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THE EFFECTS OF CONGRESSIONAL ELECTIONS ON FUTURE EQUITY MARKET RETURNS

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ABSTRACT

As the primary entity responsible for new legislation, Congress is capable of enacting legislation that may affect future market returns. To examine potential effects, the percentage of the House of Representatives and Senate controlled by a political party is examined. Additionally, the effect on returns in a change in the percentage of seats gained or lost in Congressional elections is analyzed. To test both theories, a modified “partisan view” model is adopted. Results point to the fact that equity markets perform better in situations in which power is distributed between political parties.

JEL: G 12, G13, G14, H00

INTRODUCTION

For many years, researchers have pondered a fundamental political question: “Do equity markets perform better during Republican or Democratic administrations?” Today, an answer to this question is as important as ever. Currently, American households are participating in the stock market at all-time highs. Household participation increased from just one or two percent at the beginning of the twentieth century to 31.6% in 1989. By 1998, household participation had expanded to 48.8% (Nofsinger 2004).

Most previous studies exploring the relationship between politics and equity returns have focused on the office of the President. A number of studies have found evidence of an electoral cycle in stock market returns. In general, these studies suggest stocks prices are, in part, affected by the four-year presidential term. Most of these studies also contend that Democratic administrations experience larger annual stock market returns. However, these findings have been challenged by other academics.

Interestingly, little attention has been focused on another vital component of the political process, Congress. This fact is puzzling because Congress plays an instrumental and necessary role in the creation of laws governing the economy. Thus, there is a possibility that Congress has a significant and measured impact on equity market returns. This study explores the possible relationship between equity market returns and the political membership of Congress.

To consider this possible relationship, two different approaches are proposed. First, the percentage of seats controlled by each political party in both the House of Representatives and Senate is examined. Also, the net gain or loss in the percentage of Congressional seats in each election is investigated. It is expected Congress will play a role in determining future equity market returns.

PREVIOUS RESEARCH, LIMITATIONS, AND THE SCOPE OF THIS STUDY

The Electoral Cycle

In analyzing the relationship between the political party in control of the White House and equity market returns, several studies find evidence of an electoral cycle. Using data from 1832 – 1979, stock market

returns are higher during the last two years of a presidential administration when compared with the first two years (Huang 1985). These findings are validated in other studies, and the phenomenon is found in both Republican and Democratic administrations (Hensel and Ziemba 1995; Stovall 1992; and Santa-Clara and Valkanov 2003). As a possible explanation of the electoral cycle, Havrilesky (1998) hypothesizes that a presidential administration can be separated into five distinct phases:

Promises, Promises – Presidential campaigns, especially over the last three decades, have made promises to redistribute income. It is important to note the burden of promised redistribution is not realized at the time the promises are made.

The Honeymoon – At the beginning of the administration's term, the redistributive campaign agenda is being initiated, and the associated costs of those programs are still unknown to the public.

Sectoral Dissonance – As redistributive programs take effect, their costs are finally realized by affected groups and sectors of the economy. If these parties hold sufficient political clout, then the administration will modify its objectives.

Monetary Ease – The impacts of redistributive programs create pressure for monetary policy changes. There is usually a push for lower interest rates, a depreciation of the dollar in the international market, or a stimulation of output. This point usually marks a departure from sound monetary policy.

The No-Win Tradeoff – In the last days of an administration, monetary expansion policy enacted during the *Monetary Ease* section leads to higher inflation. Looking at presidential administrations from 1966 to 1988, inflation rates consistently increased during the last year of the presidential term.

This analysis of an administration's metamorphosis shows pressure for an expansionary monetary policy during the later years. This leads to an expansion in the economy and higher inflation rates (Havrilesky 1998).

Riley and Lukesetich (1980) and Hobbs and Riley (1984) find stock markets respond more favorably to Republican victories than Democratic victories, in the short-term. This is consistent with the traditional idea that Republicans, in general, favor big business (Hensel and Ziemba 1995). However, many studies indicate the opposite is true when considering long-term stock market returns. These studies show Democratic administrations have higher stock returns than Republican administrations when the entire four-year presidential cycle is considered (Hensel and Ziemba 1995; Johnson, Chittenden, and Jensen 1999; Santa-Clara and Valkanov 2003; and Swensen and Patel 2004). Furthermore, Santa-Clara and Valkanov (2003) find the excess return of an equal-weighted portfolio is sixteen percent higher during Democratic presidencies from 1929 to 1998.

The theory of an electoral cycle has been further explored by comparing large-cap and small-cap stock returns. Large-cap stock returns are found to be statically indistinguishable between Republican and Democratic administrations. However, a statistically significant small-cap effect is observed during Democratic presidencies (Hensel and Ziemba 1995). This trend is also noted in other studies (Santa-Clara and Valkanov 2003; Johnson, Chittenden, and Jensen 1999).

The small-cap advantage during Democratic administrations is seen even when January is not considered. This is important because of the widely publicized phenomenon known as the January effect (Hensel and Ziemba 1995). The January effect implies small-cap stocks tend to show positive returns during the

month of January. It has been suggested that investors, desiring the ability to write-off “losing” stocks as capital losses, sell stocks in December that provided negative returns during the year. Then, new stocks are purchased in January with the available tax-loss selling capital, increasing stock prices of low volume and low liquidity stocks. Many studies provide empirical evidence to support the claim that the January effect is a statistical reality in small-cap stocks, although recently its effect is diminishing, and when present, appears to be occurring earlier.

Various studies indicate Democratic presidents produce, on average, slightly higher inflation rates. However, the results are not statically significant (Hensel and Ziemba 1995, and Johnson, Chittenden, and Jensen 1999). Furthermore, there is an indication inflation rates are higher for Republican administrations during the first two years of the presidential term while inflation rates are higher for Democratic administrations during the last two years (Swensen and Patel 2004).

In terms of fixed securities, statistical differences exist between Republican and Democratic administrations. Republican fixed income returns exceed Democratic fixed income returns (Hensel and Ziemba 1995, and Johnson, Chittenden, and Jensen 1999). Moreover, the average real rate of return for an individual investing in fixed income securities is negative during Democratic presidencies (Johnson, Chittenden, and Jensen 1999).

When comparing rates of returns, the subject of risk premiums must be discussed. If volatility risk is higher during Democratic administrations, then investors obviously require higher rates of return to compensate for the added risk. However, differences in volatility between the two parties are statistically insignificant. Furthermore, between 1963 and 1998, volatility during Republican administrations was slightly higher. As a result, there is evidence that excess returns experienced during Democratic presidencies is partly unexpected by investors (Santa-Clara and Valkanov 2003). Similar results are observed when examining data from the United Kingdom. In comparing left-wing and right-wing administrations, left-wing administrations experienced lower market volatility (Leblang and Mukherjee 2004).

There is also evidence of the United States electoral cycle in international stock market returns. Foerster and Schmitz (1997) find the US electoral cycle is statistically and economically significant in most of the eighteen countries they studied. Furthermore, a relationship is uncovered related to foreign exchange rates. The United States dollar tends to depreciate more in the second year of a presidential term, based on data from 1957 to 1996.

Presidential Elections and Stock Returns

Several publications also suggest a connection between the result of United States presidential elections and the performance of the stock market during the election year. From 1900 to 2000, in elections when a political party retained control of the White House, the Dow Jones Industrial Average (DJIA) increased by an average of 15.8% during the preceding year. However, in elections when a political party lost control of the presidency, the Dow Jones Industrial Average decreased by an average 1.4% during the previous year (Hirsch and Hirsch 2004).

A similar relationship is noted in elections for the House of Representatives. In studying House elections from 1916 to 1996, economic conditions have had an effect. However, this effect is not felt equally by all members. In comparison to junior members, the reelection of senior members is more heavily linked to the state of the economy (Grier and McGarrity 2002).

Similarly, Nofsinger (2004) also finds some predictability in stock market performance before presidential elections. In elections from 1900 to 2000, when the incumbent party was victorious, the DJIA experienced a 36.6% mean return for the three years preceding the election. When the incumbent party was defeated, the DJIA had a mean return of 17.3% in the three years preceding the election. The social mood theory is one possible explanation of the relationship between stock performance preceding an election and the result of the election (Nofsinger 2004).

The social mood theory suggests equity markets reflect the overall mood of society. During elections, the voters may attribute their mood to the current administration. As a result, when the mood is good (the stock market is performing well), incumbents are reelected. However, when the mood is poor (the stock market is performing poorly), incumbents are voted out of office (Nofsinger 2004).

Furthermore, Nofsinger (2004) casts doubts on the notion Democratic administrations promote higher equity market returns. First, as seen above, excess returns during Democratic presidencies are sometimes statistically insignificant. Second, the returns are not related to economic variables. Third, if the entire stock market sample is taken (1828 – 2004), then the results are reversed. Stock returns are 2.1% larger during Republican administrations if the entire market sample is taken (Nofsinger 2004). This claim is also noted by Leblang and Mukherjee (2004).

Previous Modeling of Political Variables

Several studies, including Santa-Clara and Valkanov (2003), use a statistical model based on a “political variable.” This model is motivated by the “partisan view” of the political cycle. The partisan view theory, discussed by Alesina (1987) and Hibbs (1977), contends that each party has different political motivations and policies. Hibbs (1977) asserts Democratic administrations have historically been more likely to pursue expansionary policies leading to lower unemployment, extra growth, and higher inflation. Conversely, Republicans have guarded inflation more closely, and, in general, have been more cautious in stimulating aggregate demand and employment. In conclusion, fundamental differences exist in policies involving economic issues such as corporate income, personal income, consumption taxes, government spending, insurance coverage, and social benefits between Republicans and Democrats (Santa-Clara and Valkanov 2003).

Santa-Clara and Valkanov (2003) measure the correlation between returns and political variables with the following regression:

$$r_{t+1} = \alpha + \beta DD_t + \vec{\gamma}' \vec{X}_t + u_{t+1} \quad (1)$$

where DD_t is the dummy variables indicating a Democratic President, with a 1 for a Democratic president and 0 otherwise. The vector \vec{X}_t represents the control variables, and the disturbance (error) term is represented by u_{t+1} .

In the model, four control variables are incorporated: Annualized log of the dividend to price ratio (DP_t) Term spread between the yield to maturity of the ten-year Treasury note and the three-month Treasury bill (TSP_t), Default spread between the yields of BAA and AAA-rated bonds (DSP_t), and the relative interest rate computed as the deviation of the three-month Treasury bill from its one-year moving average (RR_t)

The use of the dividend to price ratio, term spreads, default spreads, and the relative interest rate as predictors of market return is incorporated in several studies, including Campbell and Shiller (1998) and Santa-Clara and Valkanov (2003). Furthermore, Campbell and Shiller (1998) find an improvement in the predictability of stock returns when the dividend to price ratio is annualized and stated in logarithmic

form. In the study, the annualized dividend to price ratio at the beginning of year t is described by the following equation:

$$\delta_t = \ln\left(\frac{D_{t-1}}{P_t}\right) = \ln(D_{t-1}) - \ln(P_t) \quad (2)$$

where, P_t is the real price of the index at the beginning of year t , while D_{t-1} is the real dividend paid on the index during year $t-1$.

Another interesting result found by Michelson (1993) and Lamb et al. (1997) is that stock market returns tend to be higher when Congress is in recess. Lamb et al. attribute the result to greater uncertainty in terms of the regulatory environment when Congress is in session than when in recess.

Goals of this Study

Most of the previous research considering equity market returns and political party affiliation is limited in scope. By only considering the White House, these previous studies overlook a very vital component in the creation of economic policy in the United States: Congress. Swensen and Patel (2004) provide evidence that stock market returns are affected by the party in control of Congress. Though not statistically significant, their research indicates a Republican Congress tends to provide greater large-cap stock returns. As in other studies, they find Democratic presidents produce higher returns. They find the largest historical returns occur when there is a Democratic President and a Republican controlled Congress. The study also indicated that further research is necessary to uncover a deeper relationship between Congress and stock market returns. One limitation of their study is that they only look at the mean return under various conditions. In this study, a regression analysis is conducted which allows for the use of control variables for factors, other than Congressional control, that would have an effect on returns.

Michelson (1993) finds that a more Democratic Congress leads to higher stock market returns. However, that study is limited by a data set that only consists of the years 1967 to 1991. Our study will examine a much longer series of data, which is particularly important given the infrequency with which the membership of Congress changes. Also, we include the four control variables listed above, which Michelson (1993) does not.

The goal of this study is to consider the role of Congress on equity market returns. Previous research is expanded by assessing the significance in the proportion of Republican and Democratic members in the House of Representative and Senate. Furthermore, previous studies have neglected the gains or losses of Congressional seats experienced in elections, including interim elections. From the social mood theory, a party gaining seats in Congress is perceived as doing a "good" job. With popular support behind them, a party that gains seats in Congress may be able to influence policies, which could then affect equity market returns. The role of Congress in explaining future equity market returns is expected to be significant.

DATA AND MODELS

Time Frame of this Study

Some of the controversy surrounding electoral cycle research centers on the time frame of the study. As noted in Section II, different observations occur based on this factor. In this study, the decision is made to focus on the post-World War II era.

There are several reasons for this choice. First, questions exist concerning the beginning of “modern” political parties in the United States. Although Republicans and Democrats existed well before World War II, there is some controversy over whether the economic policies of both parties have changed over time. Furthermore, The Great Depression and World War II could skew the data. These events represent times of “abnormal” equity market activity. Since then, equity markets have been much more regulated with the addition of the Securities and Exchange Acts of 1933 and 1934.

This study spans from the beginning of Dwight Eisenhower's presidency in January of 1953 to the end of Bill Clinton's second term in 2000. Since the presidential term of Harry Truman started during World War II, his presidency is excluded. Over the selected time period, nine different administrations were in the White House: five Republican and four Democrat. In terms of years in office, Republicans held power for twenty-eight of the forty-eight years considered in this study.

From 1953 to 2000, both houses of Congress favored Democrats. Over this time period, there were twenty-four sessions of Congress (83rd to 106th). In these forty-eight years, Democrats held a majority in the Senate for thirty-four years. In the House of Representatives, Democrats held a majority for forty years.

We determine the change in Congressional and Presidential allotment to take place at the beginning of the year. The new Congress is usually seated on or around January 3rd, so the new Congress is in power for almost the entire year. The new President is inaugurated on or around January 20th, which means it does not line up with the dates we use quite as well. Both the Congressional and Presidential elections take place the preceding November. Therefore, there might be an announcement effect immediately following the election in November. If investors have perfect foresight about the implications of political change, that might mean that all of the effect of political changes show up in November of the preceding year. However, we suspect that the impact of the announcement is different from the actual actions over the term and that investors will not be able to perfectly predict the impacts of elections.

First Congressional Model

Initially, a modified version of the “partisan” view regression model, based on the work of Santa-Clara and Valkanov (2003), is considered. In this model, dummy variables denoting the political party in control of the House of Representatives and Senate are added. However, since Democrats have a majority in both the House of Representatives and Senate for a large portion of the study, this regression was not explored.

Instead, it is hypothesized that the amount of control enjoyed by a political party in Congress can affect future equity market returns. By examining the level of control, the performance of equity markets during moments of large and small Congressional majorities can be observed. A political party with a large majority should be able to pass more of its agendas into laws. Therefore, one of the questions this study attempts to answer is, “Does an increased amount of Congressional control by a political party affect future equity market returns?”

In order to investigate the possible relation between a political party's level of control in Congress and equity market returns, the following regression is considered:

$$r_{t+1} = \alpha + \beta_1 DD_t + \beta_2 PH_t + \beta_3 PS_t + \bar{\gamma} \bar{X}_t + u_{t+1} \quad (3)$$

In this model, DD_t is again the presidential variable. PH_t represents the percentage control of the House of Representatives by the Democrats, while PS_t represents the percentage control of the Senate by the

Democrats. The vector X_t represents the control variables. Initially, as in the model developed by Santa-Clara and Valkanov (2003), the following control variables are used in this study:

- Dividend to price ratio (DP_t)
- Term spread (TSP_t)
- Default spread (DSP_t)
- Relative interest rate (RR_t)

The first three control variables, DP_t , TSP_t , and DSP_t , utilize the same data as Santa-Clara and Valkanov (2003) (See Section II). However, in this study, the Bank Prime Rate is selected as a measure of RR_t . It is assumed this is a more direct measure of the relative interest rate. Below, Table 1 summarizes the control variables used in this study.

Table 1: Control Variables

| Control Variable | Description |
|------------------|---|
| DP_t | The annualized log of the dividend to price ratio of the S&P Composite Index |
| TSP_t | The difference between the yields of a three-month Treasury bill and ten-year Treasury bond |
| DSP_t | The difference between the yields of BAA and AAA-rated bonds |
| RR_t | The Bank Prime Rate |

Second Congressional Model

Next, the relationship between the gain (loss) in Congressional seats by a political party and equity market returns is considered. As explained in Section II, the social mood theory states that the public's mood regarding certain factors, including the economy and stock market returns, dictates their voting patterns. Typically, incumbents are voted back into office when the public's mood is “good,” but incumbents are voted out of office when the public's mood is “poor.” As a second area of research, this study will also attempt to quantify the effect of a gain or loss in Congressional seats.

In order to explore the relationship between the number of seats gained or lost by a political party and equity market returns, equation (3) is modified:

$$r_{t+1} = \alpha + \beta_1 DD_t + \beta_2 M_t + \beta_3 N_t + \bar{\gamma}' \bar{X}_t + u_{t+1} \tag{4}$$

For this regression, M_t represents the net percentage gain or loss by the Democratic Party from the preceding Senate election. Moreover, N_t represents the percentage gain or loss by the Democratic Party from the preceding House of Representatives election. The same methodology and control variables are used in this model as are used in the previous section.

Data

For this study, future stock returns are measured using the S&P Composite Index. This index is widely respected as an accurate measure of the total US equity market and is used in numerous studies. To explore the future returns of selected sectors, four subgroup indices of the New York Stock Exchange (NYSE) Composite Index are evaluated. The four selected sectors include the Industrial, Transportation, Utility, and Financial sectors.

The data in this study comes from multiple sources. S&P Composite Index data, including prices and dividends, is obtained from the homepage of Dr. Robert Shiller of Yale University (Shiller, 2007). Furthermore, data for the Industrial, Transportation, Utility, and Financial subgroup indices of the NYSE

Composite Index are provided by the official site of the NYSE (NYSE Euronext, 2007). However, it should be noted these subgroup indices were established in 1966, and thus the time scope of the analysis of these sectors is limited to the years 1966 to 2000. Historical yields of the three-month T-bill, ten-year T-bond, the corporate BAA and AAA-rated bonds, and the Bank Prime Rate are found online at the Federal Reserve Bank of St. Louis (St. Louis Fed, 2007). Moreover, all Congressional data comes from *Vital Statistics on Congress (2001-2002)*. Finally, all presidential data is taken from Dave's Leip's "Atlas of U.S. Presidential Elections" (Leip, 2007).

All data in this study are monthly data. Excluding the historical prices of the S&P Composite Index and the NYSE Composite Index subgroup indices, all other data, when relevant, is reported as its value at the end of the month. The price of monthly future returns is calculated as a simple average of daily closing prices. To indicate when the change in administration or Congress takes place, we mark it from the beginning of the year. The new Congress is sworn in at the beginning of the year, so this represents the best date for a change for our study.

RESULTS

Initial Observations

Before the proposed regression models can be evaluated, the data must be assessed. First, correlations between the variables must be calculated. Two of the control variables, DSP_t and RR_t , have a correlation of 0.7036. Moreover, the Congressional variables have notable correlations. PH_t and PS_t have a correlation of 0.7051, and M_t and N_t have a correlation of 0.6907. The correlations between all the other variables in this study are significantly lower, less than 0.4. Next, the data must be tested for stationarity. Below, Table 2 lists the initial results of the test for each variable.

Table 2: Results of the Phillips-Perron Test for Each Variable at the 5% and the 10% Significance Levels

| Variable | Reject H_0 at 5% Significance | Reject H_0 at 10% Significance |
|-----------|---------------------------------|----------------------------------|
| r_{t+1} | Yes | Yes |
| DP_t | No | No |
| TSP_t | Yes | Yes |
| DSP_t | Yes | Yes |
| RR_t | No | No |
| DD_t | No | Yes |
| PS_t | No | Yes |
| PH_t | No | Yes |
| M_t | Yes | Yes |
| N_t | Yes | Yes |
| E_t | Yes | Yes |

This table shows the results of the Phillips-Perron Stationarity Test. Yes indicates that the variables are stationary and No indicates that the variables are not stationary.

From Table 2 above, it can be seen only two variables, DP_t and RR_t , fail to reject the null hypothesis of the Phillips-Perron test at either the 5% or the 10% significance level. Thus, these two variables must be modified into a stationary form. As a result, two new variables, ΔDP_t and ΔRR_t , are introduced:

$$\Delta DP_t = DP_t - DP_{t-1} \tag{5}$$

$$\Delta RR_t = RR_t - RR_{t-1} \tag{6}$$

The two new variables are then subjected to the Phillips-Perron test in order to assure ΔDP_t and ΔRR_t are stationary. For both, the null hypothesis is rejected at the 5% significance level. Since the new variables are stationary, they will replace DP_t and RR_t as control variables in the regression models.

Results of the First Congressional Model

As stated in Section III, this model attempts to find a relationship between future stock market returns and the proportion of the House of Representatives and Senate controlled by the Democratic Party. The presidential variable, from the model developed by Santa-Clara and Valkanov (2003), is also included because it is expected to explain a portion of future stock returns. The model, defined by equation (3) in Section III, is restated below:

$$r_{t+1} = \alpha + \beta_1 \pi_t + \beta_2 PH_t + \beta_3 PS_t + \bar{\gamma} \bar{X}_t + u_{t+1} \tag{7}$$

The results of the regression are first assessed using the Breusch-Pagan and Durbin-Watson tests. The Durbin-Watson test returned a value of 1.6313. Since this value is “close” to 2.0, the null hypothesis of no serial correlation is not rejected. As a result, it can be assumed that the error (disturbance) terms are uncorrelated for the entire time series. On the other hand, the null hypothesis of the Breusch-Pagan test is rejected at both the 5% and 10% significance levels. The test results indicate that the errors are not homoskedastic, and thus, the HC *t*-values and *p*-values developed by White (1980) are reported. Table 3 provided below lists the results of the First Congressional Model linear regression. Table 3 shows that ΔDP_t has a relatively large *p*-value compared to the other parameters. As a result, the model is estimated without this parameter. The results of this regression are listed in Table 4 below.

Table 3: Results of the First Congressional Model

| Parameter | Estimate | HC t-value | HC Standard Error | HC p-value |
|------------------|-----------|------------|-------------------|------------|
| Intercept | 2.233 | 1.613 | 1.384 | 0.1067 |
| ΔDP_t | -3.978 | -0.303 | 13.141 | 0.7621 |
| TSP_t | 0.380** | 2.537 | 0.150 | 0.0112 |
| DSP_t | 1.316*** | 2.875 | 0.458 | 0.0040 |
| ΔRR_t | -0.827*** | -2.932 | 0.282 | 0.0034 |
| DD_t | 0.690** | 2.229 | 0.309 | 0.0258 |
| PS_t | 4.135 | 1.119 | 3.695 | 0.2631 |
| PH_t | -9.986** | -2.363 | 4.226 | 0.0181 |

*This table shows the results of the first congressional model. Statistical significance are represented by *at the 10% level, ** at the 5% level and *** at the 1% level. $R^2 = 0.062$ Adjusted $R^2 = 0.051$, F -statistic=5.363*

Table 4: Results of the First Congressional Model Excluding ΔDP_t

| Parameter | Estimate | HC t-value | HC Standard Error | HC p-value |
|------------------|-----------|------------|-------------------|------------|
| Intercept | 2.382* | 1.824 | 1.306 | 0.0682 |
| TSP_t | 0.387** | 2.505 | 0.154 | 0.0122 |
| DSP_t | 1.276*** | 2.770 | 0.461 | 0.0056 |
| ΔRR_t | -0.814*** | -2.793 | 0.291 | 0.0052 |
| DD_t | 0.694** | 2.237 | 0.310 | 0.0253 |
| PS_t | 3.828 | 1.054 | 3.632 | 0.2920 |
| PH_t | -9.885** | -2.343 | 4.219 | 0.0191 |

*This table shows the results of the first congressional model excluding ΔDP_t . Statistical significance are represented by *at the 10% level, ** at the 5% level and *** at the 1% level. $R^2 = 0.062$, Adjusted $R^2 = 0.052$, F -statistic=6.247*

Table 4 provides some interesting information. First, it can be seen that ΔDP_t has a minimal contribution to the model. The R^2 measures for the regression model with and without this parameter are approximately equal. As expected, the presidential variable suggests higher returns for Democratic administrations. The coefficient is 0.694, and it has significance at the 5% level. This translates into an 8.33% increase in annual return when controlling for term spread, default spread, and change in relative interest rate. This advantage also exists in the actual returns. During the time frame of this study, Democratic presidencies returned 10.11% annually, while Republican presidencies returned 8.03%, based on the S&P Composite Index.

