta M_{t-i}} + \alpha_2 \frac{\Delta E_t}{\Delta M_{t-i}} + \frac{\varepsilon_{1t}}{\Delta M_{t-i}} \right] \quad (4)$$

Equation (4) stipulates that the impact of a change in MFIs overall performance on the performance of the financial system depends on lagged changes in MFIs overall performance, current change in economic factors, the value of Φ , and the number of lagged periods. At the same time, it is further assumed that changes in MFIs overall performance depend on changes in their outreach, financial structure, and financial efficiency performances and changes in the country's economic performance on changes in its macroeconomic and socio-economic performances. Thus:

$$\Delta M_t = \beta_0 + \beta_1 \Delta O_t + \beta_2 \Delta F_t + \beta_3 \Delta P_t + \varepsilon_{2t} \quad (5)$$

$$\Delta E_t = \delta_0 + \delta_1 \Delta X_t + \delta_2 \Delta S_t + \varepsilon_{3t} \quad (6)$$

O_t represents MFIs outreach performance, F_t MFIs financial structure performance, P_t MFIs financial efficiency performance, X_t the country's macroeconomic performance, and S_t its socio-economic performance. Substituting Equations (5) and (6) into (4) leads to the impact equation:

$$\frac{\Delta I_t}{\Delta M_t} = \frac{1}{(1 + \Phi)^i} \left[\frac{\alpha_1 \beta_1 \Delta O_t}{\Delta M_{t-i}} + \frac{\alpha_1 \beta_2 \Delta F_t}{\Delta M_{t-i}} + \frac{\alpha_1 \beta_3 \Delta P_t}{\Delta M_{t-i}} + \frac{\alpha_2 \delta_1 \Delta X_t}{\Delta M_{t-i}} + \frac{\alpha_2 \delta_2 \Delta S_t}{\Delta M_{t-i}} + \frac{\alpha_1 \beta_0 + \alpha_2 \delta_0 + \alpha_1 \varepsilon_{2t} + \alpha_2 \varepsilon_{3t} + \varepsilon_{1t}}{\Delta M_{t-i}} \right] \quad (7)$$

Equation (7) stipulates that the impact of a change in MFIs overall performance on the financial system at any period (t) depends on changes in their (i) outreach, (ii) financial structure, and (iii) financial performances at (t) induced by the change in their overall performance at (t-i). It also depends on changes in the country's (iv) macroeconomic and (v) socio-economic performances at (t) induced by the change in MFIs overall performance at (t-i). For convenience, Equation (7), the impact equation can be rewritten with the anticipated signs of the relationships between the dependent variable and each independent variable as:

$$i_t = \frac{1}{(1 + \Phi)^i} [\lambda_0 + \lambda_1 o_{t-i}^+ + \lambda_2 f_{t-i}^+ + \lambda_3 p_{t-i}^+ + \lambda_4 x_{t-i}^+ + \lambda_5 s_{t-i}^+ + \mu_{t-i}] \quad (8)$$

with

$$i_t = \frac{\Delta I_t}{\Delta M_t}, \quad o_{t-i} = \frac{\Delta O_t}{\Delta M_{t-i}}, \quad f_{t-i} = \frac{\Delta F_t}{\Delta M_{t-i}}, \quad p_{t-i} = \frac{\Delta P_t}{\Delta M_{t-i}}, \quad x_{t-i} = \frac{\Delta X_t}{\Delta M_{t-i}}, \quad s_{t-i} = \frac{\Delta S_t}{\Delta M_{t-i}}, \quad \mu_{t-i} = \frac{\alpha_1 \varepsilon_{2t} + \alpha_2 \varepsilon_{3t} + \varepsilon_{1t}}{\Delta M_{t-i}}$$

In case $i=1$, the impact equation becomes:

$$i_t = \frac{1}{(1 + \Phi)} [\lambda_0 + \lambda_1 o_{t-1}^+ + \lambda_2 f_{t-1}^+ + \lambda_3 p_{t-1}^+ + \lambda_4 x_{t-1}^+ + \lambda_5 s_{t-1}^+ + \mu_{t-1}] \quad (9)$$

The impact equation translates into the following real factor relationship:

Change in the	=	λ_0
performance of the	+	λ_1 *Overtime change in MFIs financial structure performance
system (financial	+	λ_2 *Overtime change in MFIs outreach performance
development)	+	λ_3 *Overtime change in MFIs financial performance
	+	λ_4 *Overtime change in macroeconomic performance
	+	λ_5 *Overtime change in socio-economic performance
	+	v_t

Empirical Findings

Data series span over 12 years from 1993 to 2004, but were reduced to 11 series due to computational specifications. Microfinance data used are obtained from various annual Reports on Decentralized Financial Systems within the WAEMU published by the Central Bank of West African States (BCEAO) and PASNAM/International Labour Organization. Macroeconomic data are obtained from the International Financial Statistics published by the International Monetary Fund. Socio-economic data on adult illiteracy and employment ratios are obtained from the African Development Reports published by the African Development Bank.

In order to avoid correlation biases in the results due to the very short period they cover, tests were conducted to detect correlation among the various series and only the most suited series were used to compute the specified variables. The dependent variable was computed using four traditional measures of financial development: (i) Growth in M2, (ii) M2 over GDP ratio, (iii) Credit to the private sector over GDP ratio, and (iv) Credit to the private sector over Domestic credit ratio [Beck & al (1999); Hauner (2006); Yartey (2006).] The computed dependent variables are FDEV1, FDEV2, FDEV3, and FDEV4. The independent variables are STRUC, OUTRE, EFFIC, MACRO, and SOCIO computed to respectively measure the overtime change in MFIs financial structure performance, the overtime change in MFIs outreach performance, the overtime change in MFIs financial efficiency performance, the overtime change in the country's macroeconomic performance, and the overtime change in its socio-economic performance. STRUC is defined as the change in total capital over the change in deposit lagged one period. OUTRE is defined as the change in the penetration rate over the change in deposit lagged one period. EFFIC is defined as the change in the net results capital over the change in deposit lagged one period. MACRO is defined as the change in real interest rate over the change in deposit lagged one period. SOCIO is defined as the change in primary education ratio [Mayoux (1997), Hulme (2000)] over the change in deposit lagged one period (Appendix 1, Table 1).

The performed ADF unit root tests indicate stationarity in the different country data series. Generally, the goodness of fit of the data to the model varies with each dependent variable and each country (Appendix 2, Tables 1a and 1b). But, the model produced better results in the cases of Senegal, Benin, and Mali. Regressions estimated with the FDEV2 and FDEV3 produced better results across country. Likewise, the performances of the independent variables vary with each dependent variable and each country. Overall, the SOCIO variable is the most frequently significant determinant followed successively by the MACRO, OUTRE, EFFIC, and STRUC variables. Also, only the coefficients of the OUTRE, STRUC, and EFFIC variables carry the anticipated positive sign in most cases. Inversely, the coefficients of the MACRO and SOCIO variables are negative in most cases.

Individual country's results show that for Benin, OUTRE and SOCIO variables are the most frequently significant. Also, all the coefficients except those of the SOCIO variable are positive. For Burkina, only the SOCIO variable is significant with the FDEV3 dependent variable. Also, all the coefficients except the one of the SOCIO variable are positive with the FDEV1 dependent variable. For Cote d'Ivoire, only the EFFIC variable is significant with the FDEV2 dependent variable. For Mali, all the variables are revealed significant with FDEV2 dependent variable. Also, all the coefficients except the one of the SOCIO variable are positive with the FDEV3 dependent variable. For Niger, only the EFFIC variable is significant with the FDEV3 dependent variable. Also, only the coefficients of the OUTRE and EFFIC variables are positive with the

FDEV3 and FDEV4 dependent variables respectively. For Senegal, the STRUC, MACRO, and SOCIO variables are the most frequently significant. Also, all the coefficients except those of the SOCIO variable are positive with both the FDEV3 and FDEV4 dependent variables. For Togo, the STRUC, EFFIC, and SOCIO variables are only significant with the FDEV4 dependent variable. It is with the same dependent variable that the OUTRE and MACRO variables are positive. For the whole Union, no specific variable is revealed significant except the SOCIO variable with the FDEV2 dependent variable. Also all the coefficients except the one of the EFFIC variable are positive with the FDEV4 dependent variable.

In summary, the “Growth in M2, and “Credit over GDP ratio” based dependent variables produced better results while the overall changes in the country’s socio-economic and macroeconomic performance variables are the most frequently significant but carry the wrong signs. The overtime change in MFIs outreach performance is the most frequently significant industry’s specific variable. The model fitted the data on Benin, Mali, and Senegal best and the impact size is strongest for Benin.