Interestingly, PS_t and PH_t indicate opposite relationships. PH_t suggests a negative correlation between the proportion of the House of Representatives under Democratic control and future returns. PS_t indicates that there is a positive, though insignificant, correlation between future returns and the proportion of the Senate controlled by the Democrats. However, the significance of PH_t is much higher than PS_t . PH_t has a p -value of 0.01913, while PS_t has a p -value of 0.29201. When controlling for term spreads, default spreads, and the change in relative interest rates, each one percent gain of control in the House of Representatives by the Democratic Party results in a 0.0989% monthly decline in returns. This represents a 1.19% annualized decline. There is an indication that equity markets respond much better to Democratic presidencies than to a Democratically-controlled Congress.

Next, this model is evaluated for the four subgroup indices of the NYSE Composite Index. As mentioned in a previous section, since these indices were created in 1966, the time scope for this part of the study is limited to between 1966 and 2000. Tables 5, 6, 7, and 8 are listed below and report the results for all four NYSE subgroup indices: the Industrial, Transportation, Utility, and Financial subgroups, respectively.

Table 5: Results of the First Congressional Model for the Industrial Subgroup

| Parameter | Estimate | HC t -value | HC Standard Error | HC p -value |
|---------------|-----------|---------------|-------------------|---------------|
| Intercept | -0.700 | -0.395 | 1.773 | 0.6929 |
| TSP_t | 0.371** | 2.088 | 0.178 | 0.0368 |
| DSP_t | 2.227*** | 3.935 | 0.566 | 0.0001 |
| ΔRR_t | -1.113*** | -3.524 | 0.316 | 0.0004 |
| DD_t | 1.439*** | 3.462 | 0.416 | 0.0005 |
| PS_t | 4.739 | 1.018 | 4.657 | 0.3089 |
| PH_t | -7.931 | -1.468 | 5.404 | 0.1422 |

This table shows the results of the first congressional model for the Industrial Group. Statistical significance are represented by *at the 10% level, ** at the 5% level and *** at the 1% level. $R^2 = 0.0997$, Adjusted $R^2 = 0.087$, F -statistic=7.604

Table 6: Results of the First Congressional Model for the Transportation Subgroup

| Parameter | Estimate | HC t -value | HC Standard Error | HC p -value |
|---------------|-----------|---------------|-------------------|---------------|
| Intercept | -3.851 | -1.560 | 2.468 | 0.1186 |
| TSP_t | 0.347 | 1.496 | 0.232 | 0.1347 |
| DSP_t | 2.668*** | 3.675 | 0.726 | 0.0002 |
| ΔRR_t | -1.564*** | -3.618 | 0.432 | 0.0003 |
| DD_t | 1.883*** | 3.270 | 0.576 | 0.0011 |
| PS_t | 3.934 | 0.592 | 6.646 | 0.5539 |
| PH_t | -2.970 | -0.388 | 7.647 | 0.6978 |

This table shows the results of the first congressional model for the transportation subgroup. Statistical significance are represented by *at the 10% level, ** at the 5% level and *** at the 1% level. $R^2 = 0.0843$ Adjusted $R^2 = 0.071$, F -statistic=6.322

Table 7: Results of the First Congressional Model for the Utility Subgroup

| Parameter | Estimate | HC t -value | HC Standard Error | HC p -value |
|---------------|----------|---------------|-------------------|---------------|
| Intercept | 1.221 | 0.720 | 1.696 | 0.4714 |
| TSP_t | 0.645** | 2.292 | 0.281 | 0.0219 |
| DSP_t | 1.692*** | 3.261 | 0.519 | 0.0011 |
| ΔRR_t | 0.229 | 0.816 | 0.280 | 0.4145 |
| DD_t | 1.228** | 2.063 | 0.595 | 0.0391 |
| PS_t | 3.215 | 0.666 | 4.825 | 0.5052 |
| PH_t | -9.586* | -1.958 | 4.897 | 0.0503 |

This table shows the results of the first congressional model for the utility subgroup. Statistical significance are represented by *at the 10% level, ** at the 5% level and *** at the 1% level. $R^2 = 0.0443$, Adjusted $R^2 = 0.030$, F -statistic=3.183

Table 8: Results of the First Congressional Model for the Financial Subgroup

| Parameter | Estimate | HC <i>t</i> -value | HC Standard Error | HC <i>p</i> -value |
|------------------------|----------|--------------------|-------------------|--------------------|
| Intercept | 0.737 | 0.319 | 2.308 | 0.7496 |
| <i>TSP_t</i> | 0.518** | 2.455 | 0.211 | 0.0141 |
| <i>DSP_t</i> | 2.989*** | 3.902 | 0.766 | 0.0001 |
| ΔRR_t | -0.496 | -1.193 | 0.416 | 0.2331 |
| <i>DD_t</i> | 1.715*** | 3.165 | 0.542 | 0.0016 |
| <i>PS_t</i> | 9.166 | 1.538 | 5.959 | 0.1240 |
| <i>PH_t</i> | 16.493** | -2.425 | 6.801 | 0.0153 |

This table shows the results of the first congressional model for the financial subgroup. Statistical significance are represented by *at the 10% level, ** at the 5% level and *** at the 1% level. $R^2 = 0.073$, Adjusted $R^2 = 0.059$, F -statistic=5.391

PH_t has a negative correlation with future returns. PS_t has a positive correlation with future returns for all four subgroups. Moreover, PH_t has a lower associated p -value than PS_t for three of the four subgroup indices. PH_t is significant at the 5% level for the Utility and Financial subgroup indices. However, PS_t is not significant at even the 10% level for any of the four subgroups. The presidential variable, DD_t , is positively correlated with future returns for all four sectors. Also, in each case, this variable is significant at the 5% level. In fact, DD_t is significant at the 1% level for three of the four subgroup indices. As seen in the results from the S&P Composite Index, the percentage of Democrats in the House of Representatives tends to be more statistically significant than the percentage of Democrats in the Senate.

Results of the Second Congressional Model

The Second Congressional Model attempts to find a connection between the percentage of seats gained or lost by the Democratic Party in the preceding election. The presidential variable is again included. The model, defined by equation (4) in Section III, is restated below:

$$r_{t+1} = \alpha + \beta_1 \pi_t + \beta_2 M_t + \beta_2 N_t + \vec{\gamma} \vec{X}_t + u_{t+1} \tag{8}$$

Due to its lack of significance, ΔDP_t is omitted as a control variable. As in the previous section, the results of the regression are assessed using the Breusch-Pagan and Durbin-Watson tests. The Durbin-Watson test returns a value of 1.6202, allowing us to assume that there is no autocorrelation. However, since the Breusch-Pagan test is again rejected at both the 5% and 10% significance levels, HC t -values and p -values are reported. Table 9 lists these results:

Table 9: Results of the Second Congressional Model

| Parameter | Estimate | HC <i>t</i> -value | HC Standard Error | HC <i>p</i> -value |
|------------------------|-----------|--------------------|-------------------|--------------------|
| Intercept | -0.753 | -1.523 | 0.495 | 0.1278 |
| <i>TSP_t</i> | 0.282** | 1.996 | 0.142 | 0.0459 |
| <i>DSP_t</i> | 0.889** | 2.215 | 0.401 | 0.0267 |
| ΔRR_t | -0.957*** | -3.288 | 0.291 | 0.0010 |
| <i>DD_t</i> | 0.727** | 2.223 | 0.327 | 0.0262 |
| M_t | 0.933 | 0.241 | 3.871 | 0.8095 |
| N_t | -0.796 | -0.235 | 3.383 | 0.8139 |

This table shows the results of the second congressional model. Statistical significance are represented by *at the 10% level, ** at the 5% level and *** at the 1% level. $R^2 = 0.0449$, Adjusted $R^2 = 0.035$, F -statistic=4.450

From the Table 9, both M_t , the percentage of seats gained or lost by the Democrats in the Senate, and N_t , the percentage of seats gained or lost by the Democrats in the House of Representatives, are found to be statistically insignificant. Earlier in this section, it is reported M_t and N_t have relatively high correlation. Because of this, it is possible the effects of the two parameters are disrupting each other in the model. Thus, the regression is evaluated for two separate cases. The first case omits M_t , and the second case omits N_t . However, the two cases do not provide any new results.

Based on the results, there seems to be little or no relation between the number of seats gained or lost by a political party in either the Senate or the House of Representatives and future equity market return. Even when M_t and N_t are individually analyzed, the two parameters are statistically insignificant. In terms of market influence, it seems the proportion of members in Congress is more important.

DISCUSSION AND CONCLUSIONS

Summary of Findings

The study had two main goals. First, the relationship between a political party's control of Congress and future equity market returns was explored. Second, the percentage change in Congressional seats in the last election is compared against future returns. A "partisan view" regression model, adopted from Santa-Clara and Valkanov (2003), serves as the reference model in this study.

From the modeling, it is found that PH_t is negatively correlated with future equity market returns. This variable is statically significant at the 5% level. Furthermore, as seen in other studies, there is a positive correlation between equity market returns and Democratic presidents. However, unlike several other studies, the results are significant at the 5% level.

These results may point to the fact that equity markets perform better in situations in which power is distributed between political parties. As stated in Section II, Swensen and Patel (2004) find the highest historical returns in time periods where there is a Democratic President and a Republican controlled Congress. Furthermore, this could be a verification of Hibbs' (1977) claims that Democrats and Republicans have policies inherently different from one another. While Democratic presidents promote expansionary policies, the Republican Congress modifies these policies to ensure the growth of the economy is controlled, because of concerns about inflation. In turn, this could lead to conditions optimally suited for future US equity markets returns. Conversely, when Republicans control both the Office of President and Congress, expansion may be too slow; moreover, when Democrats are in control of the Office of President and Congress, the economy may expand too quickly leading to inflation. Since the distribution of power provides more viewpoints in the creation of policies, it is logical to suppose that policies promoting higher future returns are created when multiple opinions are expressed.

However, although their opinions on policy may be similar, it seems not all party members follow and promote the exact same economic policies. It is interesting to note that Democratic presidencies are positively correlated with future equity market returns, while larger proportions of Democrats in the House of Representatives and the Senate are negatively correlated to future returns. It could be that politicians who are elected President may have different opinions on policies in comparison to their counterparts in Congress. For example, Republican Presidents might be more moderate than Republican members of Congress. Also, compared to the President, members of the Senate and the House of Representatives have a smaller and more defined set of constituents, with the House being much more defined. Since members of Congress desire to be reelected, they must fulfill the wishes of their voters. Instead of looking at all US companies equally, a Senator may focus more of his or her efforts on promoting monetary policies favoring businesses residing in his or her state.

In terms of future selected sector returns, the results are similar. PH_t is again negatively correlated to future returns for all four subgroup indices. For the Utility and Financial subgroup indices, the results are significant at the 5% level. Conversely, PS_t is positively correlated to future returns, but it is not statistically significant for all of the four subgroups. Democratic presidents are positively correlated with all four sectors. In three of the four subgroups, the statistical significance of the findings is at the 1% level. For the Utility sector, the statistical significance of the results is at the 5% level.

From these results, it is interesting to note the relationship between the Utility and Financial subgroup indices and PH_t . PH_t is negatively correlated to future returns in the Utility subgroup, while it is positively correlated with future returns in the Financial subgroup. For every one percent gain in Democrats in the House of Representatives, there is a 1.15% decrease in annual Utility subgroup returns and a 1.98% increase in annual Financial subgroup returns. It is important to note these two subgroups are both affected by interest rates, such that both are negatively affected by increasing interest rates.

As mentioned in Section II, Hibbs (1977) suggests that the expansionary policies of Democrats lead to higher interest rates. However, other studies, including Santa-Clara and Valkanov (2003), contend Democratic and Republican presidents have approximately the same effect on interest rates. Furthermore, this reinforces the idea proposed above that members of political parties who are elected President have differing opinions on policies relative to other members of their party.

Under the social mood theory, it is hypothesized a large gain or loss in Congressional power can be associated with the general mood of the population. Thus, a political party gaining a significant number of Congressional seats in an election could gain political clout because it can claim it carries the “will of the people.” Under these conditions, this political party may find it easier to pass its own policies. Since the results of this portion of the study are indecisive, it is difficult to draw any conclusions from the data.

As a consequence, these results do not appear to validate this study's extension to the social mood theory. Gaining (losing) seats in Congress may reflect on the mood of the people and increase (decrease) political clout, but it could be that parties have been unable to take full advantage of these situations. Also, as stated in Section I by Nofsinger (2004), until recently, household participation in the stock market has been limited. Thus, it may be inaccurate to apply the social mood theory to previous time periods since most households were not active investors.

Future Research

Based on the findings from this study, there are several avenues of possible future research. First, it may be interesting to note the actual state-by-state breakdown of the members of Congress. For example, Republicans from the South may have a different effect on future stock returns in comparison to Republicans in the East. Although it is very common to lump the members of a political party into one group, members typically have different views towards a given policy. It could be that party members from the same geographic area have similar economic policies because these members serve the same kinds of constituents. Second, it might be informative to study the members of certain committees in the House of Representatives and the Senate. Since most bills start at the committee level, the members of committees responsible for establishing economic policies could be very important. Third, the seniority of members of Congress might reveal valuable information. As members of Congress gain experience, they may become more influential at establishing economic policies, possibly leading to noticeable changes in equity market returns. Fourth, it could be advantageous to include major tax bills in future studies. Tax law may also have a significant impact on future equity market returns. A fifth area for future research would be to examine whether a change in majority control has an impact on stock market returns, which would require going back further into the past, waiting for more observations into the future or finding some way to combine the performance of multiple countries' stock markets. In particular, examining the effect of the House, Senate and Presidency moving in one direction, while the others are moving in the opposite direction might provide more evidence for our conclusion that the markets like divided government.

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CAPITAL CONTROLS: IMPACT ON FOREIGN DIRECT INVESTMENT AND PORTFOLIO INVESTMENT IN MALAYSIA 1991-2004

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ABSTRACT

This paper examine the effects of three types of capital controls policies in Malaysia: (i) the existence of fixed exchange rates (indirect capital controls), (ii) controls on capital account and (iii) the stringency of requirements for the repatriation (direct capital controls) on FDI and PI flows as the dependent variable. The study examined the significant impact of the controls in influencing the investment atmosphere in Malaysia. The analysis were done over two period, where the period of 1991-1997 [7 years] is considered as a period where Malaysia imposed floating exchange rate system (liberalization of capital controls), and the second period 1998-2004 [7 years] as an age where the Malaysian government started imposing the fixed exchange rate regime. Overall, the result shows that the effect of capital controls on FDI flows was not significant as there were trade-off between the setback and the benefits of imposing capital controls. Meanwhile, it was also found that the reason why capital controls have more effect on PI than FDI was largely due to different nature of both investments.

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INTRODUCTION

East Asia's financial crisis began with the speculative attack on the Thai baht in May 1997. Despite attempts by the Bank of Thailand, the Thais were forced to float Thai baht on 2nd July 1997, and this move immediately sent shock waves throughout other East Asian countries. Before the Financial Crisis hit East Asia countries, many Asian businesses had acquired short-term financial instruments to finance or invest in long-term investment. It was believed that lack in transparency in banking and business dealings and the inefficient bank regulatory system and dependable financial information compounded the problem (Stiglitz, 1998). Acquiring short-term financial instruments without hedging the exposure had led to gushing defaults once the currency devaluations started.

Stiglitz (1998) noted that in respond to the Thai currency attack, the Malaysia ringgit, Indonesia rupiah, and Philippine peso were also devalued as these currencies were converted to dollar for safety purposes. The ringgit and other regional currencies came under intense selling pressure and the central banks were forced to intervene heavily to defend their respective currencies. In August 1998, ringgit was devalued 40% against US dollar compared to ringgit value on July 1997.

In order to prevent further pressure on the ringgit, the authority decided to peg the ringgit with the US dollar at MR3.80 per USD. Together with the new exchange rate regime, the Malaysian government also restricted the flow of short-term capital and prohibited the use of the ringgit outside Malaysia. All this was aimed to prevent further deterioration of the value of the domestic currency, which would adversely affect economic performance.

The portion of short-term flows surpassed that of FDI in 1992 and hit an all time high of 62 percent in 1993. Capital inflow controls imposed by BNM in 1994 (and lasted until mid-1995) did well in

moderating the surge of short-term flows. However they regained impetus following the lifting of controls, reaching 56 percent of total inflows in 1996.

Portfolio capital to Malaysia was mainly in the form of short-term capital inflows. They accounted for 45 percent of total annual capital inflow in 1996, up from 13 percent as compared to the previous year. Short-term debt of the private sector and banking institutions was low and mainly involved trade related transactions of the banking system, the bulk of which were hedged (BNM, 1999).

LITERATURE REVIEW

Based on studies by Hiebert (1999), Miller (1999) Hale (1998) & Hill (1998), capital controls indeed promote economic slow down by adversely affecting FDI in Malaysia. They believe that sudden departure from long standing commitment to open economy would certainly affect the general investment atmosphere of the country.

Reisen & Soto (2000) demonstrated that both FDI and portfolio investment put forth a significant impact on economic growth in post-crisis Asia. Furthermore, there were few macroeconomic intricacies resulted from the FDI flows since their reversibility was low. Other research done by De Mello (1999), and Borenzstein, De Gregorio & Lee (1998) also reported similar findings. Prasad et al.(2003) also concluded that FDI is one form of capital inflows which had significant correlation with domestic growth and investment.

Krugman (1998) suggested that capital controls such as the fixed exchange rate would only be relevant in short period of time to give the economy enough time to have space to breathe. However, Malaysia under the Bank Negara retained that very same tool to accommodate the economy since Malaysian economists believed that the regime would still be relevant to date. In addition, Kaplan & Rodrik (2001) cited that capital controls proved to be inefficient, diminish market confidence even further and would be used to delay needed adjustments.

Nevertheless, other studies indicated that there are ample evidence from both developed and developing countries that capital controls were in fact effective in substantially reducing, if not preventing, capital flows of latter type, in particular placement abroad of institutional saving (De Gregorio et al., 1998; Radelet & Sachs, 1998). However, controls seem to have helped to lower interest rates and to encourage a revival of domestic consumption and investment without creating precipitate mass capital flights (Athukorala, 2001).

Jomo (2001) noted that capital account controls provide greater leeway for monetary policy, stabilize exchange rates, enhance macroeconomic stability and avoid inflation due to excessive inflows. The World Bank (1997), using panel data, concluded that countries with strong fundamentals received the largest proportion of capital flows when compared to those who had weaker fundamental in economic.

The resurgence of portfolio flows also may have come about because new, inexperienced investors replace the ones who have been buried, or because memories of all investors are generally short (DeLong, 1999). The pessimistic view was based on a false aggregation of FDI with portfolio investment and short-term bank credits. It ignored the time-honored dictum in the balance of payments theory, ‘in terms of underlying determinants of mobility, long-term investment (FDI) is quite different from “hot money” (Meade, 1951).

DATA AND METHODOLOGY

The analysis were done over two period, where the period of 1991-1997 [7 years] is considered as a period where Malaysia imposed floating exchange rate system (liberalization of capital controls), and the second period 1998-2004 [7 years] as an age where the Malaysian government started imposing the fixed exchange rate regime. The data needed for the analysis was derived from Bank Negara Malaysia Annual Report, Ministry of Finance Annual Economic Report and also from the IMF sources. The dependent variables, that is, FDI, PI were built using data extracted from the Balance of Payments/International Position Statistics (BOPS). Data sets used in the empirical study are based on Moody’s investors’ service dataset. The variables and data sets are presented in Table 1.

Table 1 : The Data Sets Used in the Empirical Study

| Data | Moody's Data Set |
|------------------------------|----------------------------|
| <i>Dependent Variables</i> | |
| | FDI |
| | Portfolio Investment |
| <i>Explanatory Variables</i> | |
| Market Size | Nominal GDP (NGDP) |
| Country Conditions | Real GDP Growth (RGDP) |
| Liquidity | Exports (E) |
| Government Finance | Government Debt/GDP (DGDP) |
| Vulnerability | External Debt (ED) |

This table presents the data that is utilized in the study. All Variables in RM, apart from Ratios and indices. FDI and portfolio flows come from Bank Negara data in the Moody’s dataset.

The dependent variable, CCE is the Capital Controls Effects. The equation for the regression analysis is shown below:

$$CCE = \alpha + \beta_1 NGDP + \beta_2 RGDP + \beta_3 E + \beta_4 DGDP + \beta_5 ED + \epsilon \tag{1}$$

- CCE = Capital Controls Effects
- NGDP = Nominal GDP
- RGDP = Real GDP Growth
- E = Exports
- DGDP = Government Debt/GDP
- ED = External Debt

RESULTS

The results are presented in Table 2. The results are discussed in two sections. First we discuss the regression results for DFI flows before and after the implementation of capital controls (1991-2004). Next, we examine the results for PI flows before and after capital controls were implemented.

Discussion of Result for FDI Flows Before and After the Implementation of Capital Controls

The regression results on FDI flows show R value was 0.970 prior to the controls implementation back in 1998. When the control took place, the regression on FDI indicated R value of 0.995. For correlation purposes 0.90 is considered to have a strong linear relationship. This in fact proves that the controls had a significant effect as the R value grew stronger after the imposition.

Table 2: Regression Results for FDI and PI Flows (1991-2004)

| Explanatory Variables | Dependent Variables | | | |
|-------------------------------|---------------------|-----------|----------|-----------|
| | FDI Flow | | PI Flows | |
| | Before (β) | After (β) | Before | After (β) |
| Nominal GDP | -0.391 | -0.766 | -0.423 | -0.815 |
| Real GDP Growth | -0.94 | 0.952 | -0.635 | 0.293 |
| Export | 0.353 | 0.864 | 1.136 | 1.583 |
| Government Debt/GDP | -0.423 | -0.647 | -0.698 | 0.008 |
| External Debt | 0.297 | -0.776 | -1.568 | -0.493 |
| R Value | 0.97 | 0.995 | 0.999 | 0.986 |
| R-Squared Value | 0.941 | 0.991 | 0.988 | 0.973 |
| Coefficient Significant Value | 0.401 | 0.161 | 0.075 | 0.277 |
| F Value | 3.179 | 21.904 | 102.664 | 7.086 |
| Durbin-Watson Value | 2.952 | 3.061 | 2.952 | 3.061 |

This table shows the regression results for FDI and PI Flows from 1991-2004, before and after the implementation of capital controls.

The impact of controls on FDI were even intensified as shown by R-squared values before and after the imposition were 94.1% and 99.1% respectively. The percentage had increased to almost 100% after the controls imposition. While Coefficient significant values were 0.401 and 0.161 before and after the introduction of controls.

The F value was 3.179 before the controls were introduced, however, after the controls were established, the F value was large 21.904. The variance indicates that the controls impact on FDI flows were statistically significant. Finally, Durbin-Watson values pre-imposition and post-imposition of controls were 2.952 and 3.061 respectively. Therefore there were a significant relationship between FDI and the battery of independent variables.

First, this paper examines the effects of capital controls variables on FDI flows. These variables were chosen from existing literature. The regression results were displayed in the Table 2 above. They were consistence with theoretical predictions. The coefficients for Market size, Country Condition, Liquidity, Government Finance, and Vulnerability were all statistically significant at 1% level.

Before the controls took place, when the Nominal GDP (NGDP) increased by 1%, the Foreign Direct Investment (FDI) flows dwindled at about 0.391%. After the controls had been implemented, when NGDP escalate by 1%, the FDI flows were reduced by 0.766% as both had an inversed relationship. This signifies that the introduction of capital controls had in fact contributed towards a decrease of more than 95% in FDI flows.

On the other hand, a soar of 1% in Real GDP (RGDP) contributed to a fall of 0.940% in FDI flows prior to the adoption of controls. Thus, both variables indicate an opposite correlation. However, it demonstrated different result after the controls was implemented where an increase of 1% in RGDP would contribute to a rise of 0.952% in FDI. Thus, both reflect a positive relationship. This demonstrates a different result before and after the implementation, thus concluded that capital control indeed promotes a healthier FDI flows environment.

A hike of 1% in Exports (E) before the controls were served contributed towards a rise of 0.353% in FDI flows. An augment of 1% in E increased the FDI by 0.864% after the controls were set. Hence, the first and the second situation clearly showed parallel results between the dependents and explanatory variables. The first and second situations had demonstrated a positive relationship between FDI and the controls. The justification of both cases shows that the capital controls seem to encourage the FDI flows.

Before the controls took place, both Government Debt over Real GDP (DGDP) and FDI indicated a negative correlation. When the DGDP ratio increases by 1%, the FDI ratio reduces by 0.423%

accordingly. When the controls took place on September 1998, 1% increase in DGDP would lead to a fall of FDI flows by 0.562% accordingly that obviously indicated both had an adverse relationship. Therefore, the capital controls really had deteriorated the FDI flows in this case.

An increase in External Debt (ED) by 1% would result a hike of 0.297% in FDI flows as both had parallel relation. Whereas, when the controls were introduced, a soar in External Debt by 1% would result a reduction of 0.776% in FDI flows as both had an inversed correlation. This definitely demonstrated the capital controls had a side effect on FDI flows.

Empirical Analysis For PI Flows Before and After Capital Controls Were Implemented

The regression result on PI flows show R value was 0.999 prior to the controls implementation back in 1998. After the control was introduced, the regression of PI on the battery resulted in an R value of 0.986. For correlation purposes 0.90 is considered a strong linear relationship. Even though it was considered of having strong linear relationship, there were no significant impact of controls on the PI flows.

The impacts of controls on PI were supported by R-squared values, the R-squared values before and after the controls were 98.8% and 97.3% respectively. The percentage had decreased slightly to 97.3% after the controls imposition. No clear impact can be seen after 1998. Coefficient significant values were 0.075 and 0.277 before and after the introduction of controls. This shows that the controls had a significant impact on PI flows after 1998.

The F value was 102.664 before the controls were introduced and after the establishment of the controls, the F value was a large 7.086. The variance indicated that the controls impact on PI flows were statistically significant. Finally, Durbin-Watson values pre-imposition and post-imposition of controls were 2.952 and 3.061 respectively. Therefore there was a significant relationship between PI and the battery of independent variables.

Secondly, this paper examines the effects of capital controls variables on PI flows. These variables were chosen from existing literature. The regression results were displayed in the Table 2 above. They were consistent with theoretical predictions. The coefficients for Market size, Country Condition, Liquidity, Government Finance, and Vulnerability were all statistically significant at 1% level.

Before the controls was adopted, when Nominal GDP (NGDP) escalated by 1%, the Portfolio Investment (PI) flows decrease by 0.423% as both had an inversed relationship. However, just after the controls took place on September 1998, when NGDP increased by 1%, the PI flows would fall by 0.815% as both had an opposite relationship. This justify that the introduction of capital controls somehow deter the PI flows.

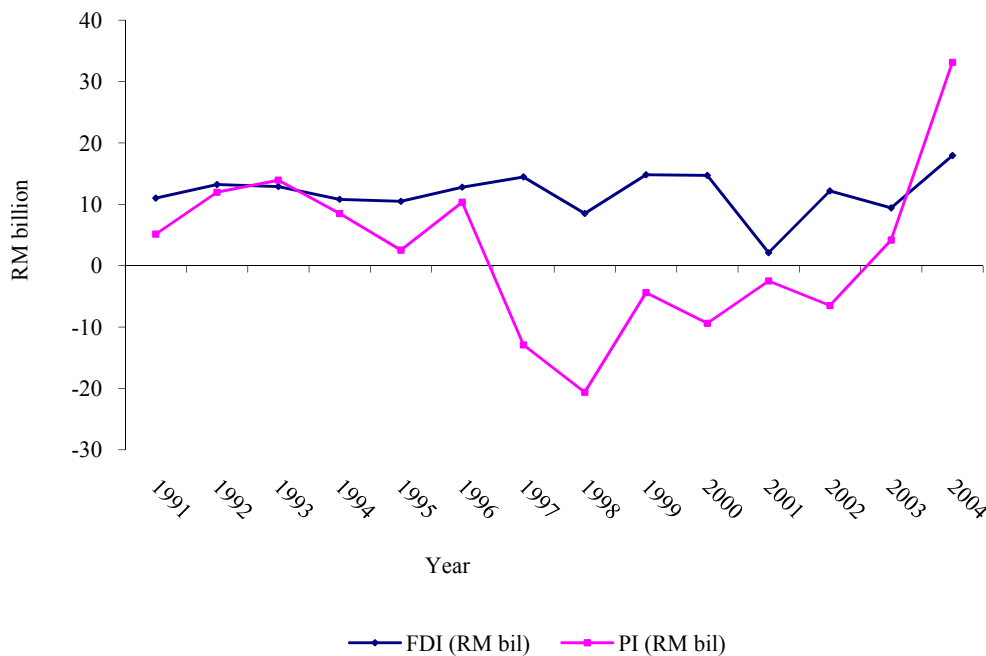
On another occasion, an augment of 1% in Real GDP (RGDP) would lead to a cut of 0.635% in PI prior to the introduction of controls. When the controls were adopted, a rise of 1% in RGDP caused an increase of 0.293% in PI flows. These indicate that both the dependent and explanatory variables had a parallel correlation. This study justify that the introduction of capital controls had helped Malaysia to improve the situation by promoting a sound environment for PI activities.

The Exports (E) and PI flows portray a positive relationship as a hike of 1% in E would cause an increase of 1.136 % in PI flows just before the controls were introduced. In the mean time, the Exports and PI flows indicated a parallel correlation as a rise of 1% in Exports contribute towards an increase of 1.583% in PI flows when the controls were adopted, an increase of almost 40%. The controls proved to fuel the PI activities in this circumstance.

When the Government Debt over Real GDP ratio (DGDP) escalated by 1%, the PI ratio decreased by 0.698 % accordingly. However, after the control was adopted, when the DGDP ratio increased by 1%, the PI ratio increases by 0.008% accordingly. It signals that those variables had a positive relationship. The establishment of the controls seems to promote healthy environment for PI activities here in Malaysia now.

A hike in External Debt (ED) by 1% would result a reduction of 1.568% in PI flows. Whereas, a hike in External Debt by 1% after the implementation would results a decrease of 0.493% in PI flows which clearly saw an improvement. Therefore, it indicates that in both situations ED show an inversed relation with the PI flows. In short, the introduction of controls indeed improved the situation better than before.

Figure 1 : The Flows of FDI and PI 1991 Through 2004



The line graph above shows the movement of FDI and PI flows for the period of 1991 to 2004. The first part of the line graph demonstrates the period of 1991 to 1997 before capital controls was introduced, which was a period when Malaysia was still embracing the capital liberalization policy. This paper demonstrated that the flows of FDI and PI were quite encouraging. However, when the Financial Crisis hit Asian in on mid 1997, the movement had fall slightly for the FDI while the PI flows was severely affected. The implementation of Capital Controls (1998-2004) provide a relief to both FDI and PI flows as the investment flows were seen to be back on track especially for portfolio investment.

CONCLUSIONS

This paper clearly revealed that the decision made by the Malaysian government to implement capital controls was in fact a wise decision. The unpopular decision really works in helping the investment atmosphere in Malaysia by providing stable financial environment. Overall, the study disclosed that capital controls had definitely encourage FDI and PI flows in Malaysia to date. The regime had enabled the authority to built investors’ confidence in continuing to invest in this country despite urge by various parties asking Malaysia to abandon the controls.

This paper had enabled the author to scrutinize the effects of three types of capital controls policies on FDI and PI flows: (i) the existence of fixed exchange rates (indirect capital controls), (ii) controls on capital account and (iii) the stringency of requirements for the repatriation (direct capital controls). The approach was important because countries typically use these instruments conjunctively. To the best of our knowledge, this is the first study that examines the impact of various types of capital controls on FDI and PI flows. In addition, the study assessment only cover Malaysia as a background study. This clearly indicate a much more focused research than the previous studies, since good quality data for the period only subsist for a more focused study.

Undoubtedly, the FDI and PI flows represent an imperative part of the Balance of Payments, and it was of this decisive motivation that the policy makers were called to understand the impact of capital controls towards the investment flows. This enabled the authority to evaluate the impact of policy decisions on the Balance of Payments. Investments flows have, in fact, played an important role in recent emerging market crises like the 1997 Asian Financial Crisis, and mass inflows of portfolio investment, in particular, often turns out to be a catastrophe rather than a blessing, when such flows come to an abrupt stop or even reverse.

Nonetheless, Malaysia's capital control (the currency peg to the dollar) poses two major threats. Firstly, its financial system is not market-based and could contribute to accumulation of bad debts in long run. Secondly, Malaysia's economic system does not create globally competitive atmosphere to companies in Malaysia and relies on export processing for growth. The capital controls could only be treated as a temporary relief, since espousal too long to the regime will cause Malaysia to be incompetent in competitive global market (Krugman, 1998).

At the same time, capital controls were posed to be inept, faded market confidence and delay needed adjustments (Kaplan & Rodrik, 2001). The impositions also tarnished government's integrity, credibility, and commitment in dealing with the financial framework for foreign investment in the future.

The distinction between FDI and PI were important for two reasons: a) Portfolio investment flows were much more volatile than FDI flows. Although FDI could decline in a crisis, it was unlikely to reverse. b) Malaysia did not need to fully liberalize their capital accounts in order to benefit from FDI since both inflows and outflows could be accommodated through special provisions. Portfolio investment did, however, require capital account liberalization. Taken together, these remarks imply that an openness to portfolio investment offer fewer benefits and imposes higher costs than does openness to FDI, and that many of the benefits access to FDI could be obtained without full liberalization.

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PREDICTING CHANGE IN MANAGEMENT ACCOUNTING SYSTEMS: THE EFFECTS OF COMPETITIVE STRATEGY

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ABSTRACT

This study reports on a survey that investigated changes in management accounting and control systems in 31 Canadian manufacturing companies. Six variables that may influence changes in management accounting and control systems are identified from contingency theory literature. The findings indicate considerable changes in the organizations' management accounting systems during the three year period. Changes in management accounting were best predicted by organizational capacity to learn. Such changes mostly occur in systems that support planning and control. Organizations that placed a high emphasis on differentiation strategies reported significant changes in their management accounting and control systems. Moreover the intensity of competition was found to affect management accounting change through the organizational structure.

JEL: M40

INTRODUCTION

During the last few decades, the environment in which management accounting is practiced appears to have changed with advances in information technology, economic swings, new management strategies and a new focus on quality and customer services (Innes and Mitchell, 1995; Libby and Waterhouse, 1996; Kaplan and Norton, 1996; Burns and Vaivio, 2001; Waweru et al, 2004). Baines and Lang field-Smith (2003) argue that managers need specific forms of management accounting information to support their decision needs within increasingly uncertain environments and to assist them monitor progress against strategies. Research in management accounting also suggests that changes in an organization's external environment should lead to change in an organization's management accounting systems (Waweru et al, 2004; Haldma and Laats, 2002; Atkinson et al, 1997).

In a bid to support such changes in the operating environment, academics, accountants in business and consultants alike have developed new and advanced management accounting techniques and systems such as activity based costing, activity based management, target costing, product life cycle costing and the balanced scorecard approach to performance measures (Innes and Mitchell, 1990; Burns and Vaivio, 2001; Haldma and Laats, 2002; Hoque, 2003; Waweru et al, 2004). Yet little empirical evidence exists on the actual rate of adoption of changes in management accounting systems and/or the forces that motivate or act to impede changes in management accounting systems (Libby and Waterhouse, 1996; Williams and Seaman, 2001; Baines and Langfield-Smith, 2003; Waweru and Uliana, 2005).

This study contributes to literature on management accounting change (MAC) by examining the extent to which management accounting and control systems have changed in 31 Canadian manufacturing firms during the last three years (2004-2006). More specifically the study investigated the volume and location of MAC and the effect of certain economic and organization level variables on MAC. The study enhances existing knowledge by introducing a new variable, competitive strategy (Porter, 1980; 1985) to the known predictors of MAC and demonstrates how intensity of competition affects MAC in organizations. Previous studies (Libby and Waterhouse, 1996; Seaman and Williams, 2001 and Waweru and Uliana 2005) have concluded that there is no relationship between MAC and the intensity of competition.

Further, the study also reports on the perceived benefits and problems encountered during the process of MAC.

The remainder of this paper is organized as follows: Section 2 presents the study theoretical framework and previous literature. The research method and the definition of the study variables are explained in section 3. Section 4 presents results followed by the discussion and conclusions in the final section.

THEORETICAL FRAMEWORK AND LITERATURE REVIEW

Contingency theory (Burns and Stalker, 1961; Lawrence and Lorsch, 1967) provides an explanation of why management accounting systems vary between firms operating in different settings (Otley, 1980; Innes and Mitchell, 1990; Fisher, 1995; Chapman, 1997; Drury, 2000; Chenhall, 2003). The contingency theory of management accounting is based on the premise that there is no universally appropriate accounting system applicable to all organizations in all circumstances (Emmanuel et al, 1990:57). Rather the contingency theory attempts to identify specific aspects of an accounting system that are associated with certain defined circumstances and to demonstrate an appropriate matching.

Management accounting systems are adopted to provide information that will assist managers in achieving the organizational objectives (Mia and Chenhall, 1994; Haldma and Laats, 2002). A management accounting system will therefore be useful to a manager if it can enhance the nature and quality of the information required. The need for an appropriate fit between the environment and organizational systems is an underlying assumption of much of the empirical contingency style management accounting research, as is the need for management accounting systems to change to support manager's new information requirements (Baines and Langfield-Smith, 2003:675). How effective the design of an accounting system is depends on its ability to adapt to changes in the external circumstances and internal factors (Haldma and Laats, 2002:383).

Organizations are open systems that receive resource inputs from the external environment and return the output back to the environment (Otley and Berry, 1980). To succeed, organizations have to maintain a consistent relationship with the environment (Otley, 1980). Consequently changes in the environment cause changes in organizations, which in turn cause changes in management accounting practices Shields (1997). While Scapens (1999) notes that the environment in which management accounting is practiced appears to have changed we have little understanding of why organizations tend to change their management accounting systems (e.g. Pettigrew and Whipp, 1991; Pettigrew et al., 1992; Atkinson et al., 1997).

Innes and Mitchell (1990) and Fisher (1995) suggest that the specific circumstances influencing management accounting comprise a set of contingent variables which may include but are not limited to (1) the external environment, (2) the technology, (3) the organization structure, and (4) the firm's competitive strategy. These contingencies are regarded as important determinants of the design of a management accounting system. An understanding of practice therefore lies in the identification of the set of influential structural characteristics within which management accounting is designed and used. The external environment contains certain factors, which may affect the organization, but over which the organization has little or no control. These factors, including economic, political/legal, and social/cultural factors, influence an organization and may shape its structure and processes, including its information systems (Ming-te and Farrel, 1990).

The main focus of this study is on MAC at the level of the organization rather than the MAC within organizations. The study identified the following factors as the main predictors of MAC: size; organizational capacity to learn; intensity of competition; decentralization (organization structure);

changes in technology and competitive strategies. These factors are shown on the theoretical framework Figure 1 and discussed later in section 3.

Figure 1: Theoretical Framework

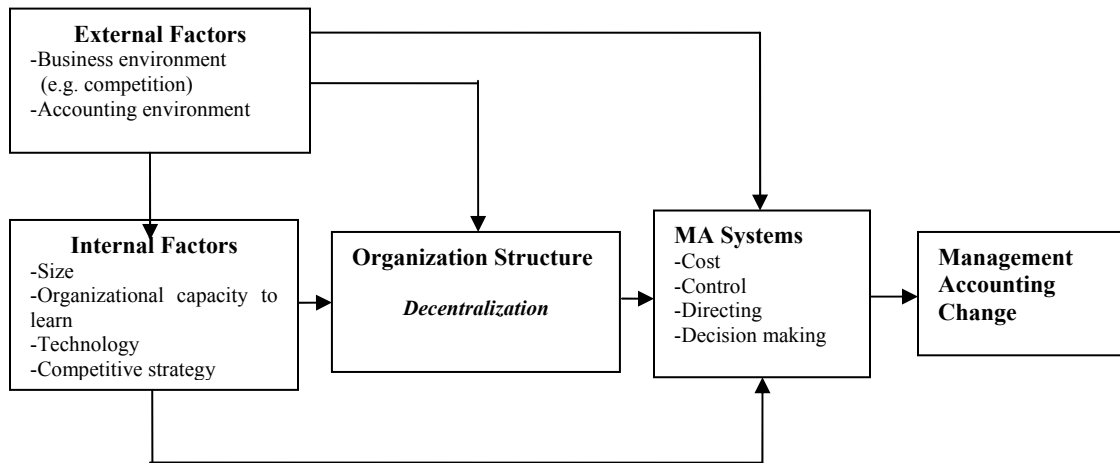


Figure 1 shows the contingency based theoretical framework of this study. The contingencies are divided into two groups: external factors and internal factors. The external factors indicate the features in the external environment that affect the operations of the organization; including the management accounting and control system. However Innes and Mitchell (1990) point out that it is not clear whether the contingent variables affect management accounting directly or through their impact on the organizational structure. Therefore organization structure is introduced in the study framework as a mediating variable. Following previous studies (Chia, 1995; Chenhall and Moris, 1986) this study measured organizational structure in terms of decentralization of authority.

Internal contingencies are determined as size, organizational capacity to learn, technology and competitive strategy (see Libby and Waterhouse, 1996; Hyvonen, 2007). Haldma and Laats (2002) argue that intensive competition influences the choice of strategy, organization structure and also the application of appropriate cost management and control. Furthermore, successful implementation of competitive strategies (Porter, 1980; 1985) involves different resources and skills, supportive organizational arrangements and control systems. As argued by Haldma and Laats (2002) and Seal (2001) the list of contingencies and relations in a theoretical framework cannot be considered exhaustive, since it is not possible to identify and include all the factors and impact. Moreover, the main focus of this study is the volume and location of MAC at the level of the organization and not within firms.

Libby and Waterhouse (1996) examined the extent and correlates of changes in management accounting and control systems in a sample of 24 Canadian manufacturing firms. They reported that on average, 31 percent of the management accounting systems in the organizations had changed during the period 1991-1993. Further, the components of management accounting that support decision making and control changed more frequently than components that support planning or directing. Organizational capacity to learn was the best predictor of MAC. However the study found no significant relationship between MAC and decentralization.

In a related study, Williams and Seaman (2001) investigated whether Libby and Waterhouse (1996) results were transferable to firms operating in Singapore. They confirmed the findings that organizational capacity to learn is a strong determinant of change. However, contrary to Libby and Waterhouse (1996) who reported a moderate support for the relationship between a more intensively competitive

environment and MAC, Williams and Seaman found that the relationship between the two variables was significantly negative. Unlike the Libby and Waterhouse (1996) study, Williams and Seaman also found a strong positive relationship between decentralization and MAC. Further, they found that size had no effect on MAC, unlike Libby and Waterhouse who reported a significant positive relationship between size and MAC. The inconsistencies in the results of these two studies clearly support the need for further research.

Baines and Langfield-Smith (2003) examined the relationship between the changing competitive environment and a range of organizational variables as antecedents to MAC. They found that the increasingly competitive environment had resulted in increased focus on differentiation strategies which had in turn influenced changes in organizational design and advanced management accounting practices. Hyvonen (2007) investigated the relationships between organizational performance and customer focused strategies, performance measures and information technology. He found a significant negative relationship between customer performance and the three way interaction involving strategy, contemporary management accounting systems and information technology. The study concluded that formal strategic control systems could actually hinder performance in some circumstances.

Sulaiman and Mitchell (2005) explored the forms which MAC has taken in a sample of 92 Malaysian manufacturing companies during the period 1997-2001. In particular they investigated the volume of MAC and its location in terms of the subsystems in which it occurred. They reported that 89 of the 92 responding companies had changed their management accounting systems during the five-year period. The planning and controlling sub-systems accounted for the greatest number of total changes (27.5% and 25.3% respectively), while the decision making sub-system ranked third (21.8%). Their findings are inconsistent with those of Libby and Waterhouse (1996) and Williams and Seaman (2001) who had reported that the most frequent systems to change were decision making systems (32% and 27% respectively). While looking at the location of change, this study attempted to shed more light on these inconsistencies is prior research.

Based on the above theoretically defined pattern and the inconsistent findings in previous research, this study seeks to answer the following research questions:

- 1) *Have management accounting and control systems in the organizations in question changed significantly during the last three years?*
- 2) *What factors facilitate and/or hinder management accounting and control systems change in the subject organizations?*
- 3) *What are the perceived benefits and/or what problems have been encountered as a result of the changes that have occurred in management accounting and control systems?*

RESEARCH METHOD AND VARIABLE DEFINITION

A questionnaire, cover letter and a self addressed stamped envelope were sent to a sample 120 controllers of manufacturing companies in South Western Ontario. The mail contact was followed by a telephone call. The questionnaire was pre-tested using a group of academicians and practitioners. The sample was randomly selected from a list of companies that was compiled using the Hoovers data base. The criteria used were as follows: a) manufacturers (SIC code 20-39), b) number of employees (between 100 and 6000) and c) area telephone codes (416, 905, 519, and 647). This yielded a total of 1,628 manufacturers.

The companies were divided into five groups based on the number of employees. The stratified sampling approach was then used by selecting firms proportional to the number of companies in each group. The names of the contact persons (controllers) were obtained from the Dunn & Bradstreet directory listing of key personnel. The study was conducted in 2007 between April and August. Only six responses were obtained from the first mail out. A reminder letter was sent to the non responding companies three weeks after the first mail out. This was followed by a telephone call where the controllers were encouraged to complete the questionnaires.

A total of 33 responses (27.5%) were received. However two of these responses were unusable due to missing data on management accounting systems and change. A total of 31 usable responses (25.8%) were therefore received. Most of the completed questionnaires were collected by the researchers directly from the responding managers. This enabled the researchers to clarify any issues that were not clear to the respondents. Characteristics of early respondents were compared to those of late respondents but no significant differences were identified. Follow-up calls to the non responding companies revealed that the reasons for non response were mainly lack of time. Tests also revealed no significant differences between the characteristics of the respondents and those of non respondents. We therefore ruled out non response bias in this study.

A list of 28 different management accounting and control systems divided into five main types (Appendix 1): planning, controlling, costing, directing and decision-making were provided to the respondents. The respondents were asked to indicate whether the systems existed in their organization and whether any changes had been made during the last three years. Although the interviewees were invited to add any other system that existed in their organization, none did.