Generally, the results reveal that overtime changes in socio-economic and macroeconomic performances are more important determinants of MFIs impact on financial development within the WAEMU than overtime changes in industry specific performances. They confirm previous findings in the literature that a positive relationship exists between the level of financial intermediation and economic performance. It is being argued that high level of financial intermediation produces faster rates of economic growth and increased total factor productivity [Beck & al (1999).] Inversely, a vibrant macroeconomic environment induces more income generating opportunities for the poorest to take advantage of the available microfinance services. The strong influence of socio-economic factors translates into the fact that improved social status of poor households such as higher level of education or better healthcare increases their income earning powers and opportunities for the productive use of loans [Wright (1999); Beck & al. (1999); Mckerman (2002).]

We estimated the sizes of the impacts MFIs had on financial development within the WAEMU (Appendix 3, Table 1) over the period 1993-2004 and found that they vary with each computed financial development variable and each country. Comparisons of the sizes of the impacts they exerted on the mutations of the financial systems, rank MFIs by country from the highest impact to the lowest as follows: Benin, Niger, Senegal, Togo, Cote d’Ivoire, Burkina, and Mali. It is worth noting that the “Growth in M2” based financial development variable, FDEV2 produced the largest impact sizes. The results show that MFIs in all the countries exerted a positive impact on financial development except in Niger using the M2 over GDP and Growth in M2 based financial development measures.

These strong and positive impacts MFIs exerted on financial development in the WAEMU are necessarily induced by their rapid expansion as evidenced by the very significant changes in their characteristics. Together, economic, outreach, financial structure, and financial efficiency measures reveal strong evolutionary trends in their performances over the period (Table 4). From 1995 to 2004, the number of their service points increased in the Union by 33.8% and in each individual member country as follows: Benin (27.2%), Burkina (-45.4%), Cote d’Ivoire (113.2%), Mali (149%), Niger (-4.5%), Senegal (196.7%), and Togo (-28.6%). The number of their employees increased in the Union by (673.3%) and in each individual member country as follows: Benin (282.1%), Burkina (589.8%), Cote d’Ivoire (1178.6%), Mali (1376.7%), Niger

(595.7%), Senegal (1975.4%), and Togo (346.0%). Their financial resources increased in the Union by 401.7% and in each individual member country as follows: Benin (286.5%), Burkina (448.6%), Cote d'Ivoire (652.1%), Mali (414.1%), Niger (187.9%), Senegal (531.3%), and Togo (230.8). The number of their outstanding loans increased in the Union by 1350% and in each individual member country as follows: Benin (2689%), Burkina (2176%), Cote d'Ivoire (670%), Mali (662%), Niger (264%), Senegal (2320%), and Togo (887%). Their investments increased in the Union by 418.4% and in each individual member country as follows: Benin (162.3%), Burkina (2242.5%), Cote d'Ivoire (331.9%), Mali (732.4%), Niger (321.8%), Senegal (392.4%), and Togo (734.2%). Comparatively, they contributed, on average, less but positively to changes in the system's efficiency (Appendix 3, Figure 1) but more to changes in the deposit sizes than commercial banks (Appendix 3, Figure 2.)

These results offer the evidence the impact of microfinance services goes beyond the win-win gain, i.e., outreach and financial sustainability to influence the development of national financial systems. In other words, they confirm Hulme's (2000) statement that if both outreach and sustainability have been enhanced then a MFI's intervention has a beneficial impact as it has widened the financial market in a sustainable fashion.

Conclusion

This paper attempted to measure the impact MFIs had on financial development in seven WAEMU member countries. The theoretical model specifies that impact as being determined at any time by overtime changes in MFIs outreach, financial structure, financial performances, and also overtime changes in the country's macroeconomic and socio-economic performances. Results obtained from the testing of the model vary with the computed "financial development" variable and the country. Individual independent variables also vary accordingly. Globally, overtime changes in the country's socio-economic and macroeconomic performances stand as the most frequently statistically significant explanatory variables. The overtime change in MFIs outreach performance is the most frequently significant industry's specific variable. The model fitted the data on Benin, Mali, and Senegal best.

On the basis of the size of the impact they had on financial development in each selected financial system over the period 1993-2004, MFIs are ranked by country from the highest impact to the lowest as follows: Benin, Niger, Senegal, Togo, Cote d'Ivoire, Burkina, and Mali. The results show that MFIs in all WAEMU regional member countries exerted a positive impact on financial development except in the case of Niger using the M2 over GDP and Growth in M2 based financial development measures. Evidence is offered here that the impact of microfinance goes beyond the win-win gain, i.e., outreach and financial sustainability to influence the development of national financial systems. Still, the very short nature of the data series introduces some limit to these results that may be removed with longer data series. For the purpose of financial reform policymaking, such exercise should be extended to all sections of the financial system and the results cross-compared. Finally, a comparison of results obtained from using the model to assess the impacts any specific financial section had on the financial system at different times will necessary provide a good indication of the section's own mutation.

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Appendices

Appendix 1

Table 1
Definition of the Computed Variables

Name	Factor measured	Definition
F1	Change in the performance of the system	Δ (M2 over GDP ratio) / Δ (MFIs deposits)
F2	“ “	Δ (Growth in M2) / Δ (MFIs deposits)
F3	“ “	Δ (Credit to private sector over GDP ratio) / Δ (MFIs deposits)
F4	“ “	Δ (Credit to private sector over Domestic credit ratio) / Δ (MFIs deposits)
STRUC	Overtime change in MFIs financial structure performance	Δ (Total capital) / Lagged Δ (MFIs deposits)
OUTRE	Overtime change in MFIs outreach performance.	Δ (Penetration rate) / Lagged Δ (MFIs deposits)
EFFIC	Overtime change in MFIs financial efficiency performance.	Δ (Net Result) / Lagged Δ (MFIs deposits)
MACRO	Overtime change in the country's macroeconomic performance.	Δ (Real interest rate) / Lagged Δ (MFIs deposits)
SOCIO	Overtime change in the country's socioeconomic Performance	Δ (Primary education enrolment ratio) / Lagged Δ (MFIs deposits)

Appendix 2

Table 1a
Results from the Regression of the Impact Equation

	Benin				Burkina				Cote d'Ivoire				Mali			
	FDEV1	FDEV2	FDEV3	FDEV4	FDEV1	FDEV2	FDEV3	FDEV4	FDEV1	FDEV2	FDEV3	FDEV4	FDEV1	FDEV2	FDEV3	FDEV4
STRUC	0.0	0.0	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	-0.0	-0.0	-0.0	-0.0	-0.0	0.0	-0.0
<i>t-statistic</i>	0.1	0.5	0.9	0.5	0.3	2.0	-0.0	1.7	0.2	-1.0	-0.2	-0.9	-0.6	-3.2	2.8	-0.4
OUTRE	0.4	4.3	0.3	3.6	0.1	1.4	-0.0	-0.4	-0.3	0.1	-0.1	0.5	-0.0	-1.1	0.1	-0.5
<i>t-statistic</i>	4.0	4.1	3.6	1.8	0.8	1.1	-0.8	-0.3	-0.6	0.0	-0.1	0.4	-0.1	-2.4	1.8	-0.7
EFFIC	0.0	0.1	0.0	0.1	0.0	-0.1	-0.0	-0.0	0.0	-0.0	0.0	-0.0	-0.0	-0.0	0.0	-0.0
<i>t-statistic</i>	2.3	1.8	1.5	1.2	0.5	-1.7	-1.7	-1.5	0.7	-0.5	0.1	-1.1	-3.0	-3.0	0.2	-1.8
MACRO	0.1	0.7	0.1	1.7	0.1	-0.3	0.0	1.0	-0.1	-3.4	-0.1	-0.2	-0.3	-2.7	0.0	-0.8
<i>t-statistic</i>	0.7	0.5	0.8	0.7	1.5	-0.5	0.4	2.0	-0.6	-3.4	-1.0	-0.5	-3.7	-5.2	0.0	-1.0
SOCIO	-1.4	-14.7	-1.0	-15.8	-0.5	-6.1	0.6	-3.8	-0.2	3.3	-0.1	1.4	0.8	7.8	-0.0	4.6
<i>t-statistic</i>	-2.9	-3.1	-2.6	-1.8	-1.0	-1.4	3.3	-1.1	-0.4	0.7	-0.2	1.1	3.1	4.2	-0.1	1.6
R-2	0.87	0.88	0.81	0.59	0.39	0.50	0.78	0.58	0.30	0.75	0.34	0.00	0.92	0.95	0.62	0.82
Adjusted R-2	0.76	0.78	0.66	0.27	-0.10	0.09	0.60	0.24	-0.26	0.55	-0.19	-0.81	0.85	0.92	0.32	0.67
Log likelihood	-63	-85	-60.7	-92.2	-55.3	-78.1	-46.8	-76.2	-54.5	-77.8	-53.7	-65.1	-50.0	-69.3	-46.3	-73.6
Akaike info criterion	13.5	18.2	13.1	19.4	12.1	16.6	10.4	16.2	11.9	16.6	11.7	14.0	11.0	14.9	10.3	15.7
Schwarz criterion	13.7	18.3	13.3	19.6	12.2	16.8	10.5	16.4	12.0	16.7	11.9	14.2	11.2	15.0	10.4	15.9
D-W stat	2.4	2.4	2.1	2.0	1.9	1.8	1.4	1.3	2.7	2.4	2.1	1.8	1.3	1.5	2.4	2.6