Within the firm (taking a contingency theory perspective of management accounting research) the following variables are identified as predictors of MAC: (1) competition, (2) decentralization, (3) size, and (4) capacity to learn (Libby and Waterhouse, 1996; Williams and Seaman, 2001). To this list we add technology (Waweru and Uliana, 2005) and competitive strategy. These measures, that are dealt with in section 4 (table 1), were determined as follows:

The perceived intensity of competition faced by the responding organizations was measured using a competitive pressure scale developed by Khandwalla (1977). This scale initially consisted of six questions rating the intensity of competition for raw materials, technical personnel, selling and distribution, quality, variety of products, price and customer service on a scale from 1 (negligible) to 5 (extremely intense). Each question related to the intensity of competition had a corresponding scale for the importance of that type of competition to long term profitability and growth ranging from 1 (not important) to 5 (extremely important). To compute the competitive pressure, the ratings for each type of competition were multiplied by their respective ratings on importance by intensity. The square root of the product was then obtained to arrive at the competitive pressure score (present the results more closely to a normal distribution). The competitive scores of the variables were then aggregated to arrive at the competitive pressure facing the firm.

Management accounting literature finds support for decentralization as a predictor of MAC (Damanpour, 1991). To measure the degree of decentralization in the responding firms, this study relied on a method used by Libby and Waterhouse (1996). Respondents were asked to indicate the level of authority required to make certain operating decisions, starting with the production worker (scored as 5) to a person outside the department (scored as 1). A list of six operating decisions was included in the interview questionnaire. The scores assigned to all operating policies in the organization were then aggregated to arrive at the decentralization score. Organizations that obtained high scores were considered to be more decentralized than those with low scores, since this was an indication that more decision making authority was placed

further down in the organization hierarchy. We used decentralization as the proxy for organizational structure.

For the purpose of this study size is defined as the number of employees working for an organization (Libby and Waterhouse, 1996; Williams and Seaman, 2001). Although it may be argued that large systems are difficult to change, this study conceptualized that larger organizations are more likely to change their management accounting practices as the operating environment changes since they have more resources. Williams and Seaman (2001), Libby and Waterhouse (1996) and Damanpour (1991) measured organizational size as the natural logarithm of the number of employees in the organization. Size was measured in this manner since it will result in the values being more normally distributed. The minimum number of employees in the responding organizations was 100 while the highest was 5800 (mean 2180, SD 1550).

Management accounting literature supports technological changes as predictors of MAC. To measure technological change, respondents were asked to rate on a scale of 1 (irrelevant) to 5 (extremely important) how several technological changes had affected MAC. The sum of the scores assigned to each technological change was aggregated to arrive at the firm's technological change score.

Organizations that have invested in a large number of management accounting systems and personnel may respond to changes in or challenges arising from their environments by changing their management accounting systems. A high degree of organizational capacity to learn may facilitate change in management accounting systems because the expertise and personnel to educate managers about the benefits of change will be available. This study conceptualizes that organizations with higher organizational capacity to learn will experience higher rates of MAC. The number of management accounting systems present in the organization at a particular point in time was used to measure organizational capacity to learn.

In this study we use the generic taxonomy for strategy suggested by Porter (1980, 1985) who argues that for a firm to compete effectively, it must derive its competitive advantage either from differentiation or cost leadership. Hyvonen (2007) argues that the successful implementation of strategy involves different resources and skills, supportive organizational arrangements and control systems. We argue that changes in the company strategy will call for changes in the company's management accounting and control systems. To measure the competitive strategy score, this study relied on the items designed by Miller et al (1992) and used by Hyvonen (2007). Respondents were asked to indicate the emphasis placed by their organization on certain strategic priorities over the last three years on a scale of 1 (no emphasis) to 5 (great emphasis). The sums of the scores assigned to each strategic priority item were aggregated to arrive at the firm's competitive strategy score (low cost or differentiation). To summarize, change in management accounting change in organizations is expected to be positively and significantly associated with:

- Greater organizational capacity to learn
- Larger size
- decentralized organizational structure
- more intensely competitive environment
- higher reliance on technology
- high emphases on differentiation strategies
- high emphases on low cost strategies

The data was analyzed using Stata. Internal consistency of the multi item scales was analyzed using Cronbach's alpha. In this study all the alpha values obtained were above 0.6 and therefore considered

acceptable. Confirmatory factor analysis was used to test the reliability of the individual items in the multi item scales, while the t-test was used to test for significant differences between the mean scores. Path analysis was used to test the indirect relationship between MAC (the dependent variable) and the above independent variables.

RESULTS

Table 1 shows a summary of the descriptive statistics computed on the factors facilitating management accounting change (MAC) in the responding companies.

Table 1: A Summary of Descriptive Statistics of the Determinates of MAC (N=31)

| Variable | Mean | Standard Deviation | Theoretical Range | Actual Range |
|--------------------------------------|-------|--------------------|-------------------|--------------|
| Number of changes | 11.8 | 4.4 | 0-28 | 3-20 |
| Capacity to learn | 18.2 | 3.8 | 0-28 | 13-25 |
| Competition | 22.8 | 1.9 | 6-30 | 17.6-27.0 |
| Decentralization (Organ. Structure) | 16.6 | 2.3 | 6-30 | 12-20 |
| Technology | 15.5 | 1.9 | 4-20 | 12-18 |
| Competitive Strategy Low Cost | 6.37 | .43 | 2-10 | 4-8 |
| Competitive Strategy Differentiation | 14.96 | 0.7 | 4-20 | 7-18 |
| Size (ln) | 7.2 | 1.0 | - | 4.6-8.7 |

Frequency and Location of Change

All the 31 responding companies reported changes in their management accounting systems during the three year period of the study. The results are shown in Table 2.

Table 2: Volume of Management Accounting Change

| | |
|---|------------|
| Total number of changes | 366 |
| Number of companies | 31 |
| Average changes per company | 11.8 |
| Actual range | 3-20 |
| Period of study | 3 years |
| Average annual rate of change per company | 3.9 |

According to the results the average number of changes in each company during the period was 11.8 which translate into a 3.9 average annual rate of change per company. The minimum number of changes reported was three while the maximum number was 20. The study further investigated the location of change across the five components of the MA system (appendix 1). The results are shown in Table 3.

Table 3: Location Management Accounting Change

| MA Sub system | Number of Changes | Proportion | Rank | Average Number of Changes Per Company | Average Annual Rate of Change Per Company |
|-----------------|-------------------|-------------|------|---------------------------------------|---|
| Planning | 106 | 29% | 1 | 3.4 | 1.1 |
| Controlling | 83 | 22.6% | 2 | 2.7 | 0.9 |
| Decision making | 80 | 21.9% | 3 | 2.6 | 0.87 |
| Costing | 64 | 17.4% | 4 | 2.0 | 0.67 |
| Directing | 33 | 9.1% | 5 | 1.1 | 0.36 |
| Total | 366 | 100% | | 11.8 | 3.9 |

According to the results the planning sub-system account for the greatest number of changes (29%) followed by controlling (22.6%), decision making (21.9%), and costing (17.4%). Directing experienced the lowest number of changes (9.1%). The high rate of planning systems may be attributed to the high levels of environmental uncertainty which has resulted from the intensive global and local competition.

Overall, the study indicated that, on average, the responding organizations had implemented 11 changes in their management accounting and control systems during the period 2004-2006 periods. When this is interpreted as the number of changes given the number of systems existing in the organization in 2006, on average 61% of the systems in a given organization changed. We may therefore conclude that the management accounting and control systems in the subject organizations had changed significantly during the last three years.

Motivators of Changes in Management Accounting Systems

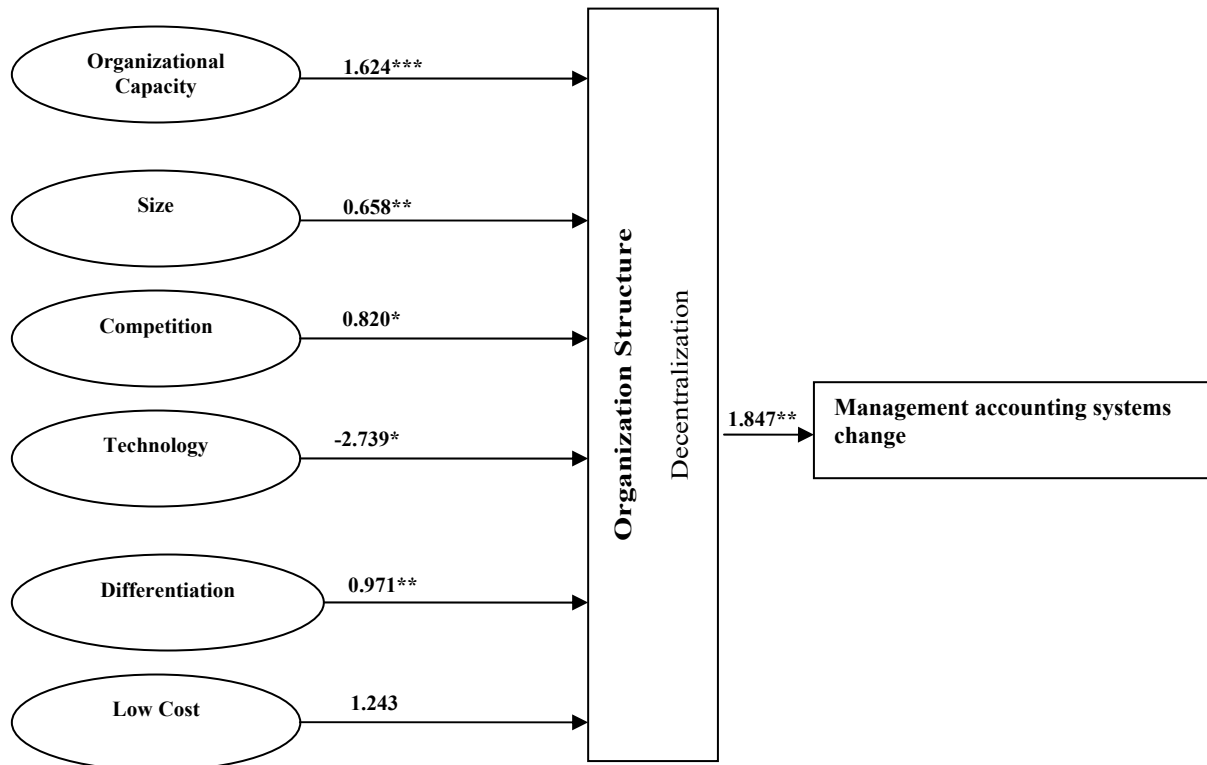
This study used path analysis (Gerdin and Greeve, 2004; Baron and Kenny, 1986) to test the indirect relationship between the dependent variable (management accounting change) and internal/external factors acting through organizational structure (decentralization). The results are shown in Figure 2.

Although multi-co-linearity was evident (for example the correlation between Size and Organizational capacity to learn, is significant at 0.001 level), this is not considered a serious problem in the model since r^2 is very high. Kaplan (1982) also points out that multi-co-linearity should not be considered a serious problem where the main aim is to measure the effect of all the independent variables on the dependent variable. In this case the issue is how variations in MAC can be explained by the independent variables rather than the accuracy of the individual coefficients.

According to the results, organizational capacity to learn, size, technology and differentiation strategy are directly and significantly related to MAC. There is a strong positive relationship between organizational capacity to learn and MAC. We may therefore conclude that organizations with greater numbers of management accounting systems are more likely to change their management accounting practices. These findings are consistent with theory, which states that more changes are expected where an organization has the expertise and personnel to educate managers on the benefits of change (Argyris and Kaplan, 1994). However the relationship between MAC and technology is negative suggesting that high reliance on technology may hinder MAC (Hyvonen, 2007). Consistent with previous studies, we find no direct relationship between competition and management accounting change. There is also no direct significant relationship between the use of low cost strategy and management accounting change, suggesting that companies adopting this strategy seldom change their management accounting systems.

There is also a strong significant positive relationship between organizational structure and MAC. There study found a strong positive relationship between intensity of competition and organization structure. We may therefore conclude that competition does not affect management accounting change directly but through the effect on organization structure. However no significant relationship was found between the use of the low cost strategy and decentralization. All the other factors had a significant relationship with organization structure

Figure 2: Path Analysis



*** $P < 0.001$, ** $P < 0.01$, * $P < 0.05$ for a two tail test

Factors Influencing/Hindering MAC

This section reports on the findings of how certain organizational changes affected MAC and the factors that the respondents considered as hindrances of MAC. The first factor loading reported indicates how the variables are weighted for each factor and the correlation between the variables and the factor. Respondents were asked to rank in order of importance how certain organizational changes had influenced MAC on a scale of 1 (irrelevant) to 5 (extremely important). The results are shown in Table 4.

Table 4: Effect of Organizational Factors on MAC

| Organizational Change | Level of Importance (mean score) | Rank | First Factor Loading |
|----------------------------|-------------------------------------|------|----------------------|
| Retrenchment | 3.2 | 3 | 0.66 |
| New auditors | 2.2 | 5 | 0.44 |
| New software | 3.0 | 4 | 0.46 |
| New products | 3.7 | 2 | 0.54 |
| Poor financial performance | 4.4 | 1 | 0.72 |
| Cronbach alpha | | | 0.70 |

According to the results poor financial performance was ranked first (mean 4.4) followed by new products (mean 3.7) while retrenchment was ranked third (mean 3.2). The results suggest that companies experiencing financial difficulties are more likely to change their management accounting and control systems than those that are performing well, which could be interpreted as that management accounting practices are perceived as value adding tools by the respondents.

Respondents were asked to rate the importance of certain factors in relation to the hindrance of management accounting change on a scale of 1 (irrelevant) to 5 (extremely important). The results are shown in Table 5.

Table 5: Hindrances of MAC

| Factor | Level of Importance (Mean) | Rank | First Factor Loading |
|---|----------------------------|------|----------------------|
| Accounting staff shortage | 3.7 | 1 | 0.82 |
| Lack of adequate computing resources | 3.5 | 3 | 0.85 |
| Management inertia | 3.6 | 2 | 0.92 |
| Poor communication with line management | 2.5 | 5 | 0.37 |
| Lack of authority of accountant | 2.1 | 6 | 0.24 |
| Need to meet statutory requirements | 2.8 | 4 | 0.73 |
| Lack of autonomy from parent company | 1.2 | 7 | 0.31 |
| Cronbach alpha | | | 0.85 |

The findings indicate that shortage of accounting staff was considered the main factor hindering changes in management accounting and control system (mean 3.7). Indeed most of the non responding companies cited lack of time as the reason why they could not complete the survey. Management inertia was ranked second (mean 3.6) while lack of computing resources was ranked third (mean 3.5). Lack of authority of accountant was ranked a distant sixth. This is not surprising, considering the fact that almost all the respondents were controllers in their organization.

Benefits and Problems of MAC

When the respondents were asked to indicate some of the benefits that resulted from the changes that had made to their management accounting and control systems, quality of information and quicker reporting were the most frequently mentioned. Other benefits that were mentioned (in order of frequency) include; more control over expenses, cost savings, ability to identify non performing customers and products and ability to understand the business better. Several respondents also mentioned accurate product costing and better financial forecasting, which had significantly reduced end of period variance analysis and explanation.

When respondents were asked to indicate the problems that had been encountered as a result of the changes, resistance by organization staff and lack of resources to educate staff on the changes made were the most frequently mentioned. For example several respondents indicated that it took a lot of time and effort for them to convince senior management that the changes were necessary. Other problems mentioned include; not being able to match the changes with the existing accounting software (hence the need to change the software and this was considered expensive) and obtaining details from the new reports. In the first year following the changes, problems were encountered when comparing the actual results with the budgeted results.

DISCUSSION AND CONCLUSIONS

This study examined the volume and location of MAC, the predictors of changes in management accounting and control systems and the benefits and problems resulting from the adoption of changes in management accounting. The results show a surprisingly high rate of change in management accounting systems which is notably higher than that found in recent comparable studies (see Sulaiman and Mitchell, 2005:433) and that the different components of MACS change at different rates. Sulaiman and Mitchell (2005) reported that the average number of changes in each of the Malaysian companies studied was 9.5 (over a span of five years). This compares favorably with the results of this study (average of 11.8).

The results indicate that systems that support planning and control changed more frequently than those that support costing and decision making. The findings are consistent with those of Sulaiman and Mitchell (2005). The need to increase shareholder value, improve the quality of products and increase customer response time may require frequent changes in the firm's profit and production planning systems.

The results show a direct significant positive relationship between MAC and organizational capacity to learn, size and differentiation strategy. We therefore conclude that organizations with greater numbers of management accounting systems are more likely to change their management accounting practices. These findings are consistent with theory, which states that more changes are expected where an organization has the expertise and personnel to educate managers on the benefits of change (Argyris and Kaplan, 1994). Furthermore organizations place high emphases on differentiation strategies are more likely to change their management accounting systems probably to cater for the ever increasing and changing the demands of the customers.

The analysis supports an indirect positive significant relationship between MAC and the intensity of competition. Competition does not appear to affect management accounting directly but through its influence on organizational structure. The findings are consistent with the theoretical expectations, since managers faced with high levels of competition are expected to require more and different types of information from their systems before making crucial decisions (Libby and Waterhouse, 1996). Waweru and Uliana (2005) and Libby and Waterhouse (1996) reported no significant relationship between intensity of competition and MAC. However, Innes and Mitchell (1990) pointed out that it is not clear whether the contingent variables affect management accounting directly or through the impact on the organizational structure.

Consistent with the findings of Waweru and Uliana (2005), the respondents reported that poor financial performance was the most important organizational factor influencing changes in management accounting and control systems. The results suggest that organizations with financial difficulties are more likely to change their management accounting systems, probably to try and improve performance (Ittner and Larcker, 1997).

Shortage of accounting staff and management inertia were the two main factors that hindered changes in management accounting and control systems. The findings are consistent with those of Waweru et al (2004) who reported lack of resources to fund change and fear of change as the dominant factors that hindered management accounting in South Africa.

As is the case with any mailed survey, limitations affecting the generalization of this study are related to the perception of the respondents and a potential of self selection bias. Furthermore, the study respondents were accountants who worked as controllers. They may be familiar with change in this area than in organizational structure or the competitive market. Generalization of the results of this study should be done with these limitations in mind.

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APPENDIX

Appendix 1: Management Accounting Change

Which of the following management accounting systems are present in your organization? Please also tick the systems that have changed during the last three years

| Planning systems | Exist in your organization | Have changed in the last three years |
|---|-----------------------------------|---|
| 1 Budgeting | | |
| 2 Profit Planning | | |
| 3 Production Planning | | |
| 4 Capital Budgeting | | |
| 5 Strategic Planning | | |
| 6 Other Planning Systems | | |
| Control Systems | | |
| 7 Individual Performance Measurements | | |
| 8 Team based performance measurements | | |
| 9 Organization Performance Measurements | | |
| 10 Measurement of performance in terms of quality | | |
| 11 Measurement of performance in terms of customer satisfaction | | |
| 12 Measurement of performance in terms of delivery innovations | | |
| 13 Other performance measures | | |
| Costing Systems | | |
| 14 Direct allocation of manufacturing overheads | | |
| 15 Direct allocation of marketing costs | | |
| 16 Direct allocations of other overheads | | |
| 17 Internal (dept. or divisional) transfers | | |
| 18 Other costing systems | | |
| Directing Systems | | |
| 19 Reward systems- bonuses | | |
| 20 Reward systems- pay for performance plans | | |
| 21 Reward Systems- Stock Options | | |
| 22 Other reward systems | | |
| Decision Making | | |
| 23 Information reported more frequently | | |
| 24 Use for more non-financial measures | | |
| 25 Information reported more broadly | | |
| 26 Use of existing systems but interpreting the results differently | | |
| 27 Other changes to reporting systems | | |
| 28 other changes to systems that do not appear in the list. | | |

INTENSITY OF COMPETITION

Please indicate the perceived intensity of competition faced by your organization in respect to the following variables.

| Competition | Negligible | | | | Extremely Intense |
|--------------------------|------------|-----|-----|-----|-------------------|
| | 1 | 2 | 3 | 4 | 5 |
| Raw materials | () | () | () | () | () |
| Technical personnel | () | () | () | () | () |
| Selling and distribution | () | () | () | () | () |
| Quality | () | () | () | () | () |
| Variety of products | () | () | () | () | () |
| Price | () | () | () | () | () |
| Other please specify | () | () | () | () | () |

Rank in order of importance the types of competition to long term profitability and growth

| Competition | Not important | | | | Extremely important |
|--------------------------|---------------|-----|-----|-----|---------------------|
| | 1 | 2 | 3 | 4 | 5 |
| Raw materials | () | () | () | () | () |
| Technical personnel | () | () | () | () | () |
| Selling and distribution | () | () | () | () | () |
| Quality | () | () | () | () | () |
| Variety of products | () | () | () | () | () |
| Price | () | () | () | () | () |
| Other please specify | () | () | () | () | () |

DECENTRALISATION

As regards decentralization, which level of authority is required to make the following operating decisions?

| | Officer Outside dept | | | | Production worker |
|----------------------|----------------------|-----|-----|-----|-------------------|
| | 1 | 2 | 3 | 4 | 5 |
| Product design | () | () | () | () | () |
| Process redesign | () | () | () | () | () |
| How much to produce | () | () | () | () | () |
| Inventory levels | () | () | () | () | () |
| Leave schedule | () | () | () | () | () |
| Training | () | () | () | () | () |
| Other please specify | () | () | () | () | () |

TECHNOLOGY

Rank in order of importance how the following technological changes have affected management accounting change.

| Technology | Not important | | | | Extremely important |
|------------------------|---------------|-----|-----|-----|---------------------|
| | 1 | 2 | 3 | 4 | 5 |
| Automation | () | () | () | () | () |
| Short production cycle | () | () | () | () | () |
| Increase in overheads | () | () | () | () | () |
| Quality requirements | () | () | () | () | () |
| Other please specify | () | () | () | () | () |

COMPETITIVE STRATEGY

Please indicate the emphasis placed by your organization on the following Product/Market strategic priorities over the last 3 years.

| Strategic priorities | No emphasis | | | | Great emphasis |
|---------------------------------|-------------|-----|-----|-----|----------------|
| | 1 | 2 | 3 | 4 | 5 |
| Provide high quality products | () | () | () | () | () |
| Low production costs | () | () | () | () | () |
| Provide unique product features | () | () | () | () | () |
| Lower prices than competitors | () | () | () | () | () |
| Customized products (flexible) | () | () | () | () | () |
| Serve only a given mkt segment | () | () | () | () | () |

FACTORS INFLUENCING M.A CHANGE

Rank in order of importance how the following organizational changes may have influenced changes in management accounting. *(Based on your experience)*

| | Irrelevant | | | | Extremely important |
|----------------------------|------------|-----|-----|-----|---------------------|
| | 1 | 2 | 3 | 4 | 5 |
| Retrenchment | () | () | () | () | () |
| New auditors | () | () | () | () | () |
| New software | () | () | () | () | () |
| New products | () | () | () | () | () |
| Poor financial performance | () | () | () | () | () |
| Other: please specify | () | () | () | () | () |

Rank in order of importance the influence of the following factors in relation to hindrance of management accounting change. *(Based on your experience)*

| | Irrelevant | | | | Extremely important |
|--------------------------------------|------------|-----|-----|-----|---------------------|
| | 1 | 2 | 3 | 4 | 5 |
| Accounting staff shortage | () | () | () | () | () |
| Lack of adequate computing resources | () | () | () | () | () |
| Management inertia | () | () | () | () | () |
| Poor communication with line mgt | () | () | () | () | () |
| Lack of authority of accountant | () | () | () | () | () |
| Need to meet statutory requirements | () | () | () | () | () |
| Lack of autonomy from parent Co. | () | () | () | () | () |
| Other please specify | () | () | () | () | () |

INTERNET BANKING IN INDIA – CONSUMER CONCERNS AND BANK STRATEGIES

P.K. Gupta, Jamia Millia Islamia

ABSTRACT

Internet banking has attracted the attention of banks, securities trading firms, brokerage houses, insurance companies, regulators and lawmakers in developing nations since the late 1990s. With the rapid and significant growth in electronic commerce, it is obvious that electronic (Internet) banking and payments are likely to advance. Researches show that impact of Internet banking on cost savings, revenue growth and increased customer satisfaction on Industry is tremendous and can be a potential tool for building a sound strategy. However, it has raised many public policy issues before the banking regulators and government agencies. Interestingly, reliable and systematic information on the scope of Internet banking in Indian context is still not sufficient, particularly what it means to the consumers and the bankers. The paper fills significant gaps in knowledge about the consumer's perspective of Internet banking, trace its present growth and project the likely scenario. The paper presents the data, drawn from a survey of Internet banking consumers and the services providers (banks) that offer Internet banking and develops a functional model for maximizing value to the consumers, which the banks may choose to adopt Internet banking strategically. The paper identifies the weaknesses of conventional banking and explores the consumer awareness, use patterns, satisfaction and preferences for Internet banking vis-à-vis conventional form of banking and also highlights the factors that may affect the bank's strategy to adopt Internet banking. It also addresses the regulatory and supervisory concerns of Internet banking.