Table 1b
Results from the Regression of the Impact Equation

	Niger				Senegal				Togo				WAEMU			
	FDEV1	FDEV2	FDEV3	FDEV4	FDEV1	FDEV2	FDEV3	FDEV4	FDEV1	FDEV2	FDEV3	FDEV4	FDEV1	FDEV2	FDEV3	FDEV4
STRUC	-0.0	-0.1	0.0	0.0	-0.0	-0.3	0.0	0.1	0.0	0.0	0.0	-0.0	-0.0	-0.0	0.0	0.0
<i>t-statistic</i>	-1.8	-1.4	0.1	0.3	-1.4	-1.6	2.1	1.4	1.2	0.3	1.0	-3.8	-0.4	-0.7	0.2	0.5
OUTRE	0.3	0.8	0.0	-2.0	-0.0	-0.5	0.1	0.3	-0.4	-0.8	-0.1	0.8	-0.0	0.3	0.0	0.0
<i>t-statistic</i>	0.5	0.2	0.1	-0.5	-0.8	-1.1	1.6	2.6	-1.0	-0.3	-0.5	1.6	-0.2	2.2	0.0	0.1
EFFIC	0.0	0.1	-0.0	0.0	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0	0.0	0.0	0.0	-0.0	-0.0
<i>t-statistic</i>	1.0	1.1	-0.1	0.0	3.9	2.7	0.9	0.7	-1.0	-0.0	-1.2	2.7	1.2	1.6	-0.7	-0.1
MACRO	-0.1	-0.2	-0.1	-0.5	-0.0	-0.5	-0.1	-0.2	-0.1	-1.7	-0.1	0.1	-0.0	-1.3	-0.0	0.0
<i>t-statistic</i>	-0.5	-0.3	-2.1	-0.9	-0.6	-1.6	-3.9	-2.3	-0.8	-2.2	-0.7	0.4	-1.6	-2.6	-1.1	0.3
SOCIO	1.2	4.1	-0.1	-2.9	-0.0	-0.4	0.2	0.7	0.1	-0.1	0.1	-0.3	-0.1	0.3	-0.0	0.3
<i>t-statistic</i>	1.4	0.6	-0.3	-0.5	-0.3	-0.5	3.5	4.0	0.4	-0.2	1.0	-2.5	-0.6	1.1	-0.2	0.6
R-2	0.37	0.46	0.51	0.19	0.89	0.96	0.89	0.76	0.24	0.56	0.26	0.79	0.59	0.99	0.43	-0.61
Adjusted R-2	-0.13	0.03	0.12	-0.46	0.80	0.93	0.80	0.57	-0.36	0.20	-0.33	0.62	0.25	0.99	-0.03	-1.89
Log likelihood	-83.1	-104	-77.0	-102	-40.0	-69.7	-43.4	-54.2	-64.3	-83.2	-61.7	-66.5	-24.2	-35.6	-24.1	-40.4
Akaike info criterion	17.6	21.8	16.4	21.5	9.0	14.9	9.7	11.8	13.9	17.63	13.3	14.3	5.8	8.1	5.8	9.1
Schwarz criterion	17.8	21.9	16.6	21.6	9.1	15.1	9.8	12.0	14.0	17.8	13.5	14.5	6.0	8.3	6.0	9.2
D-W stat	1.5	3.0	1.3	1.3	2.7	2.4	2.7	3.5	2.3	2.23	1.9	1.3	1.5	1.9	1.5	1.4

Sizes of MFIs impact on financial development in the WAEMU (1993-2004)

	Indicator	Φ	$1/(1+\Phi)$	Impact	GR
Benin	FDEV1	3.53	-0.39	1.28	-0.51
	FDEV2	-2.10	0.32	28.1	9.07
	FDEV3	0.07	1.07	1.15	1.24
	FDEV4	-3.09	0.24	8.84	2.16
Burkina	FDEV1	-6.67	0.13	0.78	0.10
	FDEV2	-0.96	0.51	1.78	0.91
	FDEV3	-1.66	0.38	1.01	0.38
	FDEV4	-1.10	0.48	0.07	0.03
Cote d'Ivoire	FDEV1	-2.09	0.32	2.07	0.67
	FDEV2	0.40	1.68	0.05	0.08
	FDEV3	0.01	1.01	1.67	1.70
	FDEV4	0.37	1.58	0.01	0.02
Mali	FDEV1	-1.30	0.43	0.32	0.14
	FDEV2	-6.34	0.14	0.00	0.00
	FDEV3	-0.09	0.92	0.97	0.89
	FDEV4	-1.22	0.45	0.00	0.00
Niger	FDEV1	0.04	1.04	-2.98	0.05
	FDEV2	-4.18	0.19	-9.28	0.00
	FDEV3	-1.71	0.37	0.36	1.44
	FDEV4	-0.68	0.59	9.52	1360
Senegal	FDEV1	0.88	8.59	1.10	9.43
	FDEV2	-3.82	0.21	20.69	4.29
	FDEV3	-1.69	0.37	0.61	0.23
	FDEV4	-1.26	0.44	0.14	0.06
Togo	FDEV1	-2.01	0.33	1.12	0.37
	FDEV2	-1.63	0.38	7.88	2.99
	FDEV3	-1.70	0.37	0.90	0.33
	FDEV4	1.54	-1.85	1.70	-3.14
WAEMU	FDEV1	-1.21	0.45	1.32	0.59
	FDEV2	1.02	-55.1	2.24	-124
	FDEV3	-0.67	0.60	1.11	0.66
	FDEV4	-1.85	0.35	0.32	0.11

Appendix 3

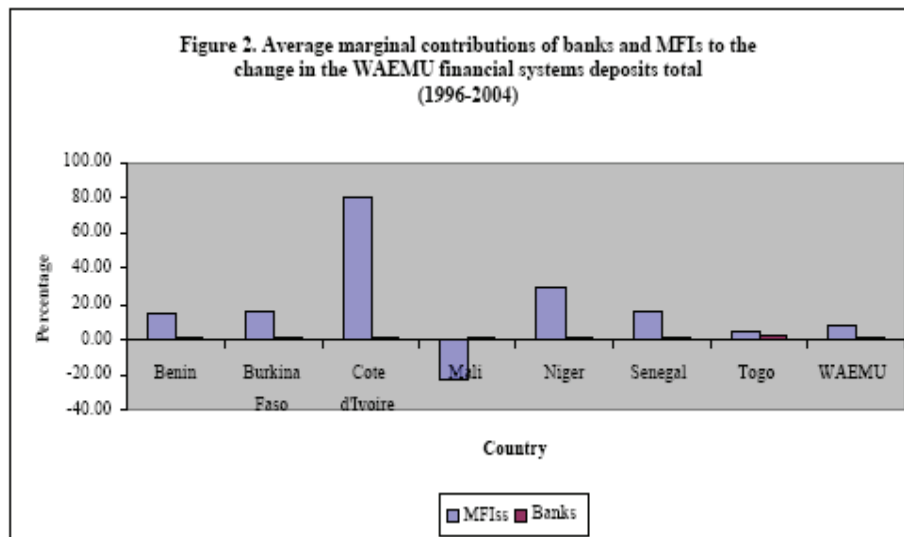
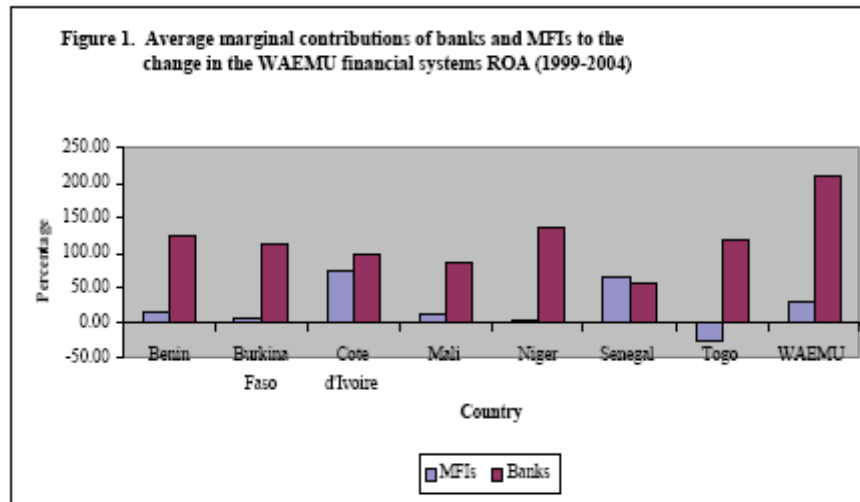
Table 1
Average rate of Growth of MFIs Performance indicators¹ (1995-2004)