JEL: G20, G28

INTRODUCTION

The objective of this paper is to examine the consumer behavior with respect to Internet banking vis-à-vis conventional banking, and to explore the possibility of blending these banking systems. The paper also suggests strategies to banks to maximize the value of services to consumers. The primary data used in the research consists of survey conducted on a sample of 2000 consumers arrived at using relative precision technique (Taylor, 1997). The survey includes in major cities of India, instrument being questionnaires filled up from the consumers and personal interaction, discussions with the front line executives of online banking divisions of the major players, particularly their marketing and customer servicing departments and the banking experts, personal visits at Automated Teller Machine (ATMs), Point of Sale (POS) counters of major banks. The major assumptions in this research are – (a) online banking is synonymous to Internet banking (b) the behavior of the surveyed population viz. consumers and bankers confirms to a normal distribution. The study limits itself to major cities given the fact that Internet Banking has no geographical boundaries.

LITERATURE REVIEW

Internet revolution is global phenomenon and going by the current growth statistics, India expects a spurt in the Internet penetration in coming years particularly in the electronic commerce. It is an obvious notion that electronic (Internet) banking and payments are likely to advance more or less in tandem with e-commerce. Researches indicate that Internet banking has a significant impact on the business models of banks, securities trading firms, brokerage houses, insurance companies etc. Internet banking has also attracted the attention of, regulators and lawmakers in the developing nations since the late 1990s.

Internet banking is a cause of concern to majority of the offline banks who should be ready for an unprecedented competition from the non-traditional banking institutions that offer banking and financial services over the Internet (Rajgopalan, 2001). Although some of the traditional banks have started offering their services on line, it is only an extension of their offline services (Devi, 2001). Internet banking has now started motivating customers to park their funds with the online banks, which has a substantially impact on the deposit base of the brick and mortar banks.

The use of technology in banking has direct relationship with the profitability. *Ceteris paribus*, investment in electronic banking increase the profit margin of banks by reducing costs and increase in non-interest income, which will increase the ROA and ROE (Sinkney, 1998). Cost-effectiveness in delivery of services directly implies *comparatively* high consumer satisfaction and a consequent change in the revenue model for the banks. Adoption of the Internet mode of banking would result in increased consumer awareness, attracts the entry of global majors in the market and would lead to the emergence of open standards in the banking industry (Treasury Management, 2001). The integration of the banking services with e-commerce and emergence of e-cash would positively affect the efficiency scores of the banks (Scott, 1999)

However, Internet banking is a mixed blessing in the form of increased risk, the level of confidence reposed by the consumers and the problem of blending it with the physical system (Hawke, 2001). Internet banking has brought about a new orientation to risks like settlement risk, international technology transfer risk, crime or fraud risk, regulatory avoidance risk, taxation avoidance risk, and competition risk (Saunders, 1997). Basel II recommendation on operational risk also supports this hypothesis. In India, some banks like HDFC and ICICI have introduced payment gateways running on secure systems having firewalls against hacking (Rao, 2001). Convenience, safety and cost effectiveness are the jargons in the spectrum of online banking (Rose, 1998).

Researchers on various occasions have raised many issues, which must be addressed in context of Internet banking in India. *First*, the availability of technology and infrastructure to support the new model of banking. *Second*, the need for Internet banking itself – Internet Banking or an efficient system of instantaneous banking or convenient banking. *Third*, an adequate mechanism to tackle the security risk and operational risk aspects (Sharma, 2001). *Fourth*, a proper legal framework to take care of the rights and obligation of the consumers. While most of these issues have been somewhat addressed, an important issue still remains - what existing and potential consumers feel about Internet banking and on the basis of this how an appropriate banking model can be developed in Indian context. There is a need to measure and analyze the consumer perception towards Internet banking, to find out what is wrong with traditional banks and provide a framework for the banks to strategically adopt the Internet so as to maximize value for the consumers.

ANALYSIS AND FINDINGS

Consumer Behavior and Concerns Awareness

The awareness level of private sector Indian banks is the highest followed by the foreign banks. This is mainly due to the reason that private sector Indian banks are relatively new and they have positioned themselves as online banks from the very inception. Also, the various consumer groups do not perceive the public sector banks as online banks. However, the banks feel that their market perception is likely to change soon once they put on intensive advertising. Banks proposing the Initial Public Offer (IPOs) of securities in near future can think of simultaneously positioning themselves as the *new generation banks*. The awareness of online offering is polarized towards their (Consumer's) own banks from which they are availing the banking services.

Consumer Behavior and Concerns: Usage Patterns

A significant proportion of Internet banking users (56.5%) use Internet banking 1-5 times a month, which is low compared to the e-developed countries, and also Asian counterparts like Korea and Japan. Another 31.5% are using e-banking 6-10 a month. Daily users of Internet banking are almost absent and the percentage of those using once in two days is meager to establish any significance probably because of low Internet penetration. However researches indicate that in spite of low availability of sophisticated branch networks, spread of Internet would promote e-banking (Jaffe, 2003).

Table 1: Gender Wise Usage of the Internet Banking

| Frequency of Use (Times per Month) | Percentage of Total Respondents | | |
|------------------------------------|---------------------------------|-------|-------|
| | Female | Male | Total |
| Never | - | - | 1.0% |
| 1-5 | 15.8% | 40.7% | 56.5% |
| 6-10 | 9.3% | 22.2% | 31.5% |
| 10-15 | 3.7% | 1.9% | 5.6% |
| 16-20 | - | 2.7% | 2.7% |
| Above 20 | - | 2.7% | 2.7% |

Table 2: Education Background and Internet Banking

| Frequency of Use (Times per Month) | Percentage of Total Respondents | | | |
|------------------------------------|---------------------------------|----------|---------------|--------------|
| | Under -Graduate | Graduate | Post-Graduate | Professional |
| Never | - | - | - | - |
| 1-5 | 2.8% | 37.8% | 11.2% | 5.6% |
| 6-10 | - | 1.6% | 9.3% | 6.5% |
| 10-15 | - | - | 0.1% | 4.7% |
| 16-20 | - | 0.1% | 0.2% | - |
| Above 20 | - | 0.1% | 0.1% | 0.1% |

A significant variation exists between the various banks for the frequency of usage ($F= 7.503$) with high value for Indian private banks followed by multinational banks. Interviews conducted at banks revealed that the use of Internet banking is mainly attributable to day-to-day transactions, which is further confirmed by the questionnaire responses. Gender wise usage of the Internet banking reflects a polarization towards males (Table 1). These results are obvious because the conventional, brick and mortar banking is also dominated by the male users. This implies a good scope for the Indian banks to capitalize the opportunity and focus on females. Research studies conducted by IAMAI also indicates that male users constitute the major chunk of the Internet banking population (www.iamai.in). In India, female workers in the organized sector have been conventionally low. But, the recent trends show a potential for significant rise in the female working population especially, in the awake of policy programs focusing on education for female child and spread of Information technology. In addition, the BPO and other ITES sectors are on rise and once the females become Internet savvy in India, they can turn out to be good customers for the banks with high probable usage.

Results reveal that a significant portion of the frequent (1-5 times a month) Internet banking users (37.8%) is a graduate followed by postgraduates who use Internet banking not more than 10 times a month. Interestingly, the professionals' category is not the frequent user. After combining the categories of professionals and post graduates, it is established that they are the second grade users of internet banking though not using beyond 1-10 times a month (Table 2).

The study shows that the income groups 2 and 3 {Less than Rs. 15,000 and Between Rs.15000-30000} are frequent users of the Internet banking. Research conducted by Ekos Research Associates Inc. Canada indicates that use of electronic banking is a positive function of income levels. However, Indian

conditions are different from those of developed countries therefore it is difficult to generalize. None the less, the findings have strategic implications for the banks since their reference group is somewhat different as noticed during the interviews with the bankers.

Consumer Behavior and Concerns: Satisfaction

The overall satisfaction scores of the respondents obtained on a scale of 1-10 on various measurable variables and tested for F-ratios reveals that satisfaction level differs among income groups, use frequency and banks (F-values - income groups = 11.828; use frequency = 21.165; banks = 9.28). The mean satisfaction levels in case of public sector banks are the lowest. This may be due to late starts, poor infrastructure or lower risk tolerances. Satisfaction levels are comparatively better for private banks because of their strategic business models as mentioned earlier. On the basis of mean scores obtained for incomes groups it may be concluded that the persons having income in the range of 15,000 – 30,000 are highly satisfied compared to others. This was obvious because this is the class, which uses Internet banking frequently. A survey of the Korean customer revealed high Internet banking use and consequently high satisfaction. But, the overall mean scores of satisfaction indicate that in general, Indian consumers are partially satisfied with the Internet banking services.

Consumer Behavior and Concerns: Preferences

The results show that most of the consumers use Internet banking for account information and day-to-day transactions. Examination of the websites of various Internet Banking service providers suggest that websites offering only basic level services and the other facilities like transfer balances, investment in securities, loan and mortgages etc. are not available. It can be concluded that the usage levels can grow once the web sites are equipped with multiple products offering coupled with appropriate infrastructure, which is, as highlighted, the problem of most of the banks in India.

Table 3: E-Banking Services of Foreign Banks

| Banks | Daily Transactions | Account Information | Transfers | Other |
|-------------------------|----------------------------------|---------------------|-----------|-------|
| | <i>Percentage of Respondents</i> | | | |
| ABN Amro Bank | 100% | 100% | 30% | 30% |
| Bank of Punjab | 60% | 80% | 0% | 20% |
| Canara Bank | 100% | 100% | 0% | 0% |
| Citi Bank | 100% | 83% | 50% | 33% |
| HDFC Bank | 62% | 85% | 50% | 33% |
| HSBC | 100% | 0% | 0% | 0% |
| ICICI Bank | 75% | 83% | 8% | 13% |
| IDBI Bank | 86% | 0% | 0% | 0% |
| State Bank of India | 100% | 33% | 0% | 0% |
| Standard Chartered Bank | 100% | 0% | 50% | 0% |
| UTI Bank | 86% | 100% | 14% | 0% |

Table 3 reveals that the e-banking services of foreign banks and some flag public sector banks are used primarily for daily transactions and private banks like HDFC, BOP ICICI are lagging. Similar results are also shown by research studies on Nigeria (Chiemeke, 2006).

Another major use of the e-banking is account information. It is well known that account information has been for many years a major area of concerns from the point of view of customer services. This is one of

prominent advantages of Internet banking what bankers revealed. The funds transfer facilities are used mostly in case of private banks and customers of none of the public sector banks were found to be using the Internet banking for this purpose. It was also found that those who use e-banking frequently visit the bank branches only 1-2 times per month. Citibank and ABN Amro bank are popular among their customers for Internet Banking. In general, people are highly concerned about security and therefore they do not rely on the public sector banks for Internet fund transfers.

Consumer Behavior and Concerns: Consumer Expectations

Table 4 Expected vs. Actual Performance (Conventional Banking)

| Parameters | F-ratio |
|------------------------|---------|
| Accuracy (ACC) | 47.593 |
| Speed (SPEE) | 13.174 |
| Confidentiality (CONF) | 30.311 |
| Customisation (CUS) | 10.167 |
| Ease of Use (EASE) | 22.820 |
| Safety (SAFE) | 51.064 |
| Empathy (EMP) | 40.384 |
| Trust (TRUST) | 101.761 |

Table 5: Conventional vs. Internet Banking

| Parameters | Computed F-ratio |
|------------------------|------------------|
| Accuracy (ACC) | 9.943 |
| Speed (SPEE) | 18.257 |
| Confidentiality (CONF) | 3.416 |
| Customisation (CUS) | 22.804 |
| Ease of Use (EASE) | 89.188 |
| Safety (SAFE) | 28.641 |
| Empathy (EMP) | 62.841 |
| Trust (TRUST) | 38.932 |

The expected level of performance and the actual performance of the conventional banking system shows a huge gap. The least mean scores of performance for parameters like accuracy, confidentiality, safety and empathy indicate significant dissonance between expectations and performance. However, trust is interestingly found to be a major area of concern. Lesser variances are obtained for speed and customisation. Also, the computed value for F-ratio is significant for all parameters except confidentiality. Conclusions derived are- (a) Consumers feel that Internet banking is easier compared to conventional banking; (b) Conventional banking lacks speed especially in case of public sector banks and (c) Ratings on various parameters are comparatively higher in case of frequent users and high-income groups. Deutsche Bank AG (2006) research indicates “speed” as an important driver of Internet Banking. GVU (2004) study indicates that security is an “important factor” for opening Internet bank account followed by convenience (83.1%), availability of variety of features and services (77.1%), attractive interest rates and services charges (74.5%), quick service (72%), familiarity with the bank name and image (68.3%), the actual bank location (42.2%), the size of the bank, in terms of assets (39.4%), and having integrated value-added services from other on-line services and resources (30.2%). The results indicate deviations in context of Indian Consumers.

The results obtained from the perceptual maps generated and cluster trees run for income levels reveal that – (a) Trust is the most important factor in provision of banking services followed by accuracy and confidentiality; (b) Consumers in the high income groups are highly concerned about the safety of transactions in banking though ease of transaction is on the least priority; (c) Speed is an area of concern for the conventional banking system where the consumer rated the least (d) Safety ranking of the conventional banking system was found to rise with the movement to higher income levels; (e) Internet banking has been highly rated the highest by the consumers on the parameters of accuracy though safety is matter of concern; (f) the opinions on ease of transactions and customization in Internet banking are mixed among the consumer groups. This may be because of the access to the computer systems and varied requirements among them.

Factorial analysis of banking services reveals that the banking services must prioritize and optimize on the group of variables consisting of speed (SPEE), Safety (SAFE), Trust (TRUST), Confidentiality (CONF) and Accuracy (ACC). Another set, which emerges, is Customization (CUS), Empathy (EMP) and Ease (EASE). The logical strategic function for bankers can be expressed as follows:

$$\text{Maximize Value } (V) = P_1(\alpha_1 \text{TRUST} + \alpha_2 \text{ACC} + \alpha_3 \text{CONF} + \alpha_4 \text{SPEE} + \alpha_5 \text{SAFE}) \\ + P_2(\alpha_6 \text{CUS} + \alpha_7 \text{EMP} + \alpha_8 \text{EASE}); \quad P_1 > P_2$$

Limiting Variables: Technology (TECH), Investment (INV), Legal Restrictions (LR), Asset Base (A)

The two main consumer groups, which extract from the clusters and perceptual ratings are – (a) high-income males placing high reliance on safety of transactions and (b) graduates in the middle income group desiring convenience of banking. Researches also show that the companies would do well if they could find the demographic profile of Internet users, which would help them devise strategies accordingly. The use and resulting profits of the Internet banking depends upon the brand positioning, level of services offered and consumers targeted. It can be concluded that from the consumer's perspective, apart from speed and convenience, there are certain other factor like trust, safety and confidentiality are of paramount importance, which unless focused cannot maximize value to the customer, at least, in Indian context.

BANK STRATEGIES

Interviews and opinions of the bankers indicate that the factors which determine the bank's strategy to go online are - *Assets of a bank* -the larger the bank the more likely it will be to choose to offer Internet banking; *Years in operation* – new banks are more adaptive to new technologies and has more probability of offering Internet Banking; *A bank that is a member of a bank holding company* is more likely to offer Internet banking, because a bank holding company can use a single Web site to provide Internet banking access to customers of the many banks in the holding company; *Urban locations* – banks situated in urban areas are more likely to offer their customers Internet banking than banks in non-urban areas. Banks in more densely populated areas may respond to greater customer demand for Internet banking and to more intense competitive pressure from rival banks in the same market; *Deposits Ratio* - Banks that are less reliant on traditional sources of funding may pursue a more aggressive overall business strategy, including the adoption of Internet banking; *Expenses ratio* - On the one hand, banks with relatively high expenses for premises and fixed assets may view adoption of Internet banking as a way to reduce expenditures devoted to maintaining a branch network.

On the other hand, some analysts have argued that banks without a large branch network will seize on Internet banking as an inexpensive means to expand their customer base; *Non-fee income ratio* – banks with lower interest income ratio would adopt Internet banking strategically. *ROE* - profitable banks will prefer Internet banking for competitive positioning and also less profitable banks may be more willing to

invest in Internet banking to improve their performance. *Rating* – Rating on safety and soundness also affect decision to offer Internet banking. Research reports indicate that Internet banking may not yet have had a big impact on the bottom line of most banks except the newly born banks. Also, awareness and growth of e-commerce would make Internet banking as an important factor affecting bank performance. It is logical that the profitable banks are more likely to adopt Internet banking than others.

International Experiences

In U.S.A. the Internet banking is relatively developed with a fairly large number of transactional websites and business volumes. However, the large banks are more dominant than the small banks in offering Internet – based banking services. It has been found that e-banks are more profitable than non e-banks but this phenomenon cannot be generalized as such. The growth is significant but not sufficient. This is probably because of lack of value added proposition that banks offer to customers (www.capco.com, 2005). In Europe, the Internet banking is growing gradually and most of the prominent banks are offering Internet banking services. Swedish and Finnish markets are market leaders lead the world in terms of Internet penetration and the range and quality of their online services. Internet Banking started slowly in Australia, but now is picking very fast. In New Zealand, the major banks offer Internet banking service to customers; operate as a division of the bank rather than as a separate legal entity. Reserve Bank of New Zealand applies a uniform approach to the regulation of both Internet banking activities and traditional banking activities. Banks in Japan are increasingly focusing on e-banking transactions with customers and Internet banking is an important part of their strategy. Based on the experience in native countries, the foreign banks are trying hard to capture the market. But, these banks have to restructure their business models suitable to Indian conditions.

In the current scenario, the banks need a transformation which can be achieved through – a mindset to adopt technology, recognizing the core competencies, an initiative from the top management to convert the organization to outward looking and aligning roles and value propositions with the customer segments. The suitability of technology and a careful analysis of the needs of customers are equally important (Pires and Aisbett, 2002). Study conducted by Sangaran (2001) on Malaysia focuses on the change that is required in the attitude of bankers to adopt Internet banking. The banks have to develop a sound strategy before implementing Internet banking in order to compete in the global market place.

Regulatory and Supervisory Concerns

Internet banking requires that the banks' internal systems to be linked with the systems in public domain. Further, the concept of conventional audit trails is not logically applicable to Internet banking. Internet Banking is susceptible to risks in the form of criminal activities, such as fraud, money laundering, tax evasion etc. Internet banking allows the banks as well as customers to operate with geographical boundaries thus creating a problem of exchange controls. Cross border issues are more critical when the banks have their operating offices in different locations posing the problems of jurisdiction and conflicting laws of different nations. Evidences indicate that banks are facing loss of customer confidentiality, which may pose a reputation risk to banks and the banking system as a whole. However some banks have started educating customers through adequate disclosures of such risks.

Internet Banking is subject to various statues including Banking Regulations Act, 1949, the Reserve Bank of India Act, 1934, and the Foreign Exchange Management Act, 1999, Information Technology Act, 2000, Indian Contract Act, 1872, the Negotiable Instruments Act, 1881, Indian Evidence Act, 1872, etc. which need to be amended and made clear in relation to the Internet banking transactions. A study conducted by Gupta (2006) also raised concerns over data protection provisions. The impact of Internet banking on monetary and credit policies of Reserve Bank of India is a critical area of concern. In

developed countries a broad regulatory framework for Internet banking exists, which is still pending in India.

SUMMARY AND CONCLUSIONS

It can be concluded that Internet banking in India is only at its primitive stage dominated by the Indian private and foreign banks. The use of Internet banking is confined to a few consumer segments. The risks associated with Internet banking are many, which the banks have to model using sophisticated systems and extensive use of technology. The legal framework as its exists requires an updating to streamline and handle the issues associated with Internet banking. The functional model can be used to prioritize perceptual variable concerning consumer behavior so that value to the consumer can be maximized. The banks can focus on strategic consumer groups to maximize its revenues from Internet banking. The experiences of the global economies suggest that banks cannot avoid the Internet banking phenomenon, but to gain a competitive advantage, they must structure their business models to suit to Indian conditions.

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ROLE OF INTANGIBLE ASSETS IN THE SUCCESS OF SMALL AND MEDIUM-SIZED BUSINESSES

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ABSTRACT

This paper examines the determining factors in the success of the small and medium-sized business. The emphasis of the investigation has been in the role played by intangible assets in the establishment and maintenance of a competitive advantage. In order to analyze in detail the characteristics of intangible assets and their relation with the success of small and medium-sized businesses, a case study was undertaken of 5 different businesses of varying activities; two of them located in Catalonia, and three in Jalisco. Evidence was obtained from various sources, principally through interviews with management teams and visits to company premises to observe operating processes. The results confirm the relevance of intangible assets in the establishment and maintenance of a competitive advantage, and also suggest that such assets are a consequence of organizational learning. In addition, there is evidence of a relationship between the skills, preferences and attitudes of the management team, and its capacity to oversee the learning process and the creation and utilization of skills and resources within the specific know-how of the business.

JEL: M11, M12, M13

INTRODUCTION

Recent literature dealing with strategic management emphasizes the importance of resources based upon information and knowledge in the development of a business. Despite much interest, there are relatively few studies that consider the role of these assets empirically in the development of the small and medium-sized business. To help resolve this situation, this study considers the determining factors in the success of the small and medium-sized business. The emphasis of the investigation is in the role of intangible assets in the establishment and maintenance of a competitive advantage. The primary aim of the study is to confirm empirically if intangible assets are the determining factor in a sustainable competitive advantage, and if organizational learning is the principal source of intangible assets through which the small and medium-sized business (SMB) can sustain its competitive advantage.

This paper exposes some of the most significant results of the investigation and structure in the following way: The *Literature Review* considers diverse theoretical models relating to the success of companies, along with their adjustment to approach the analysis of the performance of the SMB. The resource-based theory (RBT) is explored, since this explanation of the performance of the company would appear to adapt well to the objectives of the investigation. Next, in *Objectives and hypothesis* the set of hypotheses relating to the intangible assets and their relation with the success of the SMB are considered, formulated from the RBT and the analysis of the characteristics of these types of companies. In *Methodology* the choice of methodology for the case studies to make the contrast of the hypotheses is discussed, describing the companies included in the study and the procedures that were carried out in the investigation, including the criteria that were followed to guarantee the objectivity of the results. In the *Results* section the findings of the study are presented through empirical evidence. This section begins with a description of the characteristics of the management of the companies studied, and subsequently the attributes of the resources and capabilities of the companies. Once the attributes of the product of the company that represent a competitive advantage are defined, a review of the evidence of this advantage, first in the capabilities and thereafter in the resources of the company and its potential was evaluated in maintaining the advantage of the company in the long term. Finally, in *Conclusions and limitations*, the findings are

reported and their relevance to the hypotheses of the work is discussed, as well as the necessity for future investigations.