Type	Economic measures		Outreach measures		Financial structure measures			Financial performance measures			
Indicators	Per capita deposits	Credit Over GDP	Penetration Rate	Number of Institutions	Deposits	Total resources	Credits	ROA ²	ROE	LPQ ³	Capital to assets
Benin	12.9	22.4	17.4	26.6	2.5	18.9	21.1	-81.2	-60.8	4.1	9
Burkina Faso	20.8	1810.7	109.7	11.3	11.2	21	155.6	151.5	436.1	-10	-9.9
RCI	32.8	3997.3	172.2	11.5	22.3	23.7	16.6	-78.5	-405	51.8	350.1
Mali	33.8	517.6	135.1	26.1	14.2	38.3	32	17.1	11.6	9.9	-1.1
Niger	21.8	1612.4	10.9	86.5	14.2	6.4	-3	-151.4	-176.1	-0.7	-5.8
Senegal	38.2	1493.4	142.2	51.8	20.5	35.8	24.1	17	48.4	1.9	-13.1
Togo	14.9	748	13	21.6	3.9	17.8	21	-7.8	-30.3	-23.4	-6.3
WAEMU	22.3	1795.7	24.4	20.6	10.6	20.7	33.5	-17.9	-174	-8.7	-2.8

1. Original data unit in CFA Francs

2. 1999-2004 data

3. Loan Portfolio quality



Growth of Banking Sector in the Sultanate of Oman: An Analysis

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Abstract: *Financial stability represents an essential precondition to sustainable growth in an economy. The banks in the sultanate can be divided into three main categories – local commercial banks, foreign commercial banks and specialized banks. The objective of the study is to assess the growth of banking sector in the Sultanate of Oman. The study covers the period from 2000-2009 using trend analysis. The banking sector of Oman has developed at par with International banks. Although the number of banks has not increased very much as some banks have also closed their operation and some new have started business. But it is found out that on the assets side all the components have shown remarkable increase like cash and deposits with CBO, due from banks abroad, extension of credit to the private sector from the commercial banks has almost doubled. The study will be useful for the researchers and the academicians as well as the policy makers. The policy makers can take the finding in consideration while deciding on future course of action, which will be useful in deciding the future financial and monetary measures. This paper highlights the growth pattern of Oman's banking industry.*

Keywords: Commercial bank, specialized banks, financial stability, sustainable growth

Introduction

Commercial banks are considered to be an important component in fulfilling the financial credit requirement of businesses. Banks main source of earning is from the differential rate in lending and accepting deposits. They also play a very important role in fulfilling the credit requirement for the non-corporate by providing loans for various needs like purchase of house, renovation, study loans, credit for starting new business, and lockers for valuable ornaments and documents, financial advice for investment of savings. Banks borrow most funds from households and non-financial businesses, and lend most funds to households and non-financial businesses. It is an institution for receiving, keeping, and lending money. Banks also enable customer payments via other payment methods such as telegraphic transfer, (Electronic Funds Transfer Point of Sale) EFTPOS, ATM and Credit cards.

From the foregoing review of literature it has been observed that in Oman a few studies have been undertaken to assess and evaluate the banking sector growth. Some of the previous studies made a comparative analysis of the banks in Oman and the banking industry of UAE. In the recent past Oman has emerged as one of the fast growing economy in the gulf. To support the high growth a vibrant banking industry is indispensable. An endeavour is made in the present study to evaluate the growth of banking industry in Oman.

Study covers period from 2000 to 2009, in order to examine the trends and pattern of growth of commercial banks in the sultanate of Oman. The study is design to cover the following objectives:

- (i) To examine the growth of commercial banks in terms of number and branches.
- (ii) To assess and evaluate the growth pattern of Assets of commercial banks
- (iii) To evaluate the growth in the components of liabilities of banks
- (iv) To study the efficiency of the banks in using their deposits
- (v) To appraise profitability of the banking industry during the period under review.

Omani banking industry is not new and it is smoothly functioning in the sultanate of Oman. However, globalisation opened new vistas for developing countries to augment their economies. The proposed study is therefore, directed towards examining the different aspects of growth of banking industry of Oman such as growth of commercial banks, branch expansion, credit to private and public companies, growth in assets and liabilities and profitability.

Banking Industry in Oman: Major Development

For sustained growth of any economy a sound banking system is pre-requisite. The banking system of Oman has evolved to face the emerging challenges arising from time to time. The banking sector is an important factor in maintaining financial equilibrium and economic stability. The Omani banking sector, which comprises the Central Bank of Oman (CBO) and various commercial and specialized banks operating in the Sultanate, is stable, highly efficient and able to respond to regional and international developments.

The establishment of the Central Bank of Oman in the beginning of 1974 was a natural outcome of the steady evolution of the monetary system in the Sultanate of Oman coupled with the prospects of the vast economic developments the country was about to witness. Until 1970, when H.M.Sultan Qaboos bin Said took over, there was no national authority responsible for the supervision of the incipient banking system. Initially the number of banks was small and the banking activities were limited. The two monetary authorities that preceded the establishment of the Central Bank of Oman, namely the Muscat Currency Authority in 1970 and the Oman Currency Board in 1972 were not vested with full banking status, but, they had well prepared ground for the emergence of the Central Bank of Oman. However, the major event heralding the eminent creation of the Central Bank of Oman was the launching of the Banking Law in 1974 (which was amended vide Royal Decree No. 114/2000) (Ministry of Information, Sultanate of Oman).

The steady expansion of the banking sector has resulted in subsequent rise in the number of commercial banks and branches opened in various parts of the Sultanate as a result of the liberalization policies adopted by the government. By the end of 2009, the number of branches opened by commercial banks in the whole country were 442, and the number of banks were 17, out of which 7 are Local banks while the rest 10 are foreign banks (in additions to 2 specialized banks, namely: Oman Housing Bank and Oman Development Bank) as against 55 branches in 1975. To render services to the branches of the Commercial banks, the Central Bank of Oman opened two branches, one in Salalah, in the South in 1978, and the other in Sohar, in the North, in 1988. CBO's services through the establishment of these branches cover a wide range of essential banking activities such as clearing house facilities, inter-bank transfers, issuance and redeeming of currency, selling commemorative Currency, and accepting old currency for new one. Six of the local banks are listed on the Muscat Securities Market (Central Bank of Oman 2009).

The continued strong economic performance, liberalization measures by the economy, diversification, major infrastructure developments, accelerated privatisation program, the in-flow of foreign direct investments (FDI), and favourable demographics with population growth and high a percentage of youth were responsible for banking industry's growth in Oman. (Oman Banking Sector, Proxy to Omani Economy, 2007) The major issues that came for review during the period of study are the readiness of the banks in Oman to adapt and operate efficiently in the ever-changing global business ambience. The commercial banks of Oman have successfully adopted the international standards for credit risk and market risk and some basic indicators for operational risk. All the banks in Oman have made a steady progress in adopting professional approach to fulfil disclosure norms. Concerted efforts are being put by the government and banks to protect interest of the customers and investors. Furthermore, decision was taken that disclosures would be part of the annual financial reports and that the Auditors would review the disclosures as an agreed upon procedures and banks have already complied with the requirement while submitting their 2007 financials (Central Bank of Oman, 2008).

The banks in Oman are divided in three main categories- Local Banks, Foreign Banks and specialized banks. The following table gives the details of these banks.

Table 1: Local Banks and Foreign Banks in Oman

Name of the Bank	Date of Establishment
Local Banks	
National Bank of Oman	1973
Oman Arab Bank	1973
Oman International Bank	1975
Bank Muscat	1981
Bank Dohfar	1990
Bank Sohar	2007
Al Ahli Bank	1997
Foreign Banks	
HSBC Bank Middle East	1948
Standard Chartered Bank	1968
Habib Bank Ltd.	1972
Bank Melli Iran	1974
National Bank of Abu Dhabi	1976
Bank Saderat Iran	1976
Bank of Baroda	1976
State Bank of India	2004
Bank of Beirut	2006
Qatar National Bank	2007
Specialized Banks	
Oman Housing Bank	1977
Oman Development Bank	1977
Alliance Housing Bank 1997	1997

Source: Compiled from the various issues of the Annual report, Central Bank of Oman.

Most of the banks are trying to drive maximum benefits from the ongoing international economic integration. Service sector in most of the developing countries is growing at a rapid pace and financial services growth is unparalleled. Therefore, commercial banks of Oman positively responded to the changes in global and national economy. To further enhance the dissemination of information on regulatory and supervisory mechanism of the CBO and other developments in

the market, a 'Report of the Banking Oversight Departments' was issued annually, covering the regulatory and supervisory framework of CBO, performance of banking system and initiatives of the central bank relating to the banking sector and development of banking system in Oman.

The other major initiative relating to banking industry in Oman are the enhancement of the entry level minimum capital requirement to R.O. 100 million for local commercial banks and to R.O. 20 million for foreign banks. Offsite supervision in case of Finance and Leasing companies (FLCs) and specialized banks was also strengthened under the guidance of Central Bank to adopt international best practices and codes as per the country specific challenges recommended by IMF/ World Bank under the Financial Sector Assessment Program (FSAP).

While the capital adequacy of banks in Oman generally remained at comfortable levels, to further strengthen the regulatory capital framework, the minimum capital ratio was enhanced recently from existing 10 percent to 12 percent, to be complied on or before December 2010. Further, in view of the inherent risk in non-resident lending, the ceilings on the non-resident exposures were lowered in April 2010 to 2.5 percent and 20 percent of the local net worth of the lending bank for individual exposure and aggregate level, respectively, from the previous limits of 5 percent and 30 percent of net worth. The gross non-performing loans (NPLs) of commercial banks recorded an increase of RO 159 million, from RO 293.9 million in December 2008 to RO 453 million in December 2009. Partly influenced by the impact of the global and regional financial turmoil, the increase in impairment was observed in both local and overseas exposures. The gross NPLs (net of reserve interest) accounted for 3.5 percent of gross loans (net of reserve interest) at the end of December 2009 compared to 2.1 percent at the end of the previous year. The loan loss coverage, taking into account general provisions as well remained comfortable, despite the fall from 127.3 percent in December 2008 to 104 percent in December 2009 (Central Bank of Oman 2009).

Literature Review

Fernandez and Sahawneh (2007) studied the growth of the banking sector in United Arab Emirates during the period 2002 and 2006. They found out that the banking sector in the UAE was growing at a high positive rate both in number of banks and volume of business. The numbers of banks operating in the UAE exhibits a dramatic growth of above 39 percent. The number of banks has increased from 457 in 2002 to 637 in 2006. They also found excellent growth observed in the financial position of banks. The aggregate balance sheet of the banks operating in the UAE grew by 159.26 percent during the period from 2002 to 2006, with the highest growth in 2005. Every component of the balance sheet has shown spectacular growth.

El-Kuwaiz (1995) and De Gregorio and Guidotti (1995) showed that financial measures of banking development are strongly correlated with economic growth in broad cross-section countries. Countries with efficient financial systems and growing banking sectors tend to grow rapidly. Hashmi M. Anaam (2007) conducted a study and concluded that the UAE banking sector is working under lot of protective measures despite this; the foreign banks are becoming increasingly active in the economy. The banking sector is gearing up to meet global challenges by conforming to international rules and regulations. The big banks are dominating the banking sector because they *are* financially sound. The banking sector is well managed by the central bank, which is good for the country's growth and globalisation efforts, undertaken by the government.

Zhicheng LIANG (2007) found that the quality of a country's legal institutions could exert important influences on the country's financial systems and economic outcomes. In this paper, they introduce a theoretical model to investigate the law-finance-growth nexus in a transition

context with less-developed legal institutions. The theoretical model suggests that, in transition economies with widespread presence of soft budget constraints, a weak legal system may lead to severe problems of banking credit misallocation and investment inefficiency. Moreover, by employing a panel dataset covering 29 Chinese provinces over the period of 1990-2001, they investigated the relationship between banking sector development and economic growth in China. Empirical results show that, without an effective and well-developed legal system, banking sector development only partially contributed to China's economic growth. Rao (2002) studied 35 domestic and foreign banks operating in United Arab Emirates. The paper examined the cost efficiency, scale and cost productivity growth rate. The study found that only small banks improved their scale economies while large banks maintained status quo. This highlighted that the management teams of small banks were capable of managing their portfolio efficiently.

King and Levine (1993) found out that there is strong link between progressive financial systems and economic growth based on the data of the 80 countries they studied. They used various variables to assess the financial system and growth. Tarawneh (2006) compared financial performance in the banking sector with some evidence from Omani commercial banks. The banks were divided in various categories on the using the financial ratios and simple regression to assess their efficiency based on various parameters. The study found that banks with higher capital, deposits, credits or total assets do not always have better profitability ratios. The study of Thabet A. Edris (1997) uses various tools to assess the relative importance of services of the banks for customer in the decision for banks selection. Further analysis revealed that Kuwaiti, non-Kuwaiti and joint business organizations have different perceptions of the services offered by the banks in Kuwait and nationalities are important determinant in case of bank selection.

Kraft, E. Galac, T., (2007) examined the experience of Croatia, which liberalized its banking regulations in the early 1990's. After the end of the wars surrounding the break-up of former Yugoslavia, Croatia experienced rapid growth in the number of banks, strong deposit growth and substantial increases in deposit interest rates in the period 1995-98. This buoyant period was punctuated by the failures of numerous medium-sized banks in 1998 and 1999. They found that high deposit interest rates helped fund the expansion of risk-loving banks, and had important negative external effects on healthy banks, thus making a strong contribution to the banking crisis of 1998-99. They provided a set of predictive models of bank failures. These models showed that deposit interest rates were one of the most significant variables predicting bank failures. High risk banks – the ones that eventually failed – often offered higher deposit interest rates than low risk banks. Scholtens Bert's (2000) paper analyses competition, growth, and performance in the banking industry. They analyse the relationship between market structure and the performance of the banking industry. Furthermore, they tested hypotheses on whether size matters for individual banks' profit performance. It was found out that bank profits are inversely related to the amount of bank assets and are positively associated with the amount of tier-one bank capital. Alexander, Helmut, Bucha (2007) did a study to assess the Merger scenario in the GCC after the Merger of Emirates Bank and the National Bank of Dubai in UAE. They also concluded that some of the countries in GCC are over banked and especially UAE, despite this there is no situation prevailing at present that a merger and acquisition wave will take place soon. The regional players should consolidate now so they can be ready for meeting the future challenges.

The study of Tser-Yieth Chen, Tsai-Lien Yeh (1998) used data from 34 banks in Taiwan to assess their efficiency. They found out that 19 banks are inefficient and they can improve their efficiency by better mobilization of resources and increasing bank investment avenues. It was also concluded that financial ratios are not enough to measure the performance of the banks.

Sapthis and Doumpos (2002) tried to find the effectiveness of the Greek banking system based on their asset size. They used multi criteria such as return and operation factors using data from 1990 to 1999 to show the differences in the bank's profitability and efficiency in the small and large banks in Greece. Mazhar M. Islam (2003) analysed the performance of the foreign and International banks in the GCC countries using the financial ratios. The study concluded that performance of the banks has improved over the years, banks are well capitalized and they have adapted to the technological developments. They are in line with the international requirement such as capital/asset ratio and fully comply with regulatory measures.

Chu-Mei Liu's (2001) attempt was made to ascertain the five private banks in Philippines based on their savings consciousness programme, marketing campaign programme, technological innovation and outreach programmes. The finding suggests that banks are implementing their schemes well according to the needs of the customers and promoting it using various measures. Oman Banking Sector Report (2007), Proxy to Omani Economy, They made a comparative study of the five major banks in Oman, namely Bank Muscat, National Bank of Oman, Oman International Bank, Bank Dhofar, Alliance Housing Bank. The study covered the market share of the banks, Profitability, liquidity, margins, Efficiency, Capital Adequacy, Credit Quality, Operating Performance, and also used some ratio to assess the valuation of the individual banks from the period 2003 to 2007. The study concluded that the Oman's banking industry has developed in general and these five banks had shown considerable improvement in their performance during the period.

Research Methodology

The objective of the study is to find out the growth of banking industry in Oman during the period 2000 to 2009. The study is based on the secondary data. The data were collected by various sources, like the Central Bank of Oman annual reports, Al-Markazi magazine also a CBO publication, the various commercial banks operating in the Sultanate both local and foreign banks, other government publications from various ministries and the press. The analysis of the statistical information is done with the help of appropriate statistical tools to assess the growth of banking sector in Oman in terms of growth in number of banks and changes in their assets and liabilities components leading to changes in their profitability. The tools such as mean, accounting ratios, growth rate etc. are being used to assess and analyse the growth of banking industry of Oman.

Analysis and Discussion

The establishment of the central bank of Oman in 1974 was an important watershed in the banking history of Oman. Since then there has been no looking back and the growth of banking sector has been given boost by policy changes from time to time.

In the following paragraphs an attempt is being made to assess the growth of banking in Oman, growth in terms of in number of banks and branches and favourable changes in the Assets and Liabilities of the commercial banks.

Growth in Number of Banks and Branches

The following table 2 gives an account of the growth in the number of banks, branches their authorized offices and operating offices in Oman during the period of study (2003-2009). The number of local banks has increased from 5 to 7 during the period of study. The number of authorized offices has shown a considerable increase from 312 in 2003 to 407 in 2009. The number of operating offices also rose from 304 in 2003 to 398 in 2009.