LITERATURE REVIEW

Strategic management considers that a company is successful if has a competitive advantage, if possible sustainable, that allows it to obtain profits. The structural theory (Porter 1981, 1991) and the resource-based theory (Wernerfelt 1984, Rumelt 1984, Barney 1986, Dierickx and Cool 1989, Grant 1991, Peteraf 1993) approach the analysis of the determining factors in which the companies can develop a competitive advantage from different perspectives. These theories seem to complement each other (Barney 1991, Hansen and Wernerfelt 1989, Spanos and Lioukas 2001), although empirically it has been demonstrated that the internal factors of the company explain a greater percentage in the variance of the benefits of the companies than the factors associated with the industry (Rumelt 1991, McGahan and Porter 1997, Mauri and Michaels 1998, Spanos and Lioukas 2001).

In this sense, the resource-based theory (RBT) represents, in principle, the best option to approach the analysis of the determinants of the success of the small and medium company (SMB). However, the explanation of the competitive advantage has a limitation, namely due to the fact that each company is unique, and it does not explore the differences that exist in the competitive behavior of the SMB in relation to larger companies (LC). This limitation is significant, since it could imply that the explanation of the success of the company in the RBT is correct when is applied to the analysis of the competitive behavior of LC; but this is not the case, even to a small degree, when it considers the determinants of the competitive advantage of the SMB.

The doubts associated with the explanatory value of this theory, when considering the analysis of the SMB, originate from the differences between these types of companies and LC not being limited their scale, or taking into account that they are in a different phase of evolution which all companies have to follow. Frequently the SMB cannot or does not want to transform itself into a LC, and in general, its behavior and the results that it obtains are conditioned by factors that are clearly different from those that affect LC, as much by their type, as by their level of impact in the results (Chen and Hambrick 1995).

These conditioning factors fundamentally relate to the greater level of uncertainty in which the SMB must operate, with its ability to change without incurring high costs and its ability to innovate (Storey 1994, Burns 1996, Julien 1998).

To a certain extent, the characteristic differentials of the SMB are reflected in this type of company not being able to accede to certain types of resources, at least not without significant disadvantages when compared to LC. This situation gives rise to differences in the resources and capabilities of both types of companies. In this sense, if it is accepted that the SMB can be successful, and that the strategic, unique and idiosyncratic assets explain the competitive advantage, then, to explore the determinants of the success of this set of companies, it is necessary to establish which are the types of assets that have greater probability of being used in the creation and maintenance of its competitive advantage.

In this study, to identify those resources and capabilities crucial to the performance of the SMB, the results were examined of diverse empirical investigations related to the determination of the factors of success (Haahti 1994, Hurmerinta-Peltomäki, 1994, Yusuf 1995, Lin 1998, Warren and Hutchinson 2000, Read 2000-2001). From these results it was observed that amongst the most important factors in the performance of the SMB are the characteristics of the manager/owner, the specific abilities, knowledge and attitudes of the employees and managers, the relations established with the clients, suppliers and distributors, the knowledge of the market and its tendencies, as well as the reputation of the company and the product.

Some of the factors necessary for success indicated before, namely the aptitudes and knowledge of the employees and managers, have also been identified and analyzed in other papers, particularly the ability of the SMB to specialize and to change (Storey 1994, Burns 1996, Julien 1998). These abilities are valuable for this type of company, given the characteristics of the present competitive environment, whose more evident characteristics are the economic globalization and the speed of change associated with technological advances.

The conjunction of these factors has given rise to two tendencies. Firstly it leads to the formation of global markets for many standardized products. Secondly, it contributes to market fragmentation, encouraged by the coexistence of multiple technologies and the formation of more and more specific niches, associated with the emergence of new breeds of consumers.

The formation of niches can also respond to the characteristics of the supply, particularly in activities whose level of uncertainty and risk demands that companies maintain a high level of flexibility and capacity of adaptation, to adjust quickly and at low cost, to the changes in the business environment. This circumstance favors the SMB, as much by its ability to specialize and to change, as for the limited appeal of these types of markets for the LC.

As previously discussed, it is usually thought that the SMB has greater probability of success if it focuses its competitive strategy on finding a niche, where it is able to take advantage of the ability to specialize and change without incurring high costs. If this is true, then the determining factors of the ability to specialize and to change constitute the basis for which the competitive advantage of the companies of this type is maintained.

Once the set of resources and capabilities that are key to the success of the SMB are identified theoretically, their common characteristics are established, with the intention of facilitating the design of the analysis model that is set out in this paper.

The main attribute common to all such resources is its intangible nature. This result is certainly not a surprise, in fact in strategic management many precedents exist that point to the relevance of intangible resources in the strategy of the company (Itami 1987). In the context of the resource-based theory, some investigations of empirical nature have been made that demonstrate the relation of these resources with a competitive advantage (Hall 1992, 1993). Nevertheless, if this relation is also true in the context of the SMB is yet to be verified.

STUDY OBJECTIVES AND HYPOTHESIS

Taking into account the above, the need to undertake new investigations that allow validation of the explanation of the competitive advantage as outlined by the resource-based theory when it is applied to the SMB, in particular the role that the intangible assets play in the success of this type of organization, appears to be demonstrated.

With this intention, using the literature outlined earlier a set of hypotheses relating to the competitive performance of the SMB have been established. Firstly they are of general character:

- Are the intangible assets the main determinant of the sustainable competitive advantage of the SMB?
- That organizational learning is the main source of the intangible assets in which the SMB maintains its competitive advantage.

These general hypotheses framed in the resource-based theory (RBT), and its fulfillment implies the verification of the following hypotheses:

1. The resources and capabilities that contribute to create and to sustain the competitive advantage of the company are valuable, scarce, difficult to define and replicate.
2. The assets of the SMB that have greater probability of contributing to create and to sustain the competitive advantage of the company have intangible character.
3. The best intangible assets for the competitive advantage of the company are created inside the organization.
4. The resources and capabilities supported by the employees and managers of the SMB, in particular by their owners, are fundamental for the support and reconfiguration of the competitive advantage of the company.
5. Organizational learning is the main mechanism of the SMB for the reconfiguration of the company and the creation and development of new resources and capabilities.
6. The characteristics of the management team of the company, and in particular those of their owners, are determining in the characteristics and the dynamics that the organizational learning followed in the SMB.

METHODOLOGY

In order to empirically test the hypotheses of this paper, several case studies have been made. This methodology was chosen for adaptation in the analysis of the variables that explain competitive advantage as outlined in the RBT (Rouse and Daellenbach, 1999). The design of the investigation established the following model of case studies proposed by Yin (1989), characterized to incorporate diverse mechanisms to guarantee the quality of the study. Amongst such mechanisms are the tools used to control the reliability of the evidence, as much concerning the protocols that are used to lead the fieldwork, as in the logging and processing of the gathered data, and in the detailed description of the treatment that is given to the evidence and its analysis. This allows confidence in the trustworthiness of the study and the validity of its conclusions.

The contrast of the hypotheses of this investigation has been made by means of the study of five companies defined as SMB which possess a competitive advantage. Two of them are located in Catalonia, Spain and three more in Jalisco, Mexico. Of these, three correspond to the service sector and two to the industrial sector (see Table 1)

Table 1: Sample Companies

| | Case | Activity | Number of employees | | Location |
|----|--------|--|---------------------|---------------|-----------------------------|
| | | | First Period | Second Period | |
| C1 | MSP | Local Courier | 20 | 25 | Guadalajara, Jalisco |
| C2 | IMPRO | Business Consultants | 35 | 35 | Guadalajara, Jalisco |
| C3 | Huurre | Fabrication of insulated panels | 30 | 55 | Cassà de la Selva, Cataluña |
| C4 | Actar | Design, editing and distribution of books and catalogues of art, architecture and design | 18 | 34 | Barcelona, Cataluña |
| C5 | CEO | Market Research | 89 | 106 | Guadalajara, Jalisco |

Given that this study attempts to contrast hypotheses, it was necessary to undertake a multiple case study that allowed the replication of results, as much in direct form as in a logical form, since this is a criterion important in establishing the validity of the results (Yin 1989). For this reason companies of diverse sectors and regions were chosen. The concept was to be able to compare the patterns of resources and outstanding capabilities for the SMB, as well as the mechanisms used in usage, in diverse contexts, with the purpose of identifying variations associated to the activity and the geographic location of the company. In fact, companies originating from regions with varying levels of economic development were chosen in order to observe how this affects the internal dynamics and operation of the company.

It is important to point out that the group of companies studied does not constitute a representative statistical sample. In fact, the case study does not look to make a generalized statistical analysis; therefore the cases that are included in this study do not constitute a sample selected with random criteria. The cases are chosen by their suitability to investigate in depth the causes of a given phenomenon (Eisenhardt 1989). A case study could be considered as an experiment, and the study of multiple cases as a sequential set of experiments, or surveys, and not a survey with a small sample. In the logic of experimental investigation, the results of an experiment are confirmed or rejected by the same group of investigators, or alternatively by others who question the findings or look to extend them. If the results coincide (direct replication) or present variations attributable to an identified cause (logical replication) the empirical findings support the theory. If this is not the case, the evidence is incorrect or insufficient to explain the studied phenomenon. The experiments are not chosen at random, nor their results compared equally with those of other experiments. The logic of investigation by means of case study is comparable in this respect.

The method of generalization of by case study is analytical, in which a previous theoretical development is used as reference to compare the empirical results of the case study. If two or more cases support the same theory, replication can be considered. The empirical results can be considered more forceful if two or more cases support the same theory, and they do not compete with another equally reasonable rival theory (Yin 1989).

If this study had been made following the logic of quantitative investigation, their results would be seen as extremely limited, due to the vastly reduced sample size. In fact, N=5 would not be representative of the universe as vast as is SMB in Jalisco and Catalonia. However, this not is case. As indicated by literature (Eisenhardt 1989, Yin 1989) a case study that includes 5 cases can be adopted, although it is recognized that the inclusion of additional cases would have been of use in analyzing some aspects of the competitive advantage of the SMB where theoretical saturation was not obtained (Eisenhardt 1989).

The evidence for the study was obtained following different criteria to guarantee the trustworthiness of the study (Yin 1989). The main tools of data collection were interviews with members of the management teams, visits to the facilities to observe their operative operation and the attendance of work meetings. The study, of longitudinal character, was initiated in 1998 and it has monitored the strategies followed by the companies until 2005. In this paper only the information corresponding to the first two periods of study appears (1998 and 2000), as there were significant strategic changes in three of the five cases, a situation that prevented the accomplishment of the later joint analysis.

RESULTS AND FINDINGS OF THE STUDY

The findings of this investigation show the importance of the intangible assets in the success of the SMB and agree, in general terms, with the literature concerning RBT. Two characteristics of the SMB are confirmed as being particularly important in their success: its capacity to innovate by means of informal and incremental mechanisms and to adjust to the necessities of its clients without incurring high costs. Both aspects are related to the characteristics of their management team. These findings are detailed in this section.

The evidence obtained indicates that a high level of coincidence exists between cases in the values and attitudes that are considered important, of the activity to which the company is dedicated and of its geographic origin. Even so, the only attitudes that were considered important in all the cases were customer service and the reputation of the company (year 2000) and the critical behavior and search for better alternatives (year 1998).

Amongst the most significant attitudes for a company is the acceptance of change and flexibility, along with the commitment to the company and responsibility. That these attitudes of the employees are considered of high importance confirms the relevance to the SMB of the ability to change without incurring high costs. Other attitudes considered important are the level of motivation, loyalty to hierarchical superiors, adaptation to the culture of the organization, and clearly, attention paid to clients and the company's reputation.

As far as decision making, the evidence found does not allow us to establish a pattern in the attitude of the management team with respect to the participation. It was observed that owners, directors and specialized employees working in teams without differences in roles associated with a formal hierarchy were perceived. However, it was also observed that important decisions are usually taken by a single person (or a reduced group) that exerts clear leadership within the company.

As far as the technical valuation of management, the evidence indicates that in all cases the companies are considered to be managed better than the competitors, particularly regarding its production policies. The most relevant evidence from this part of the study considers three findings:

Leadership: A defined leader clearly exists, not necessarily the owner of the company, although usually part of the founding team. This figure defines the mission and vision of the company and is able to obtain the cooperation of the members of the organization in the attainment of its objectives.

Efficiency: It was seen that all the management team relies on a high level of capabilities and technical knowledge relating to their business, allowing the company to produce or provide services more efficiently. Nevertheless, in no case was it observed that the leader relied on formal training in management. This situation, added to the scant attention which the areas of the company more removed from the interests of the leader received, generate great differences in the aspects in where the company is more efficient and where it is less so. In fact, associated problems were observed with the management of activities not connected with the core activities of the company. These problems are accentuated when the growth of the company requires the formalization of the organizational design, the roles of the employees within the company and particularly with the coordination of those tasks requiring the use of formal planning tools. That the management team counted on a high level of training within the company is a predictable result, since it agrees with the literature related to the creation of companies that usually relates the creation of new organizations to the initiative of an entrepreneur who considers him or herself to be able to cater to market needs owing to their high level of experience and knowledge of the activity. This would be the case of former executives of established companies who, on leaving decide to create a SMB (Storey 1994). However, where the attention of management is centered in certain aspects of the company and where it is neglected deserves more attention.

On the one hand, Leonard-Barton (1992) in her analysis of the effect of capabilities of a company in development of new products, indicates that characteristics of dominant coalitions of organization facilitate or obstruct innovative activity (and by extension all activity in the company) because they only understand activities related to their own interests, whereas they neglect what they do not understand, judging as irrelevant or with little potential. This seems to agree with the evidence found. On the other hand, in the case of the SMB this should not be so, since the management team is usually familiar with and responsible for all aspects of the company. The truth is, as indicated by Burns (1996), that the figure of the manager of the SMB, for better or for worse, has a determining influence in the performance of this type of company, since their vision and values influence all aspects of the organization and their behavior is usually much less adverse to the risk than managers of larger companies. They are free to establish the objectives that are consider appropriate for his organization, without being inhibited by the necessity to guarantee that a certain level of economic and financial rationality remains. Their objectives can be

multiple, and in certain cases, those of other people. To the sovereignty of the owner manager of their patrimony (the company) other considerations such as limited rationality can be added, allowing them to accept that the physical limitations of a person or a small team mean it is impossible to manage and to interpret the enormous volume of necessary information so that their decisions are perfectly rational.

Teamwork: This is a common practice, possibly associated with a high level of company ownership, particularly of the members of the management team and the oldest and most specialized employees, who have participated throughout the history of the organization in the construction and development of the organizational routines. In addition, many of them have had to change their role in the organization to be able to respond to the necessities of the development of the company.

Attributes of The Resources and Capabilities of a Company

One of the most interesting aspects of the evidence found is that the product of the companies counts on more of the attributes than the competitive advantage of the company can support (see Table 1, Panel A,B,C). The only case where a key criterion clearly exists is in C3, where the price represents 90% of the decision of purchase of the target client. In C1, the adjustment of the product to the necessities of the client represents 40% of the decision to buy by its target client and whilst it is an important criterion, it does not reach the relevance level that the price has in C3. In the remaining cases, diverse attributes exist that have a similar importance in the purchase decision. The identification of the differing attributes of products C1, C2, C3 and C5 allowed the establishment of the attribute that is more representative of the competitive advantage of the company. In C4 several equally important attributes were identified that are complementary.

As can be observed in the second part of the table, all cases count on products equipped with different attributes, barely replicable, that are key in the decision of purchase of their target client. Nevertheless, the importance of these attributes varies considerably between cases. An example is C2, whose product counts on only one important differential attribute, which represents 15% of the target client’s purchase decision. On the other extreme is C3, where the sum of the differential attributes of its product represents 100% of the decision to purchase.

Table 2: Attributes That Represent the Competitive Advantage of the Company

Panel A: Attributes and Competitive Advantages

| ATTRIBUTES | 1998% | | | | | 2000% | | | | |
|--------------------------------|-------|----|----|----|----|-------|----|----|----|----|
| | C1 | C2 | C3 | C4 | C5 | C1 | C2 | C3 | C4 | C5 |
| Price | | 20 | 90 | 10 | 5 | | 20 | 90 | 5 | 5 |
| Quality | 20 | 5 | 5 | 10 | 30 | 20 | 5 | 5 | 15 | 30 |
| Aesthetics | | 5 | | 20 | 5 | | 5 | | 20 | 5 |
| Availability | | 10 | 5 | 20 | 5 | | 10 | 5 | 20 | 5 |
| After-Sales Service | 15 | 5 | | | 20 | 10 | 15 | | | 20 |
| Innovation | 5 | 20 | | 20 | 5 | 15 | 20 | | 20 | 5 |
| Suitability for customer needs | 40 | 20 | | | 10 | 30 | 20 | | | 10 |
| Functionality | 20 | | | | 10 | 20 | | | | 10 |
| Image | | 15 | | 20 | 10 | 5 | 15 | | 20 | 10 |

Panel B: Difficulty in Replicating the Company Product Attributes 1998

| ATTRIBUTES | 1998 | | | | | | | | | | | | | | |
|--------------------------------|------|----|----|----|----|--------|----|----|----|----|-----|----|----|----|----|
| | High | | | | | Medium | | | | | Low | | | | |
| | C1 | C2 | C3 | C4 | C5 | C1 | C2 | C3 | C4 | C5 | C1 | C2 | C3 | C4 | C5 |
| Price | | | 1 | 1 | | 1 | | | | | | 1 | | | 1 |
| Quality | 1 | | 1 | 1 | | | | | | 1 | | 1 | | | |
| Aesthetics | | | | 1 | | | 1 | | | 1 | 1 | | 1 | | |
| Availability | | | 1 | | | 1 | | | | 1 | | 1 | | 1 | |
| After-Sales Service | 1 | | | | | | | | | 1 | | 1 | 1 | 1 | |
| Innovation | | | | 1 | | 1 | 1 | | | 1 | | | 1 | | |
| Suitability for customer needs | 1 | | | | 1 | | 1 | | 1 | | | | 1 | | |
| Functionality | 1 | | | | 1 | | 1 | | | | | | 1 | 1 | |
| Image | | 1 | | 1 | 1 | 1 | | 1 | | | | | | | |

Panel C: Difficulty in Replicating the Company Product Attributes 2000

| ATTRIBUTES | 2000 | | | | | | | | | | | | | | |
|--------------------------------|------|----|----|----|----|--------|----|----|----|----|-----|----|----|----|----|
| | High | | | | | Medium | | | | | Low | | | | |
| | C1 | C2 | C3 | C4 | C5 | C1 | C2 | C3 | C4 | C5 | C1 | C2 | C3 | C4 | C5 |
| Price | | | 1 | 1 | | 1 | | | | | | 1 | | | 1 |
| Quality | 1 | | 1 | 1 | 1 | | | | | | | 1 | | | |
| Aesthetics | | | | 1 | | | 1 | | | 1 | 1 | | 1 | | |
| Availability | | | 1 | | | 1 | | | | 1 | | 1 | | 1 | |
| After-Sales Service | 1 | | | | | | | | | 1 | | 1 | 1 | 1 | |
| Innovation | | | | 1 | | 1 | 1 | | | 1 | | | 1 | | |
| Suitability for customer needs | 1 | | | | 1 | | 1 | | 1 | | | | 1 | | |
| Functionality | 1 | | | | 1 | | 1 | | | | | | 1 | 1 | |

Company Capabilities

Once the attributes of the product of the company that represent their competitive advantage are defined, the following stage of this analysis relates to the capabilities of the company. Evidence obtained indicates that, in the same way that a clear pattern does not exist in the attributes of the product that represent the competitive advantage of the organization, neither does it in the type of capabilities that the company considers essential for its success. In fact, the only common characteristic to all the cases is that they lack capabilities associated with the legal framework that regulates their activity and that they seemingly do not receive favorable treatment on the part of the public bodies associated with their chosen activity.

The second aspect of the capability profile of these companies that differs from that expected is the relatively low importance given to the functional capabilities in all the cases. The argument that functional capabilities are clearly important for all the companies was anticipated, whereby it follows that the creation of the SMB originates from the discovery of a better way to satisfy a need, or of the productive application of a technological innovation. In addition, in all the cases, it is considered that the production policy represents strength for the company and that its management is better than that of the competitors. Since the maintenance of the competitive advantage of the company is within its own capabilities, it is possible to surmise that the most important capabilities of the company are those that allow their product to be equipped with attributes that influence the purchase decision of their target client. Nevertheless, the perception of those interviewed with respect to the importance of the diverse

capabilities of the company, although in general terms agreeing with the foregoing, presented some significant differences, namely the need to equip the product with the important attributes that are non-differentiating but simply allow the product to be in the market.

In addition, it was observed that the capabilities evolve with a certain independence of the competitive advantage of the company. In other words, the evaluation of the capabilities and the attention that is not always lent to its development respond to the objective of equipping the product with a specific attribute. However, the correction of the perception of the interviewees, as much of the attributes of the product as the capabilities in which they are supported, is limited by the information available.

Company Resources

In Table 3 the contribution of the resources to the success of the company is presented. As it is possible to observe, the number of resources in which all the cases coincide is low. In the first period, only four resources were considered of high importance in all the cases: the abilities of the employees and the management team, in addition to the abilities to innovate and to manage change. For the second period, 3 resources were added to this set: the perception of the level of quality that the product must have, the service that must be given to the client and the ability to work in a team.

A second set of resources exists that, whilst not being considered unanimously of high importance, were observed to have increasing importance as in the future they would be integrated into the set of the resources considered unanimously of high importance. Amongst these resources are the following: databases, distribution networks, contact networks, management style, company reputation and value chain management in company procedures.

All of the resources mentioned are of intangible character. Nevertheless, amongst the resources that were considered unanimously of low importance are only intangible resources, such as licenses, patents, and copyrights, the reason for this being that none of the companies count on such resources. This situation reflects some of the limitations of the SMB, particularly with regards to difficulties to innovate by means of investment in Research and Development (R+D).

As far as the tangible resources, it is interesting to note that none of the categories were considered unanimously of high importance, rather as average or low. Such resources are necessary for the company but its relative importance is determined by the specific activity of the company. In general terms, the tangible resources are more important for industrial companies than for companies in the service sector. Nevertheless, two such companies, and only one manufacturer, considered of high importance the IT infrastructure, being the only tangible resource obtained in this evaluation.

In Table 4, the resources are characterized following the Barney model of strategic resources (1991). A considerable coincidence exists between the resources valuable for the company. In the first period, there was coincidence in the case of 7 resources and in the second, 4 resources more were added.

The seven resources that have been unanimously considered as valuable from the first period, besides having intangible character, mainly take their material support from the employees and the management team of the company. In addition, all these resources manifest themselves in the organizational knowledge, although not exclusively. Resources such as the abilities of the employees and the management team can be formed by different mechanisms external to the organization, but their use equally implies its incorporation into the company culture as its adjustment and specialization to the specific necessities and conditions of the organization.