Table 2: Authorized and operating Offices of Commercial Banks in Oman (2003 to 2007)

Year	2003	2004	2005	2006	2007	2008	2009
Local banks	5	5	5	5	7	7	7
Authorised Offices	312	310	319	325	352	390	407
Operating offices	304	307	310	315	335	365	398
Foreign Banks	9	9	9	9	10	10	10
Authorised Offices	23	23	23	27	29	31	35
Operating Offices	23	23	23	25	27	30	31

Source: Compiled from the various issues of the Annual report, Central Bank of Oman

Table also gives an account of the number of foreign banks operating in the sultanate the number of these banks has not shown any significant change in the period, only one more banks has been added to the list. In case of foreign banks some banks have closed their operation while some have entered Oman. Some major banks who left are Citibank N.A., and Banque Banorabe, while State bank of India, Bank of Beirut and Qatar national bank have started operation in 2004, 2006 and 2007 respectively. At the end of 2009 in total there were 17 banks operating out of which 7 local and 10 foreign banks.

Table 3: Assets of Commercial banks of Oman (2000 - 2009) (In Million RO)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Cash & Deposits with CBO	132.2	138.3	166.7	133.7	167.8	140.3	248.9	666.7	1430.4	779.4
Due from Banks abroad	275.8	202.4	322.3	350.5	545.6	741.3	1209.6	1350.2	1604.6	1393.5
Credit to private sector	2885.1	3072.3	3054.6	3089.9	3274.1	3658.6	4397.0	6101.2	8759.4	9185.0
Credit to Public Enterprises	16.3	28.1	46.0	69.0	87.3	111.8	195.8	364.8	469.1	577.6
Credit to govt.	79.3	140.6	169.7	149.4	144.3	126.0	110.2	39.5	28.2	71.8
Treasury Bills	40.0	160.0	69	138.0	149.0	6.0	0.0	0.0	0.0	0.0
Government Bonds	120.9	126.2	118.4	130.4	146.5	122.1	118.4	112.0	133.3	144.2
Other Domestic Securities	33.3	32.7	24.1	25.1	30.9	44.4	51.6	87.1	96.8	95.5
Foreign Securities	78.8	74.9	85.9	83.4	121.7	154.8	302.5	92.6	347.6	140.8
Others	83.4	28.6	119.0	167.1	55.0	270.2	250.6	1109.8	419.2	1434.4
Fixed Assets	39.3	46.8	36.9	36.6	35.4	37.4	36.5	73.8	99.2	110.5
Other Assets	179.2	154.0	150.1	117.5	131.1	217.0	330.9	338.0	390.6	266.2
Total	3963.6	4204.9	4362.7	4490.6	4888.7	5629.9	7251.9	10335.7	13778.4	14198.9

Source: Compiled from the various issues of the Annual report, Central Bank of Oman

Table 3 gives and account of the Assets of the commercial banks in the sultanate during the period 2000 to 2009. Different components of assets side of Balance sheet are given in terms of Omani Rials.

The Cash and Deposits with the CBO

The position of Cash & deposits with CBO of commercial banks in Oman shows a wavering trend. It shows a rise of 647.2 million RO from 2000 to 2009 a change of 490 percent. During other years it shows a positive change of 25.5 percent in 2003 to 2004, while in 2005 it shows a

decrease of 16.4 percent over the previous year. However, in 2006 and 2007 a growth of 77.04 percent and 167.9 percent is recorded respectively. In the year 2009 cash position of commercial banks with the central bank has shown a negative change over the previous year. The average annual growth rate is 51.2 percent.

Due from Banks Abroad

This component shows a considerable amount of rise from year 2000 to 2009, it was enhanced from 275.8 million RO to 1393.5 million RO a change of 405 percent. The year wise growth show a consistent rising trend except in the year 2001 where it stood at 202.4 million RO as compared to its previous year 275.8 million RO. The average annual growth stands at 41 percent.

Credit to Private Sector

The credit to the private sector from the commercial banks has almost double during the period of the study, from 2885.1 million RO in 2000 to 9185 million RO in 2009 which in percentage is 218.36 percent, which indicates the role of banks in extending credit to this sector and helping in development of the business. It is also indicative from the statistical information provided in table 5 that commercial banks operating in Oman are playing a pivotal role in augmenting the economic development of Oman. The trend shows that there is a steady rise in the credit extended to this sector in the early period and the changes from 2006 to 2008 are appreciable.

Credit to Public Enterprises

The credit extended by the commercial banks to public sector companies shows a remarkable change of 3443.56 percent from 2000 to 2009. The major shift has taken place in the extension of credit in 2006, and 2007 showing an increase of 75.1 and 86.3 percent on account of policy initiatives by the Central Bank. Although comparing with the amount of credit extended to private sector there exist huge gap, so more ways and means should be worked out to minimize this gap. It is evident from the table 5 & 6 that private sector is getting more credit facilities from the commercial banks than the public sector. This paradigm shift is attributed to the on going process of globalisation. Gradually private sector all around the world is getting more attention from domestic government and financial institutions.

Credit to Government

This component of the asset side shows a declining trend in the period under review. It stood at 79.3 million RO in 2000 and declined to 28.2 million RO in 2008. On the yearly basis also it maintain a declining trend, as it is (-) 3.4 percent in 2004 and (-) 12.7 percent in 2005 and then a sharp fall of (-) 64.2 in 2007 when compared from the preceding years, which shows that the financial requirements of the government have been controlled in a positive manner reducing their dependence on the borrowing from commercial banks. In order to see significance of variances, one-way ANOVA is used. The summary of ANOVA statistics with regard commercial banks' credits to different groups is given in annexure 1. The critical value of F for $v_1=2$ and $v_2= 27$ at 5% level of significance is 3.354 and the calculated value of F is 35.64, which is more than the critical value and hence, the difference in the mean values of variables is significant at 5% level of significance.

It is also indicative from the statistical summary that differences between means of different components of the assets of commercial banks are significant at 5% level of significance. Allocation of sector-wise credit by the commercial banks during the period under reference is provided in table 4. It is discernible from the statistical information that highest percent of credit is given in the form of personal loans, followed by import trade, manufacturing, construction activities financial institutions, services and wholesale and retail trade during the whole period under review. More than 30 percent of the total credit sanctioned by the banks went to personal

loan category. On an average 10 percent of the total credit is being given to import trade. Agricultural and allied activities and exports trade accounted for the minimum allocation of the credit. The variations in the sector wise allocation of credit under review are noticeable. Some of the sectors of the economy got more credit than the others.

**Table 4: Distribution of Commercial Bank Credit by Economic Sectors
(Rial Omani Million)**

Sectors	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Import Trade	381.4	324.4	314.6	327.9	386.4	394.6	416.4	505.4	655.3	558.7
Export Trade	9.6	5.6	5.2	4.6	5.3	9.8	14.0	26.9	24.5	8.7
Wholesale & Retail Trade	168.1	176.0	136.2	135.7	146.2	193.5	202.4	238.4	423.9	582.1
Mining and Quarrying	73.8	80.7	80.1	75.9	99.7	109.0	188.1	396.7	459.7	552.1
Construction	204.7	231.2	225.1	213.5	222.8	256.0	274.5	376.2	809.7	896.1
Manufacturing	242.2	326.3	287.1	280.3	270.8	309.0	366.4	623.3	858.1	766.6
Electricity, gas and water	14.7	52.8	64.6	94.9	115.6	160.5	172.4	176.0	202.3	275.3
Transport and Communication	42.4	70.3	54.2	43.7	45.4	44.9	65.5	55.5	158.0	161.2
Financial Institutions	240.9	197.0	154.7	163.8	164.3	201.9	234.0	277.3	446.0	407.5
Services	169.5	232.2	233.4	233.0	255.8	237.0	313.1	370.6	707.6	802.9
Personal Loans	977.8	1054.3	1169.2	1235.9	1244.4	1482.7	1824.6	2599.7	3569.0	4009.8
Agriculture and allied activities	29.6	18.8	25.2	27.6	31.4	40.2	38.6	40.6	42.4	42.1
Government	79.3	140.6	176.7	149.4	144.3	126.0	110.2	39.5	28.2	71.8
Non-Resident lending	109.3	103.6	66.0	57.1	50.2	43.1	49.6	169.6	188.4	188.7
All Others	237.4	227.2	278.0	265.0	253.1	288.2	433.2	609.7	683.6	510.8
Total Credit	2980.7	3241.0	3270.3	3308.3	3505.7	3896.4	4703.0	6505.4	9256.7	9834.4

Treasury Bills

Investment of the commercial banks in treasury bills is showing wavering trend and it has fell sharply from 160 million RO in 2001 to 6 million RO in 2005, showing that these investment are no more lucrative for banks and they have diverted their investment to other more profitable avenues.

Government Bonds

The investment in government bonds by the commercial banks also shows a declining trend except it increased slightly in the year 2004. During the period of study it shows fluctuating trends in the investment of government bonds by the commercial banks. Although the fluctuations are not significant as compared to treasury bills, but highlights that the commercial banks are diverting their investment to other areas.

Other Domestic Securities

The investment by commercial banks in the domestic securities show an increasing trend from 33.3 million RO in 2000 to 95.5 million in 2009 an increase of 186.79 percent. Changes in annual percentage terms are 23.1 percent from 2003 to 2004, 43.6 percent from 2004 to 2005, then 16.2 percent from 2005 to 2006 and the big jump of 68.7 percent from 2006 to 2007. This clearly shows that the banks are diverting their funds to these securities from Treasury bill and bonds.

Foreign Securities

The Investment by the commercial banks in foreign securities shows a fluctuating trend. The increase from 2003 to 2004 is 45.9 percent and it rose by 27.21 percent in the following year, but

the change from 2005 to 2006 was 95.4 percent, which is very high, because of the opportunities provided by the capital market of the emerging economies. There is decline of 69.3 percent from 2006 to 2007 investment in the securities in the foreign market, which is due to the precautions under taken due to volatility in the market. However, in 2008 it has recorded an impressive recovery, but it failed to continue the same trend in the following year.

Fixed Assets

The Fixed assets of the commercial banks have registered a very high growth during the period under review; it increased from 39.3 million RO in 2000 it increased to 110.5 million RO in 2009. Fixed assets showed a fall in the years 2004 and 2006 but it increase by more than hundred percent from 2006 to 2007 on account of the various initiatives of the commercial banks.

Other Assets

This component of the assets side showed a positive growth pattern with high changes in the years 2005 and 2006 with rise of 65.5 percent and 52.5 percent respectively. The changes in the growth are minimal in the years 2004 and 2007 as compared to the previous years. However the overall trend is positive which shows that the banks have utilized their revenues well.

Table -5
Liabilities of Commercial Banks in Oman (2000 - 2009) (In Million R.O.)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Govt. Deposits	306.0	285.5	276.4	299.9	441.4	543.5	676.5	907.2	1696.6	1833.1
Deposits of Public Enterprises	191.5	215.7	229.2	166.4	136.8	137.9	144.4	275.2	527.8	724.2
Deposits of Private Sector	2009.9	2181.9	2271.6	2386.3	2500.1	3080.6	3864.0	5309.0	6354.8	6533.4
Due to Banks Abroad	534.7	517.8	486.8	398.9	313.5	194.7	539.6	1110.5	1920.3	1767.9
Core Capital & Reserves	433.3	425.8	432.8	548.7	587.3	781.7	900.0	1458.2	1801.0	1906.5
Supplementary Capital	84.5	108.9	97.9	110.1	100.3	119.2	122.8	282.7	333.7	444.9
Specific Provisions & Reserved Interest	157.9	232.5	297.4	371.2	357.0	278.1	255.9	216.7	226.1	281.8
Other Liabilities	245.8	345.7	270.6	209.1	452.3	494.7	748.6	776.2	918.1	707.1
Total	3963.6	4204.9	4362.7	4490.6	4888.7	5629.9	7251.9	10335.7	13778.4	14198.9

Source: Compiled from various issues of the Central Bank of Oman annual report

Table 5 presents an analysis of the component wise liabilities of the combined balance sheets of the commercial banks in Oman during the period from 2000 to 2009.

Government Deposits

The change in the government deposits under the period of review has increased by 499.05 percent from 2000 to 2009. It can be observed from the table that there is an increasing trend over all the years with 47.2 percent in 2004, 23.1 percent in 2005, 24.5 percent in 2006 and 33.4 percent in 2007. Government Deposits have registered a compound annual growth rate of 19.60 percent during the period under observation.

Deposits of Public Enterprises

The commercial banks have been able to channelize deposits from the public enterprises in a big way showing a rise of 278.17 percent from the year 2000 to 2009, if compared on the annual basis there is huge amount of fluctuation shown in the inflow of deposits. It declined by 17.8 percent in 2004, rose by a marginal 0.8 percent in 2005, rise by 4.7 percent in 2006, but the year 2007 showed a huge of 90.6 percent on account of policy initiatives. Deposits of public enterprises have shown a compound annual growth of 14.23 percent.

Deposits of Private Sector

Deposits of the private sector increased by 225.06 percent from 2000 to 2009. There is a consistent growth pattern shown in the private sector deposits with minimal 4.8 percent 2004, it increased further to 23.2 percent in 2005 and to 25.4 percent in 2006 and 37.4 percent in the years 2007. It can be seen that the rise in the deposits of private sector is nearly 100 percent more than the deposits attracted from the public enterprises. CAGR of 12.51 percent is attained by the Deposits of Private sector. To verify significance of variances, one-way ANOVA is used. The summary of ANOVA statistics with regard deposits of Government, deposits of private enterprises and deposits of public enterprise is presented in annexure 2. The critical value of F for $v_1=2$ and $v_2=27$ at 5% level of significance is 3.354 and the calculated value of F is 28.46. Calculated value of F is more than the critical value and hence, the difference in the mean values of variables is significant at 5% level of significance.

Furthermore, annexure gives an account of the statistical summary regarding differences between means of different components of the liabilities of commercial banks. The calculated value of F for $v_1=7$ and $v_2=72$ at 5% level of significance is 23.89 which is more than the critical value (2.14) of F indicating that the differences are significant at 5% level of significance.

Due to banks Abroad

The due to the Banks abroad registered CAGR of 12.70 percent during the period under review. The trends shown by this components is wavering it has declined when compared to their previous years in 2004 by 21.4 percent and by -37.9 percent in 2005, while increase drastically in 2006 and 2007 by 177.1 percent and 105.8 percent respectively. This is attributed to the investment opportunities of the commercial banks; they have borrowed heavily when there are more lending opportunities and also the less rates interest charged by the foreign banks.

Core Capital & Reserves

The core capital & reserves of the commercial banks has recorded a steep hike in the period under review for the study. The core capital & reserves stood at 1906.5 million RO in 2009, which was 433.3 million RO in 2000. During the period it has shown an increasing trend and increased by 7 percent in 2004 and rose by 33 percent in 2005, but in 2006 it increased by only 15 percent. However, this changed drastically in 2007 when it increased by 62 percent as compared to 2006.

Supplementary Capital

The analysis of supplementary capital tells that there is abnormal trend in its growth. It shows a rising trend increasing from 84.5 million R.O. in year 2000 to 444.9 million R.O. in 2009. However, some downfall is recorded in the year 2002 and 2004 when compared from the previous year.

Specific Provisions & Reserved Interest

This component of the liabilities of the commercial banks consistently registered a decline in the period under review. It showed a decline of 41.6 percent from 2003 to 2007. There has been a continuous decline in all the years with 3.8 percent in 2004, fell further by 22.1 percent in 2005, by 15.3 percent in 2007.

Other Liabilities

The liability of commercial banks has also increased from 245.8 million RO in 2000 to 707.1 million RO in 2009. The average annual growth of other liabilities stood at 45.1 percent. The annual increase was very high in 2004 and stood at 116.3 percent while in other years the growth was not very high.

Ratio between total loans to total deposits for the study period is presented in table 6. It is evident from the table that loans to deposits ratio has gradually decreased over the period of time under observation. It is 1.19 times in 2000 and reached at the lowest ebb of 1.00 times approximately in 2006. In the last two years of the study period the ratio has shown a marginal improvement. Average Annual Growth Rate of deposits is better than that of loans. It can be concluded that commercial banks are efficiently utilizing the deposits mobilized by them.

Table 6
Ratio between Total Loans and Total Deposits of Commercial Banks in Oman
(in Million RO)

Years	Total Loans Of Commercial Banks	Total Deposits Of Commercial Banks	Ratio(Loan to total Deposits)
2000	2980.7	2507.4	1.19
2001	3241	2683.1	1.21
2002	3270.3	2777.2	1.18
2003	3308.3	2852.6	1.16
2004	3505.7	3078.3	1.14
2005	3896.4	3762	1.04
2006	4703	4684.9	1.00
2007	6505.5	6491.4	1.00
2008	9256.7	8579.2	1.08
2009	9834.4	9090.7	1.08
Total	50502	46506.8	
AAGR	13.547	14.46	

Profitability of Commercial Banks

The commercial banks profitability is an important indicator of how well they are and their growth pattern. The Oman economy in the last few years has been in a buoyant mood and it has been also been capitalized by the commercial banks. It has been observe that the banks during the period of study have shifted their focus to generate revenue other than the traditional sources like loans and advances to investment income; fees based income and income from foreign exchanges. It means commercial banks are now focusing on the retail banking.