Table 3: Contribution of Resources to the Success of the Company

| Resource | First Period | | | | | | | | | | | | | | | Second Period | | | | | | | | | | | | | | | | | |
|----------|-------------------------|----|----|----|----|--------|----|----|----|----|-------|----|----|----|----|---------------|----|----|----|----|--------|----|----|----|----|-------|----|----|----|----|---|---|---|
| | Low | | | | | Medium | | | | | Hight | | | | | Low | | | | | Medium | | | | | Hight | | | | | | | |
| | C1 | C2 | C3 | C4 | C5 | C1 | C2 | C3 | C4 | C5 | C1 | C2 | C3 | C4 | C5 | C1 | C2 | C3 | C4 | C5 | C1 | C2 | C3 | C4 | C5 | C1 | C2 | C3 | C4 | C5 | | | |
| 1 | Employees | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| 2 | Management Team | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| 3 | Change management | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| 4 | Ability to innovate | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| 5 | Service | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | |
| 6 | Teamwork | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | |
| 7 | Quality | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | |
| 8 | Databases | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | |
| 9 | Distribution networks | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | |
| 10 | Work networks | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | |
| 11 | Management style | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | |
| 12 | Company reputation | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | |
| 13 | Value chain | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | |
| 14 | Organisational routines | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 |
| 15 | Suppliers | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 |
| 16 | IT | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 17 | Product reputation | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | |
| 18 | Access to consumables | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | |
| 19 | Distributors | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | |
| 20 | Own point of sale | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | |
| 21 | Access to finance | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| 22 | Special accessories | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 34 | On the shelf product | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 34 | Design | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 25 | Brand name | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 26 | Commercial secrets | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 27 | Own premises | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 28 | Tools | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 29 | Trademarks | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 30 | Machinery | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 31 | Vehicles | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 32 | Raw material | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 33 | Contracts | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 34 | Licences | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 35 | Patents | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 36 | Copyright | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 37 | Franchisees | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Notwithstanding, obtaining these resources not only depends on the daily activity of the organization. In most cases, the existence of programs explicitly destined to the achievement of the resources is observed. Amongst these, the most notable are destined for the development of new skills for employees and the management team of the company. These programs are the clearest manifestation of the strategy of obtaining of resources of the company, and are not limited to support the obtaining of the resources that can be created in the same company. In fact, they also take part in obtaining of resources through the market.

It was observed that the characteristics of the management team influence the preferences of the company, whether using the market to obtain resources or to create them internally. In C3, the company that goes to the market more often, the Board of Directors is in favor of acquiring the resources that the market can provide more efficiently outside of the organization, such as advertising campaigns and external training programs. However, C5 managers prefer to control the acquisition of these resources from within the company. Some management teams prefer to centre their activity on core activities and to subcontract or to acquire such resources and complementary abilities.

Evidence demonstrates that intangible resources are difficult to obtain, and even more if it is considered that the tangible resources can be easily obtained. Furthermore, the acquirement of such resources are not always undertaken in all the circumstances since it implies elevated amount of investment, as in the case of the purchase of buildings, where the associated difficulties are also high. In fact, the evidence indicates that in the determination of the difficulties in obtaining resources, the particular characteristics of the company are more important than the mechanisms through which the resources are obtained.

Although the analysis of each individual case supports the hypothesis indicating the difficulties in obtaining intangible, idiosyncratic and specialized resources for assets that cannot be acquired in the market, the joint analysis of the cases reflects serious limitations in the validity of this hypothesis.

Previously, the characteristics of the management team that influence the choice of the mechanisms of obtaining resources used by the company have been discussed. However, in addition the size to the organization seemingly has a significant impact on the capacity of the company to obtain resources, both tangible and intangible. The analysis of the individual cases suggest that the size of the company does not affect its capacity to obtain intangible resources since these type of resources are obtained through internal mechanisms. On the contrary, the size of the company negatively affects its capacity to obtain tangible resources and to acquire the necessary financing. Nevertheless, the size of the company influences the capacity of companies to obtain resources of different form in each case. The evidence indicates that an inverse relation exists between the negative size of the company and the effects on obtaining of resources: the larger the company, the negative effect of his size acquires fewer resources and conversely, its positive effect to a greater number.

It would be appropriate to point out that the main negative effect of company size is related to the access of financing, and this is not so pronounced in the case of the greater organizations. Nevertheless, the evidence indicates that the effect of company size on its capacity to obtain resources is basically neutral or positive. In fact, their negative effects are fairly limited. These results lead us to consider that once a minimum dimension is surpassed, the size of the company is irrelevant to its capacity to acquire intangible resources.

The last aspect that is approached in this section is the existing relationship between the company strategies regarding the management of its resources and the maintenance of its subsequent capabilities.

The existence of programs to improve the use and quality of resources demonstrates that such assets constitute the basis on which the capabilities of the company are developed.

The link between improvement programs and the capabilities of a company forms part of the RBT. Nevertheless, the usual argument only places emphasis on the capabilities as determining the use of the resources, whilst the characteristics of the resources of the company are determining in the type of capabilities that it has. In fact, when the strategy of the company implements improvement programs in the use and quality of resources, it is encouraging the evolutionary process of the capabilities and with it, of the competitive advantage of the company.

In this part of the study it would also have been possible to approach the relationship between the strategies that the company implements in the management of its capabilities and the reconfiguration of its resources. Nevertheless, this is more complex to define, since the capabilities of a company have a complex social base, which implies that other people external to the company play a part in determining them.

The evidence found also indicates that a high level of coincidence in the existence of programs destined to improve the use and the quality of the resources exists. Among them, notably the case of programs destined to develop the skills of the employees. The strategy of the companies, unanimously as much in 1998 as in 2000, promotes the development of its capabilities by means of finding the best uses for the skills of the employees, and also by means of the improvement of their quality.

However, the strategy of the company does not only consider the skills of the employees, as all the members of the organization participate in striving to develop the quality of the product and the service that should be given the client. In the same sense, the reputation of the company practically receives unanimous attention on part of the strategy. In addition, the strategy of the company also emphasizes the advantage and improvement of links with other shareholders. The distribution networks are the second resource that unanimously received more attention by the strategy of the company. Between both periods a tendency was observed for the creation of programs of improvement in their use, principally in the quality of resources, focused on harnessing the organizational networks of the company, their routines and their value chain.

CONCLUSIONS AND LIMITATIONS

The evidence shows that the theory of resources and capabilities is a valid explanation for the success of the SMB, and that the intangible resources are adapted in order to promote a competitive advantage. Nevertheless, the findings also show that the type of intangible asset to which these companies have access usually does not have the necessary characteristics to maintain this advantage in the long term. In fact, it was not possible to identify a unified pattern of resources and capabilities in which the SMB can maintain its competitive advantage. In this sense, each SMB will have to individually find the strategic resources for their particular case, adapted to the internal conditions and the characteristics of its market. Also, the evidence suggest that the most important intangible assets in the success of the SMB are obtained by means of organizational learning, as much by the explicit aims as by the those promoted by the strategies followed by the management of the company. Starting on this basis, the results of this study show the importance that efficiently managing process to obtain and use intangible resources has to a SMB.

In this investigation the resource profile of the company was analyzed following the criteria considered in the Barney model (1991), as well as from the possession of other important attributes for the performance of the SMB. The evidence related to these other criteria of evaluation has been sufficient to accept that the

hypotheses of this work are valid, although its fulfillment is not homogenous in all cases. It was not possible to establish a pattern of behavior that establishes a clear tendency in the valuation of the duration, or useful life, that the different resources will have before it is necessary to be substituted or transformed. However, in all cases it was possible to observe that the company maintains the use of its important resources using internal mechanisms. Also it was observed that all the resources considered unanimously important are obtained through internal mechanisms, fundamentally by means of the accomplishment of the daily tasks of the company.

As far as the maintenance of resources and capabilities to sustain a competitive advantage, whilst in each one of the studied cases it was possible to identify a set of strategic resources, when the results of the cases are compared it was observed that none of the resources considered unanimously important also unanimously possess the attributes necessary to be strategic. This is clearly not relevant to the results of this work, since in fact it has been possible to identify that the intangible assets are fundamental for the success of the SMB and that most important assets are obtained by means of organizational learning, as much explicit as by the strategies followed by the management of the company. Starting on that basis, the results of this work show the importance that efficiently managing processes of obtaining and use of intangible resources has to the SMB.

Finally the limitations of this work should be outlined. Firstly, the difficulties associated with generalizing the validity of the results of any investigation, be they of qualitative or quantitative, in a complex, heterogeneous and changing business environment such as the world of the SMB.

In this sense the results must be interpreted with care, since very considerable differences in the variables exist in determining the success of the company associated to the activity of the company, at the level of intensity in the use of new technology, in the relative size of the given company in their sector, etc. In all cases the management team and the learning processes are important for the results of the company, but they do not correlate exactly, and for that reason the interpretation of the findings must be made assuming that is necessary to fit them to each specific enterprise.

The second limitation is related to the short-term nature of the results. If one of the characteristics that define the SMB is its ability to change quickly, it is evident that the results of all investigations related to this type of company will tend to be obsolete in a relatively short period of time, as a result of this change process. For this reason it is necessary to revisit and update the studies of the SMB. In particular it is necessary to undertake more focused investigations into specific groups of SMB, allowing the limitations associated with the heterogeneity of the sector to be overcome and therefore to reach more specific and generalized conclusions by sector and type of SMB.

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FACTORS INFLUENCING BRAND LOYALTY IN PROFESSIONAL SPORTS FANS

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ABSTRACT

Many researchers have provided comprehensive definitions for the term of brand loyalty and also examined the factors affecting brand loyalty with many empirical studies. But there is little research focusing on the brand loyalty of professional sports fans. The topic area about factors influencing brand loyalty in professional sports fans was identified because these fans bring significant financial benefits every year and stimulate economic growth in the United States. Although different conceptual models seek to explain brand loyalty, many factors influence customer brand loyalty. Different factors may influence brand loyalty in the sports industry as compared to other industries. The purpose of this review is to analyze critically theoretical and empirical literature about the factors influencing brand loyalty in professional sports fans, implications for brand management, and to identify areas of future scholarly inquiry. The forms of literature included in this review are periodicals, periodicals, periodical, books, non-periodical, doctoral dissertations, masters dissertations, and government documents. Most literature was retrieved from the ProQuest database. Types of scholarly literature included in the review are theoretical, empirical, critical and methodological inquiry. Only a little literature is explored in this area; more additional research is needed to explore the theme.

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INTRODUCTION

The topic about factors influencing brand loyalty of professional sports fans is a topic of worldwide interest. In the recent years, technologies improved, helping people to complete their work effectively, and to have more leisure time to join various activities after working time. Therefore, how to attract people and persuade them to spend money in professional sports are essential marketing strategies for the managers in the professional sports industry. The sports industry is playing a significant role in the business world today. In the United States, it ranks as the 11th largest industry (Bristow & Sebastian, 2001). Street and Smith reported “Americans spent \$213.5 billion on sports in 1999, a whopping \$763 per capita” (as cited in Mitchell, Montgomery, & Mitchell, 2003, Introduction section, para. 2). Therefore, it is important to understand the factors that influence brand loyalty of professional sports fans to promote effective brand management strategies.

Brand loyalty is the most significant component that many industries and many scholars are examining as factors that could influence brand loyalty. High brand loyalty could lower many aspects of cost spent by the organization. Furthermore, according to the framework of brand equity that was reported by Gladden (1999), brand loyalty is one component of brand equity. When brand loyalty increases, the brand's equity/value will increase, too. Developing effective strategies to attract professional sports fans requires understanding the relationship between professional sports fans and brand loyalty. This may help the managers who are in the professional sports industry to develop marketing strategies in the future. This critical analysis of the literature concludes with a synopsis and interpretation of theoretical, empirical, methodological literature, conclusions, and recommendations for future scholarly inquiry about factors influencing brand loyalty in professional sports fans.

Researchers report most customers exhibit significantly less brand loyalty for inferior quality products (Bristow, & Sebastian, 2001). However, professional sports fans exhibit strong loyalty to professional

sports teams, even when sports teams have losing records (Bristow & Sebastian, 2001). There are several models that explain factors that affect brand loyalty. For example, Bristow and Sebastian (2001) examined a tripartite model that found three factors that influence brand loyalty: perceived brand-performance fit, social and emotional identification with the brand, and habit and a long history with the brand. Gounaris and Stathakopoulos (2004) examined three dimensional variables (consumer drivers, brand drivers and social drivers) of brand loyalty in their conceptual model, and reported possible outcomes of consumers' behavior; buy nothing, buy an alternative brand, word-of-mouth communication, or visit other store. Tapp (2003) organized brand loyalty in two parts and tested an attitudinal loyalty and behavioral loyalty model. They found several factors about attitudinal and behavioral loyalty of football fans that influence different levels of behavioral loyalty. These factors are vicarious enjoyment, social influence of other fans, habit, change in career/job, change in family circumstance, self image, and brand symbolism. Taylor and Hunter (2003) reported loyalty could be influenced by brand attitude and satisfaction. They tested their conceptual model and found four loyalty factors, trust, affect, resistance and value. Selnes (1993) used a conceptual model testing the relationship among quality, customer satisfaction, brand reputation, and intended loyalty. Gladden and Milne (1999) reported brand equity is composed of perceived quality, brand awareness, brand association and brand loyalty. They used a conceptual framework of brand equity in the team sport setting to test the three factors, team related, organization related and market related.

The topic area about factors influencing brand loyalty in professional sports fans was identified because these fans provide important financial benefits every year, and stimulate economic growth in the United States. "It may be five times more expensive for a firm to attract a new customer than it is to keep an existing customer" (as cited in Bristow, & Sebastian, 2001, p. 257). Although different conceptual models seek to explain brand loyalty, many factors influence customer brand loyalty. Different factors may influence brand loyalty in the professional sports industry as compared to other industries. After reviewing journals regarding fanatic fans, these loyal fans were found to express strong support for the professional team, even though the team might have a losing record. This is an interesting phenomenon and different when examining brand loyalty toward general products. There may be significant "emotional" factors influencing brand loyalty of professional sports fans. The problem area of brand loyalty of professional sports fans is about the practices within the field of marketing, management, sports management, and brand management. The purpose of this review is to analyze critically theoretical and empirical literature about the factors influencing brand loyalty in professional sports fans, implications for brand management, and to identify areas of future scholarly inquiry.

LITERATURE REVIEW

"Much of the research on loyalty has focused on fan identification with the team" (Richardson, 2004, p. 90). To explain the fans' behavior sufficiently, team identification is the significant component. "Team identification refers to a spectator's involvement with and psychological connection to a sport team" (Wann, & Schrader, 2000, p. 160). This connection that fans develop towards teams is a type of in-group favoritism. Thus, this connection helps people develop a social identity by attaching themselves and attaining group membership. The interaction of in-group members is more frequent than that of out-group members (Lo, 2000). A person may have higher positive affections toward in-group members than to out-group members. "Highly identified sport fans would be more likely to present themselves as a fan of a specific team to a rival supporter than marginally identified fans" (Wann, 2000, p. 199).

In 1979, Tajfel and Turner introduced their seminal theory of social identity. Different from identity theory, social identity theory is based on an individual's group identity. This theory identifies three major constructs of an individual's position within a group identity: social categorization, social comparison, and social identity. The four major propositions in this theory are, first, individuals classify numerous stimulations from surroundings to simplify the information and to understand self-environment better.

Second, individuals may identify themselves with the group to which they belong by social classification. Third, individuals compare the characteristics of their own group with other groups, by social comparison. Finally, individuals consider that the traits of their own group are more positive and applicable than the traits in other groups (Lo, 2001). Several empirical studies reported group identity indeed influences on-group favoritism and in-group favoritism (Lo, 2001). This theory is socially significant for addressing essential issues about an individual's group identity in the discipline of human resource management and marketing. The theory has been adapted to various research fields such as social psychology, human resource management, psychology, and marketing. This is the predominant theory used to examine individual group identity with well-developed propositions and strong empirical support.

Social identity theory can be applied to explore the fans behavior from psychological aspects. Fandom is both a public and private experience, and the two types of identity have been explored (Jacobson, 2003). Using this theory, Jacobson reported that there are two levels that influence fans' identity. The first level is an interpersonal network and community-effect level. Fans are influenced by friends, family members, or geographic areas (support local team) on identity. The second level is a symbolic level. These include the team's specific and unique factors such as the team's name, logo, color, and fight song (Jacobson, 2003). Social identity theory can be used to explain the sports fans' self and social identification. Within this theory, researchers can find the factors that will cause the sports fans to create a positive attitude toward the sports team, and lead to loyalty to specific teams. These factors are more psychological aspects, such as habit and long history, social and emotional identification, brand symbolism, basting-in-reflect-glory, and self image (Tapp, 2004).

Measurement of Fan Attitudes and Behaviors

Shank and Beasley (1998) conducted a methodological study to measure sports involvement. They used a non-experimental, mixed-method design. They began with six in-depth interviews using gender comparisons (three males and three females). This resulted in the first step for better understanding of the involvement construct and developing the questionnaire. After the interviews, the *Sports Involvement Inventory Survey* was developed and 136 customers in Cincinnati completed the survey. Shank and Beasley's literature review was thorough and current in comparing and contrasting measurement about sports involvement of fans. "Sports involvement measures have been used by Lascu, Giese, Toolan, Guehring and Mercer in a study of golf spectators and Walefield in a study of baseball fans (Shank, & Beasley, 1998, p. 436). Items for the *Sports Involvement Inventory* and additional survey questions were generated from the literature review of involvement studies and the interviews. A non-probability, accidental sampling plan resulted in the data producing sample of 136, but the response rate was not reported. The 8 items of *Sports Involvement Inventory* were used to examine the level of sports involvement. The base question of this sports involvement inventory begins with "To me, sports are". Responses are on a 7-point semantic differential scale, with polar responses for these 8 items as boring to exciting, interesting to uninteresting, valuable to worthless, appealing to unappealing, useless to useful, not needed to needed, irrelevant to relevant, important to unimportant. The total scale has seven scales from weak to strong. The range of scores on the Sports Involvement Inventory is from 8 (the lowest level of sports involvement) to 56 (the highest level of sports involvement).

Gwinner and Swanson (2003) conducted a study about antecedents and sponsorship outcomes of fan identification. They used a non-experimental, causal comparative and quantitative design with 1070 adult spectators at an afternoon university football game. Their literature review was thorough and current in contrasting theories about team identification. Ashforth and Mael in 1989 reported team identification is "the spectators' perceived connectedness to a team and the experience of the team's failing and achievements as one's own" (as cited in Gwinner, & Swanson, 2003, p. 276). Under this definition, it can be presented as a more specific instance of organizational identification. The propositions that were examined in the study were that highly-identified fans exhibit higher levels of sponsor recognition,

patronage, and satisfaction and have more positive attitudes toward sponsoring firms than less identified fans. Gwinner and Swanson's interpretation of these findings is that highly identified fans are more likely to exhibit several positive outcomes related to sponsorship. This led to the conclusion that greater gains in sponsorship effectiveness can be made by segmenting the sport spectator market according to the level of team identification. An implication for practice is the suggestion that team identification is an important component in sponsorship effectiveness. Therefore, sponsors can develop effective strategies by considering the component of team identification. The strength of the study reported by Gwinner and Swanson is that team identification is an important consideration in sponsorship effectiveness.

Wann, Hunter, Ryan, and Wright (2001) conducted a study about the relationship between team identification and willingness of sport fans to consider illegal acts to assist their team such as assisting athletes in acquiring banned substances (steroids), or illegally assisting the athletes in college courses (help them pass the exam). They used a non-experimental, causal correlational, quantitative design of 71 college students. Wann, Hunter, Ryan, and Wright's literature review was thorough and current in comparing and contrasting the theory of social identity about highly identified fans concerning the team's successful or unsuccessful performance. Empirical studies of the link between team identification and willingness of sport fans to consider illegally assisting their team were examined. This resulted in Wann, *et al.* study testing the proposition that persons with high levels of team identification would be more likely to consider such behavior as illegally assisting their team. Findings supported the hypothesis of the positive relationship between team identification and fans' willingness to consider cheating using correlation analysis ($p < 0.001$). Wann, *et al.* interpretation of these findings is consistent with the work of Russell and Baeninger (1996) and Wann, Peterson, *et al.* (1999) that numerous people were willing to admit the possibility of committing anti-social acts under the cover and protection of anonymity. This led to the following conclusions that fans with high team identification will have a high willingness to consider using illegal ways to assist the teams they support. Limitations reported by Wann, Hunter, Ryan, and Wright are: First, the sampling population might be too small to represent the whole population and it was a convenience sample. Second, the research focused on the fans with high identification who were willing to assist the team by illegal acts, but will the general sports fans that do not have high team identification have such willingness of illegal acts, too? They generated the following areas of future study: Examine the relationship between team identification and willingness of general sports fans to consider illegally assisting the team.

Brand Loyalty

In 1950, Brown and Cunningham began to research the concept of brand loyalty (Lim, & Razzaque, 1997). Research continues today, resulting in abundant literature about brand loyalty. Runyon in 1980 defined brand loyalty as "a special case of programmed decision making when customers adopt a decision strategy of giving all or most of their patronage to a particular brand" (as cited in Datta, 2003, p. 139). Many experts and researchers defined brand loyalty in their way, but the most notable conceptual identification of brand loyalty was presented by Jacoby and Kyner in 1973. They suggest that customer brand loyalty is "the behavioral outcome of a customer's preference for a particular brand from a selection of similar brands, over a period of time, with, importantly is the result of an evaluative decision-making process" (as cited in McMullan and Gilmore, 2003). Oliver (1999) described brand loyalty as "a deeply held commitment to re-buy or re-patronize a preferred product/service consistently in the future, thereby causing repetitive same brand set purchasing, despite situational influences and marketing efforts having the potential to cause switching behavior" (p. 34). According to Oliver's definition, brand loyalty can be separated in two aspects: behavioral and attitudinal. Dick and Basu (1994) developed a conceptual model of attitudinal loyalty and behavioral loyalty. They proposed that a customer may buy a specific brand because of the low price. However, a slight price increase may affect customer purchasing behavior and cause a shift to buy another brand. However, purchasing behavior may not be sufficient to explain brand loyalty. Sheth, Mittal and Newman in 1999 reported "For this reason-marketing scholars

argue that the customers might be considered loyal only if the consumer's attitude towards a brand is more favorable than for the competing brands" (Datta, 2003, p. 139).

Conceptual Framework of Customer Loyalty

Dick and Basu introduced their conceptual framework of customer loyalty based on reasoned action theory and integrated concepts of brand loyalty (Dick & Basu, 1994). This framework identifies five major influencing factors of customer loyalty defined as (1) cognitive antecedents (accessibility, confidence, centrality, clarity), (2) affective antecedents (emotion, feeling states/mood, primary affect, satisfaction), (3) conative antecedents (switching cost, sunk cost, expectation), (4) social norms, and (5) situational influences (Dick, & Basu, 1994). The moderators of the relationship are relative attitude and repeat patronage, and the consequence is customer loyalty. "A number of relationships involving antecedents, moderators, and consequences of loyalty may be derived from the customer loyalty framework" (Dick, & Basu, 1994, p. 110) led to a numbers of propositions. Brand loyalty is a two dimensional construct involving relative attitude and repeat patronage/purchasing behavior (Dick, & Basu, 1994). In the last 10 years, the loyalty framework has been revised and adapted to brand management and marketing by numerous scholars in the marketing field. Several empirical studies by Lim and Razzaque in 1997, Datta in 2003, and Gounaris and Stathakopoulos in 2004, led to refinement in the conceptual framework. Gounaris and Stathakopoulos (2004) developed a conceptual model adopted from the conceptual framework and depicted direct and indirect relationships among concepts described by Dick and Basu, which the conceptual framework is socially significant, addressing essential issues about brand loyalty in the discipline of marketing, and is useful in explaining and predicting the factors influencing brand loyalty. Thus it is a well-developed guide to conduct the empirical research. The conceptual framework has a good balance between simplicity and complexity, contributing to its usefulness. Studies by Garland and Gendall in 2004 verify the propositions of a two dimensional construct of brand loyalty involving relative attitude and repeat patronage. The conceptual framework has been adapted to various research fields such as management, brand management and marketing. This is the predominant conceptual framework used to examine brand loyalty with well-developed propositions and strong empirical support.

Customer loyalty is viewed as the strength of the relationship between an individual's relative attitude and repeat patronage. The relationship is seen as mediated factors by social norms and situational factors. Cognitive, affective, and conative antecedents of relative attitude are identified as contributing to loyalty, along with motivational, perceptual, and behavioral consequences. Based on the framework, the task of managing loyalty would involve: 1. determining the loyalty status of a target population in terms of strength of the relationship and comparing it with competing offerings, 2. identifying relevant antecedents and consequences in a given market context, 3. determining the relative impact (or contributions) of antecedent factors and the likelihood of different consequences, and 4: identifying causal variables on which the target is underperforming compared to competitors, from which increase in loyalty may be affected through strategic interventions.