Table 7
Profitability of the Commercial Banks (In Million RO)
(2000- 2009)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
1. Interest Income	3448	3265	2909	2650	2639	2970	3859	5172	6144	6855
2. (Interest Expense)	(1891)	(1647)	(1025)	(812)	(738)	(936)	(1440)	(2253)	(2525)	(2710)
3. Net Interest	1557	1618	1884	1838	1901	2034	2419	2919	3620	4145
4. Foreign Exchange	85	72	79	83	88	97	119	190	257	251
5. Fee and Commission	133	149	172	177	193	220	250	362	503	524
6. Other Income	226	256	322	389	655	845	935	1283	1666	1704
7. Gross Income (3+4+5+6)	2001	2095	2457	2487	2837	3196	3723	4754	6046	6624
8. Operating Expenses	936	967	1112	1136	1179	1206	1376	1838	2263	2486
a)Administrative Costs	830	864	1005	1029	1069	1156	1281	1719	2120	2303
b)Depreciation	104	94	104	105	94	85	89	105	142	181
c)Others	02	05	03	02	16	-35	06	14	01	02
9. Gross Profits (7-8)	1065	1128	1345	1351	1658	1990	2347	2916	3783	4138

10. Provision for doubtful debts*	419	1085	644	1236	739	545	467	426	1049	1865
11. Profits after provision (9-10)	646	93	701	11.5	91.9	1445	1880	2490	2734	2273
12. Provision for Taxes	127	44	82	1.9	12.5	21.3	25.1	35.3	393	365
13. Net Profit after Provision & Taxes (11-12)	519	49	619	96	794	1232	1629	2137	2341	1908

Source: Compiled from various issues of Annual report Oman Central Bank

Commercial banks profits after provisions but before taxes shows an incredible rise in the period of study from just 64.6 million RO in 2000 has risen to 227.3 million RO in 2009 which in percentage term is 250 percent. The net profit after taxes and provisions are showing a remarkable change from just 9.6 million RO in 2003 to 213.7 million RO in 2007 describes the extent of growth the banking sector has witnessed. Even if it's analysed on the annual basis it has been very good during this period.

The income from interest has increased from 344.8 million RO in 2000 to 685.5 million RO in 2009, which is showing an increase of 98.7 percent. The expense component has increased from just 189.1 million RO to 271.0 million RO in 2009. The net income from interest shows a rise of 166 percent from 2000 to 2009 although the annual rise is normal with 3.4 percent, 7 percent, 18.9 percent, and 20.7 percent in the years 2004, 2005, 2006 and 2007 respectively. This rise shows that there has been significant growth in the amount of credit by the commercial banks and high interest rate spreads.

The income from the other sources foreign exchange also increased by 195 percent from 2000 to 2009 from 8.5 million RO to 25.1 million RO. The increase has been consistent in the period but showed major change in 2001, 2006 and 2007 with 22.7 percent and 59.8 respectively. Fees and commission has also contributed to the rise in the profitability of the commercial banks and as a major source of earnings. This has changed from 13.3 million RO in 2000 to 52.4 million RO in 2009. The gross income of the commercial banks in sultanate also jumped up by 91.1 percent from 200.1 million RO in 2000 to 662.4 million RO in 2009. The growth has been consistent in the period. Operating expenses has gone up for the commercial banks from 93.6 million RO in 2000 to 248.6 million RO in 2009. The gross profit also recorded a growth of 288.5 percent in the period under review. Which clearly indicates that the performance of the banks have improved on account of better management of its assets and liabilities.

Table 8: Comparative Statement of Gross Income and Operating Expenses of Commercial Banks in Oman (2000-2009)

Years	Gross Income	Growth (%)	Operating expenses	Growth (%)
2000	200.1	-	93.6	-
2001	209.5	4.7	96.7	3.3
2002	245.7	17.2	111.2	14.9
2003	248.7	1.22	113.6	2.2
2004	283.7	14.07	117.9	3.8
2005	319.6	12.65	120.6	2.3
2006	372.3	16.49	137.6	14.1
2007	475.4	27.69	183.8	33.6
2008	604.6	27.2	226.3	23.1
2009	662.4	9.6	248.6	9.6

Same as Table 7

From the above table it is significant to note that the commercial banks operating in Oman are able to cut their operating expenses throughout the period under review. It is discernible from the

table that the gross income is increasing at faster rate than the operating expenses. Only in 2007 growth rate of operating expenses is higher than the Gross income. In the last two year under study operating expenses have dramatically shown a sharp increase. This fact must be immediately recognized by the top management so that necessary actions can be taken to control operating expenses. However, banks have done a good job to put the operating expenses within the manageable limits.

Table 9
Return on Capital on Employed* of Commercial Banks in Oman

Years	Capital (in Million RO)	Net profit after Provisions & Taxes	Rate of Return
2000	477.8	51.9	10.86
2001	534.7	4.9	0.92
2002	530.7	61.9	11.66
2003	658.8	9.6	1.46
2004	687.3	79.4	11.55
2005	900.9	123.2	13.68
2006	1022.8	162.9	15.93
2007	1740.9	213.7	12.28
2008	2134.7	234.1	10.97
2009	2351.4	190.8	8.11

Source: Same as Table 7, *=(Core Capital + Supplementary Capital)

Table 9 presents an account of rate of return on capital of Commercial Banks in Oman. Overall profitability of the banks is showing a continuous improvement throughout the period under reference. The return is indicating that the commercial banks are reaping the benefits of government's initiatives. Except in three years of the study period rate of return on capital employed is more than 10 percent. Profits after provisions and taxes in 2001 are at the lowest point.

Rate of return on total assets of commercial banks operating in Oman is given in table. It is discernible from the facts presented in the table that rate of return on the total assets is not very satisfactory. Net profit after provisions and taxes in terms of percent of total assets is compared and it is important to note that only in three years during the time period of study, rate of return on total assets is more than 2 percent. In 2001 the rate of return is substantially very low. It is 0.12 percent in 2001 and 0.21 percent in 2003. It is further evident that net profits after provisions and taxes have registered wide fluctuations over the years.

Table 10: Rate of Return on Total Assets of Commercial Banks of Oman

Years	Total Assets (in Million RO)	Net Profit after Provision and Taxes	Rate of Return on Total Assets(number of times)
2000	3963.6	51.9	1.31
2001	4204.9	4.9	0.12
2002	4362.7	61.9	1.42
2003	4490.6	9.6	0.21
2004	4888.7	79.4	1.62
2005	5629.9	123.2	2.19
2006	7251.9	162.9	2.25
2007	10335.7	213.7	2.07
2008	13778.4	234.1	1.70
2009	14198.9	190.8	1.34
Total	73105.3	1132.4	1.55

Source: Table 3 and Table 7

Conclusion

It can be concluded from the study that the banking sector of Oman has shown a significant growth during this period. The banking sector of Oman has developed to be at par with International banks by adapting to the International rules and regulation. Although the number of banks has not increased very much as some of the banks have also closed their operation and some new have started business. However, it is visible that on the assets side all the components have shown remarkable rise from 2000 to 2009. Like Cash and deposits with CBO have shows a rise of 132.2 million RO from 2000 to 2009, a change of 490 percent. The Due from banks abroad also shows a considerable amount of rise from year 2000 to 2009, it rose from 275.8 million RO to 1393.5 million RO a change of 405 percent. The extension of credit to the private sector from the commercial banks has almost doubled from 2885.1 million RO in 2000 to 9185.0 million RO in 2009 which in percentage is 219.0 percent, which indicates the role of banks in extending credit to this sector and helping in development of the business and helping in economic development. The major highlight is the growth of credit to the Public companies from 16.3 million R.O. to 577.6 million R.O. from 2000 to 2009 because of the various initiatives taken by the government and central bank, but a lot is needed to o fill the gap existing in the credit extended to these enterprises. The investment in others is an emerging component showing wide fluctuations giving a rise from a mere 83.4 million RO in 2000 to 1434.4 million RO in 2009. Fixed assets also increase by 181.2 percent during the period.

The profitability details shows that the banking sector has done well in the period and availed the opportunities provided by the economic growth of the country. The income from interest has increase by 98.5 percent. Earning from foreign exchange has shown change of 195 percent from 8.5 million RO in 2000 to 25.1 million in 2009. The income from fees and commission also increase considerably. The other income component has showed exponential growth registering a rise of 653 percent from 2000 to 2009. The provision for doubtful debts had gone down from 41.9 million RO to 186.5 million RO highlighting the facts that banks are managing their assets in an efficient manner, keeping in view the amount of loans disbursed by them.

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Appendices

Annexure I

ANOVA						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	140891970.2	2	70445985	35.63532	2.66E-08	3.354130829
Within Groups	53375178.63	27	1976858			
Total	194267148.9	29				

ANOVA						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	1.92E+08	11	17445992	31.40512	1.01E-28	1.878388
Within Groups	59995538	108	555514.2			
Total	2.52E+08	119				

ANOVA						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	12051369	9	1339041	0.614111	0.782816	1.966054
Within Groups	239850086	110	2180455			
Total	251901455	119				

Annexure 2

ANOVA						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	67102982	2	33551491	28.45745	2.25E-07	3.354131
Within Groups	31833145	27	1179005			
Total	98936127	29				

ANOVA						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	90569797	7	12938542	23.89651	1.85E-16	2.139656
Within Groups	38983725	72	541440.6			
Total	1.3E+08	79				

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