Brand Loyalty: Empirical Studies

Gounaris and Stathakopoulos (2004) conducted a study about antecedents and consequences of brand loyalty. They used a non-experimental, correlational survey research design, and confirmatory factor analysis to test a model about antecedents' factors influencing brand loyalty and four types of brand loyalty. The sample included 850 consumers of whisky from shopping malls and in the street, Greece. Gounaris and Stathakopoulos' literature review was thorough, current in comparing theory of reasoned action and concept of a two dimensional brand loyalty. Empirical studies of antecedents (risk aversion, variety seeking, brand reputation, availability of substitute, brands, social group influences, and peer's recommendation) and four types of brand loyalty (buy nothing, buy alternative brand, word-of-mouth

communication, and visit other store) were examined, leading to the major gap in the literature about the need to understand direct and indirect relationships among the concepts of brand loyalty identified by many theorists. This resulted in Gounaris and Stathakopoulos' study testing the propositions of reasoned action theory developed in 1969 by Fishbein and loyalty framework developed in 1994 by Dick and Basu (as cited in Gounaris, & Stathakopoulos, 2004).

Behavioral and Attitudinal Factors Influencing Brand Loyalty: Empirical Studies

Lim and Razzaque (1997) conducted a study about brand loyalty and situational effects. They used a non-experimental, causal comparative, quantitative design of 160 undergraduate students from National University of Singapore. Lim and Razzaque's literature review was thorough and current in comparing and contrasting concepts about two dimensional brand loyalty. Theoretical and empirical studies of behavioral and attitudinal brand loyalty were reviewed, leading to the major gap in the literature that not only to customer attitudes influence behavior, but brand attitudes may be tied to certain situational contexts. A non-probability, accidental sampling plan resulted in the data producing sample of 160, the response rate was not reported. The researcher used a three-step procedure to conduct the experiment. The first step, focus group interviews were conducted to generate an initial list of situations in which consumption or purchases are likely to result for each product. In the second step, three principal situations were picked from seven situational dimensions using a pre-experimentation survey with a seven-point response scale. After picking these three principal situations, researchers used cluster analysis to ensure that the three situations are seldom correlated with one another. Third step, the composite scale (multi-attribute attitudinal measures, semantic differential, global attitudinal measure and attitudinal confidence measure) were used to measure the strength of attitudes toward two brands (greeting cards and computer diskettes) after classifying the subjects into two groups (high and low relative brand attitude). Reliability and validity of the composite scale were not reported in this study. Findings supported the hypothesis 1: There is a significant difference in repeat purchase rates across group with differing levels of relative brand attitude ($p = 0.003$ for greeting cards; $p = 0.000$ for computer diskettes); and hypothesis 3: There are significant interaction effects between attitude and situation on repeat purchase rates ($p = 0.029$). Finding did not support hypothesis 2: There is a significant difference in repeat purchase rates across situations ($p = 0.439$ for greeting cards; $p = 0.178$ for computer diskettes), using two-way factorial analysis of Variance (ANOVA). Lim and Razzaque's interpretation of these findings is that although situational influences may not impact purchasing behavior directly, it seems to be a moderating variable that would influence the customer's relative attitude toward purchasing behavior. This led to the conclusion that the attitude-within-situation is a better predictor of repeat purchasing behavior when attitude

Behavioral and Attitudinal Factors Influencing Brand Loyalty in Professional Sports Fans: Empirical Studies

Bristow and Sebastian (2001) conducted a study about factors influencing brand loyalty of Chicago Cubs baseball fans. They used a non-experimental, exploratory study of 371 respondents from patrons at a restaurant located across the street from Wrigley Field. Bristow and Sebastian's literature review was thorough and current in comparing the conceptual framework about two dimensions of customer brand loyalty. Empirical studies about influencing factors of brand loyalty of Chicago Cubs fans were examined, leading to the major gap in the literature that there was no empirical evidence that shows these three factors (perceived brand-performance fit, social and emotional identification and habit and long history) have a significant influence on the fans brand loyalty in professional sports. This resulted in Bristow and Sebastian's study testing the tripartite model of consumer brand loyalty that was adopted from the conceptual framework of Dick and Basu, Sheth, Mittal, and Newman. A non-probability sampling plan resulted in the self-selected, data producing sample of 374, a response rate of 80%. The *Product Expertise Scale* developed by Mishra *et al.*, in 1993, was used to measure *perceived-performance*

fit; the *Desire to Win/Competitiveness Scale* developed by Confman in 1993, was used to measure *social identification variable*; the *Loyalty Proneness Scale* developed by Lichtenstein *et al.* in 1990, was used to measure *emotional identification variable*; and the *Measure of Nostalgia* developed by Holbrook in 1993, was used to measure *habit and long history variable* (as cited in Bristow & Sebastian, 2001). Reliability and validity were not reported in this study.

DISCUSSION OF THE LITERATURE, SUMMARY AND INTERPRETATIONS

The purpose of this critical analysis of theoretical and empirical literature is to explore the factors influencing brand loyalty of professional sports fans, and to identify future areas of scholarly inquiry. The major findings of this literature review are that the topics of affecting factors of perceived brand-performance fit, social and emotional identification, habit and long history with the brand, brand symbolism, self image and basking-in-reflect-glory lead to two dimensions of brand loyalty and consequence of brand loyalty. The next two areas aim to present a synopsis of the state-of-the-art of the theoretical and empirical literature about the topic and let the reader know what is known and unknown.

Theoretical Literature

Sports fans- The theoretical literature about Social Identity Theory sufficiently explains fans' attitudinal and behavioral performance through psychological aspects. This theory identifies three major constructs of individual's group identity, social categorization, social comparison, and social identity. The four major propositions in this theory are that first, individuals classify numerous stimulations from surroundings to simplify the information and to better understand self-environment. Second, individuals may identify themselves with the group to which they belong by social classification. Third, individuals compare the characteristics of their own group with other groups, by social comparison. Finally, individuals consider that the traits of their own group are more positive and applicable than the traits in other groups (Tajfel, & Turner, 1979; Hogg *et al.*, 1995; Thoits, & Virshup, 1997; Funk, 1998; Brown, & Capozza, 2000). There are two levels when applying social identity theory to fans' identity, influence fans' identity. The first level is an interpersonal network and community-effect level, fans are influenced by friends, family member or geographic area on identity (Chorbajian, 1978; Smith, 1979; Snow, & Oliver, 1995; Zillmann *et al.*, 1989; Giuliano, Popp, & Knight, 2000); and the second level is symbolic, team's specific and unique factors such as the team's name, color, and fight song will influence fans' identity (Ciadini *et al.*, 1976; Cialdini, & Richardson, 1980; Snyder *et al.*, 1986; Hirt *et al.*, 1992; Wann, 1993; Mahony *et al.*, 2000; End, 2001).

Brand loyalty- The theoretical literature about Theory of Reasoned Action explains a person's behavior. The theory is based on the notion that a person's behavior is determined by what information the person happens to have available to him or her. The major of propositions in this theory are that a person's behavioral intentions are a function of two different factors, attitude toward the behavior and subjective norm (Fishbein, & Ajzen, 1967). The theory can be applied to marketing to predict customer purchasing behavior (Randall, 1989; Lutz, 1991; Chang, 1998; Donald, & Cooper, 2001). For example, for the purchasing process, a person may have a strong positive attitude toward the purchase of a new product and the subjective norm could also be pointing in the favor of the person's intention to buy. However, some researchers argue the propositions reported by Fishbein, and Ajzen. The main conflict for this theory is that actions are sometimes changed by factors outside a person's control. For example, a person may have a strong positive attitude toward the purchase of a new product and the subjective norm could also be pointing in the favor of the person's intention to buy, however, if the person does not have the money, the purchasing process will be interrupted (Mackenzie, & Jurs, 1993; Godin, & Kok, 1996; Ajzen, 1996). Even though the theory of reasoned action can not predict all behavior successfully, it has been found applicable fitting in many situations in many empirical studies (Cuerrier *et al.*, 1992)

The theoretical literature about a framework for customer loyalty was developed by Dick and Basu in 1994. The conceptual framework is based on the propositions of the theory of reasoned action and integrates concepts of brand loyalty. This framework identifies five major influencing factors of customer loyalty defined as cognitive antecedents - accessibility, confidence, centrality, clarity (Mitchell, 1989; Johnson, & Eagly, 1989; Krosnick, 1989), affective antecedents - emotion, feeling states/mood, primary affect, satisfaction (Allen, et al., 1992; Oliver, 1992; Oliva, et al., 1992), conative antecedents - switching cost, sunk cost, expectation (Poter, 1980; Arkes, & Blumer, 1985; Dick, 1991), social norm and situational influence (Ajzen, & Fishbein, 1980; Dick, & Basu, 1994). The moderators are relative attitude and repeat patronage, and the consequence is customer loyalty. The major propositions in this conceptual framework are "A number of relationships involving antecedents, moderators, and consequences of loyalty may be derived from the customer loyalty framework" (Dick, & Basu, 1994, p. 110). The conceptual framework has been adapted to various research fields, especially in the marketing field. Many researchers develop their research models for conducting customer brand loyalty based on the conceptual framework for customer loyalty (Lim, & Razzaque, 1997; Datta, 2003; Gounaris, & Stathakopoulos, 2004).

Empirical Literature

Sports fans- The research evidence consistently demonstrated that many factors will result in sports fans' behavior, and the majority of these factors are psychological aspects, such as habit and long history, social and emotional identification, brand symbolism, Basking-in-reflect-glory, and self image (Shank, & Beasley, 1998; Wann, et al, 2001; Gwinner, & Swanson, 2003). But finding more factors is needed because it may help more in the accuracy of predicting sports fans' behavior by researchers. Shank and Beasley (1998) conducted a mixed-method design, methodological, non-experimental study to measure sports involvement. The scale of *Sports Involvement Inventory* was used to examine the level of sports involvement. Findings supported the adequate psychometric qualities of the *Sports Involvement Inventory* and this new developed scale was shown to be a relatively good predictor of sports-related behavior. Recommendations reported by Shank and Beasley are that the *Sports Involvement Inventory* should be used to extend the knowledge base about how the involvement construct in general can be used, and the need to test the inventory's applicability in different types of sports. Future studies might examine the relationship between sports involvement and sport motivation from the perspectives of the participant and the spectator.

Gwinner and Swanson (2003) conducted a non-experimental, causal comparative and quantitative study to examine the antecedents and sponsorship outcomes of fan identification. A multi-item measurement instrument was used to measure six antecedent variables (*perceived prestige, sports domain involvement, fan associations, sponsorship recognition, sponsor patronage, attitude toward sponsors and satisfaction with sponsor*). The finding was that highly identified fans are more likely to exhibit several positive outcomes related to sponsorship (Shank, & Beasley, 1998). Limitation reported by Gwinner and Swanson is that additional antecedent variables may be relevant for predicting team identification in some of these alternative sponsorship contexts. They generated several areas of future study. First, explore the impact that specific "reputation" types may have on team identification. Second, what impact might a school that is perennially considered a basketball powerhouse have on team identification with that school's other athletic team? Third, image transfer might be an important variable impacting the outcome of sponsorship and relating to team identification. Wann, Hunter, Ryan, and Wright (2001) conducted a non-experimental, causal correlational, quantitative study to examine about the relationship between team identification and willingness of sport fans to consider illegal acts to assist their team. The instruments of *Sport Fandom Questionnaire (SFQ)*, *Sport Spectator Identification Scale (SSIS)*, *Sport Fan Cheating Scale (SFCS)* and *Demographic Scale* were used to measure fans' willingness to consider using illegal or violent action for the purpose of giving one's team an unfair advantage. A finding is that numerous people were willing to admit the possibility of committing anti-social acts under the cover and protection

of anonymity (Wann. *et al.*, 2001). Limitations reported by Wann, Hunter, Ryan, and Wright are first, sampling population might be too small to represent the whole population and was done for convenience. Second, the research focused on the fans with high identification and willingness in illegal acts to assist the team, but will the general sports fans that do not have high team identification have similar willingness of illegal acts. They generated several area of future study, to examine the relationship between team identification and willingness of general sports fans to consider illegally assisting the team.

Brand loyalty- The research evidence consistently demonstrated that the consequence of forming customer brand loyalty has the same processes in many fields. Some factors will affect customers exhibiting likely attitudes toward the product, such as accessibility, confidence, centrality, clarity, emotion, mood, primary affect, satisfaction, switching cost, sunk cost, expectation, risk aversion, variety seeking, brand reputation, availability of substitute, brands, social group influences, and peer's recommendation. The next phase is that customers will exhibit repeat purchasing behavior, and finally, customer brand loyalty will be formed (Dick, & Basu, 1994; Lim, & Razzaque, 1997; McMullan, & Gilmore, 2002; Gounaris, & Stathakopoulos, 2004). McMullan and Gilmore (2003) conducted a non-experimental, methodological study to develop a proposed scale of customer loyalty measurement. They discussed existing measurement scales of brand loyalty, such as Raju's *Exploratory Tendencies in Consumer Behavior Scales (ETCBS)*; Parasutaman's *Service Quality Scale (SERVQUAL)*; Oliver's *Satisfaction Measurement Scale*; Beatty's *Involved Commitment Scale* to develop a new multi-item scale instrument. The new multi-item scale instrument integrated items of reflected ego involvement, purchase involvement and brand commitment and represented dimensions of loyalty and was used to measure brand loyalty. The finding was the scale can measure the development of loyalty efficiently (McMullan, & Gilmore, 2003). They generated several areas of future study. The study is a pilot in testing the validity and reliability of the measurement scale and the next stage should apply the scale to a large population and different service sectors to allow further testing of the scale and develop a scoring system to identify different levels of customer loyalty.

Behavioral and Attitudinal Factors Influencing Brand Loyalty: Empirical Studies

Lim and Razzaque (1997) conducted a non-experimental, causal comparative, quantitative study to examine the relationship between brand loyalty and situational effects. The *Composite Scale* was used to measure the strength of attitudes toward two brands (greeting cards and computer diskettes). A finding is that although situational influences may not impact purchasing behavior directly, it seems to be a moderating variable that would influence the customer's relative attitude toward purchasing behavior (Lim, & Razzaque, 1997). There are three limitations reported by Lim and Razzaque: first, the research study only involved two products, and therefore, lacks generalization. Second, the manipulation of situational treatment is confined to the use of descriptors presented in survey questionnaires. Third, the measurement of the dependent variable is seen as the weakest link in the entire research process. They generated the following areas of future study, to cover wider categories of product and to use more psychometrically adequate research instruments in follow-up studies.

Behavioral and Attitudinal Factors Influencing Brand Loyalty in Professional Sports Fans: Empirical Studies

Bristow and Sebastian (2001) conducted a non-experimental, exploratory study to determine which factors influenced brand loyalty among Chicago Cubs baseball fans. The instruments of *Product Expertise Scale*, *Desire to Win/Competitiveness Scale*, *Loyalty Proneness Scale*, and *Measure of Nostalgia* were used to measure three variables (*perceived performance fit*, *social and emotional identification*, and *habit and long history*). A finding was that die-hard Cub (loyal) fans were generally more brand loyal, and were more likely to purchase Cubs paraphernalia than were less loyal fans (Bristow, & Sebastian, 2001). Limitations of the study are that the sample might not be representative of the population of Chicago Cubs fans or of the population of the greater Chicago area. Future studies should

expand the sample size and focus on different kinds of professional sports such as basketball, football, and hockey.

CONCLUSIONS

Factors influencing sports fans' behavioral performance have been explored for decades, so it is not a new issue with theoretical developments based on theories. Tajfel and Turner's social identity theory is a well-developed theory to explain an individual's group identity. The theory suggests that upon joining a group, an individual will think of that group as superior to any other group. Applying the theory in sports fans' team identity, it is reasonable to assume that fans tend to incorporate both public and private fandom from interpersonal/network level when creating and maintaining a fan identity. The significance of the theoretical literature for the topic is that social identity theory can appropriately explain fans' perceptions and self-categorizations based on their social identities (passive aspects). However, the theory cannot explain the reasons fans categorize themselves into a specific group and the roles fans will use to create identities for themselves (initiative aspects).

Factors influencing customers' brand loyalty have been explored for decades, so it is not a new issue with theoretical development based on the theory cited in this review. Ajzen and Fishbein's theory of reasoned action is a well-developed theory to predict individual's behavior. The theory suggests that an individual's behavioral intentions are a function of two different factors, attitude toward the behavior and the subjective norm. When applying the theory to customer brand loyalty, it is reasonable to assume that attitude toward the behavior and subjective norms will influence customers' purchasing behavior, and will result in their brand loyalty. The significance of the theoretical literature for the topic is that although the theory of reasoned action may explain antecedent factors might influence customer purchasing behavior and result in brand loyalty, other variables, such as volitional control, and situational effects, might interrupt the purchasing behavior and brand loyalty.

There are many empirical studies about factors influencing fans' identification. These could be (a) factors influencing customer brand loyalty, (b) two dimensional brand loyalty (attitude and behavior), and (c) factors influencing fans' brand loyalty cited in this view were replicated, they also had some problems or limitations such as limited sample size, not enough antecedent variables, and a few studies did not report their reliability and validity, and no IRB reported in these empirical literatures. The strengths of these studies are that they adequately identified and measured the importance of: (a) sports fans' involvement, and customer brand loyalty; (b) factors influencing fans' identification; (c) factors influencing customer brand loyalty; and (d) factors influencing sports fans' brand loyalty. In the methodological study about sports fans and brand loyalty, Shank and Beasley developed a new instrument called Sports Involvement Inventory to measure fans' sports involvement. The instrument had good reliability and validity after the pilot test, but it needs to be determined if the inventory is applicable to different types of sports. McMullan and Gilmore generated existing validated and reliable scales to measure brand loyalty. After pilot testing, the newly-developed scale had high reliability and validity, but the scale should be applied to a large population and different service sectors to allow further testing of the scale and to develop a scoring system to identify different levels of customer loyalty. Furthermore, most empirical studies show that the sample might be too small to represent the whole population (Wann, Hunter, Ryan, & Wright, 2001; Bristow, & Sebastian, 2001; Gounaris, & Stathakopoulos, 2004). Some empirical studies show that antecedent variables should be expanded to explain fans' identification and brand loyalty sufficiently (Lim, & Razzaque, 1997; Gwinner, & Swanson, 2003; Gounaris, & Stathakopoulos, 2004).

RECOMMENDATIONS

Expanding the theoretical formulations proposed by Tajfel and Turner's (1979) social identity theory is an area of potential future scholarly inquiry. There is a need to develop theoretical formulations of

individual group identity further to understand “sports fans’ self role-identity and group identity” better. Combining self role-identity and group identity may more sufficiently explain fans’ identification. In addition, future research should bring other aspects of social psychology into sport and fandom studies to reinforce the theory to explain sports fans’ behavior. Expanding the theoretical formulations proposed by Ajzen and Fishbein’s (1967) theory of reasoned action is an area of future scholarly inquiry. There is a need to add other variables, such as volitional control and situational effects, to explain customer purchasing behavior and brand loyalty sufficiently.

Empirical studies are needed in the fans’ brand loyalty area. There are few empirical studies provided regarding fans’ brand loyalty. Empirical studies need to support theoretical literature about factors that influence fans attitude and behavior and brand loyalty. Research should focus on attitudinal and behavioral factors of fans to explore whether fans will become brand loyal. Explorative, factor analysis, correlational design, or multi regression is needed to examine the factors influencing brand loyalty of sports fans.

Methodological study is another area of future scholarly inquiry where design, sample size, population studied, and measurement of variables are needed. Many methodological studies have too small sample sizes. The sample size should be more than 500 subjects to address external validity concerns. To measure fans’ brand loyalty, research should focus on psychological variables, perceived brand performance fit, habit, and history with the brand.

Research Strategies to Address Selected Recommendations

The review has been used to explore the factors influencing sports fans’ brand loyalty, and to identify future areas of scholarly inquiry. The findings of this literature review are that some factors affect customer attitudes toward the brand, and exhibit repeat purchasing behavior, and that customers will exhibit loyalty to a specific brand. Most of these factors are rational. A customer exhibits likely attitude toward a specific brand and finally becomes loyal usually based on the degree to which the brand meets or exceeds the customer’s expectations, such as high quality, low price and promotion. But for exploring sports fans’ brand loyalty, rational factors are not sufficient to explain their attitudinal and behavioral brand loyalty. Some researchers reported that fans’ exhibit strong loyalty to sports teams even when sports teams have losing records.

The phenomenon needs to be explored from the aspect of “fans’ emotional attachment”. Factors influencing fans’ brand loyalty have a more psychological dimension, such as habits and long history, social and emotional identification, brand symbolism, BIRG, and self image. With these psychological factors, fans’ will exhibit emotional attachment to specific teams, identify themselves with the teams, and be loyal to the teams, even though the teams might have losing records. Furthermore, these research strategies also can contribute new knowledge about the relationship between influencing factors and fans’ brand loyalty and the relationship between fans’ team identification and brand loyalty. To examine this relationship is valuable because it can provide information to marketing managers when developing strategies. In addition, each of these research strategies is a researchable topic because a few researchers have already measured and explored the same or similar variables and topics. These three research strategies are critical for future scholarly inquiry.

Research Strategy 1

Recommendation- Only a few empirical studies examine factors influencing fans’ brand loyalty. There is a need to explore whether some factors influence fans’ brand loyalty.

Research hypotheses- Directional Hypothesis (One-Tailed):

1. There is a significant, positive relationship between perceived brand-performance fit and fans' brand loyalty.
2. There is a significant, positive relationship between social and emotional identification and fans' brand loyalty.
3. There is a significant, positive relationship between habit and long history with the brand and fans' brand loyalty.
4. There is a significant, positive relationship between brand symbolism and fans' brand loyalty.
5. There is a significant, positive relationship between self image and fans' brand loyalty.
6. There is a significant, positive relationship between basket-in-reflect-glory and fans' brand loyalty.

Proposed methodology- A non-experimental, quantitative design is proposed. A survey will be used to collect data from 500 fans of one stadium to test the hypothesis.

Variables: The causal (independent) variables are perceived brand-performance fit, social and emotional identification, habit and long history, brand symbolism, self image, and BIRG. The effect (dependent or outcome) variables are fans' brand loyalty. To test the hypotheses, the statistical analysis is: 1. Correlation between influencing factors and fans' brand loyalty using a CFA.

Research Strategy 2

Recommendation-Only a few empirical studies examine whether the differences exist between loyal fans and less loyal fans on perceived brand-performance fit, social and emotional identification, habit and long history, brand symbolism, self image, and BIRG.

Research hypothesis- Directional Hypothesis (One-Tailed):

1. Loyal fans will score higher in perceived brand-performance fit than less loyal fans.
2. Loyal fans will score higher in social and emotional identification than less loyal fans.
3. Loyal fans will score higher in habit and long history than less loyal fans.
4. Loyal fans will score higher in brand symbolism than less loyal fans.
5. Loyal fans will score higher in self image than less loyal fans.
6. Loyal fans will score higher in basket-in-reflect-glory than less loyal fans.

Proposed methodology- A non-experimental, quantitative design is proposed. A survey will be used to collect data from 500 fans of sports restaurant to test the hypothesis.

Variables: The causal (independent) variables are fans' brand loyalty. The effect (dependent or outcome) variables are perceived brand-performance fit, social and emotional identification, habit and long history, brand symbolism, self image, and BIRG. To test the hypotheses, the statistical analysis is: 1. independent t-test analysis is used to examine wherever the difference exists between loyal fans and less loyal fans on six dependent variables (perceived brand-performance fit, social and emotional identification, habit and long history, brand symbolism, self image, and BIRG).

Research Strategy 3

Recommendation-Only a few empirical studies examine the relationship between fans' team identification and brand loyalty. There is a need to explore whether fans that have higher team identification will have higher brand loyalty.

Research question or hypothesis- Directional Hypothesis (One-Tailed): There is a significant, positive relationship between fans' team identification and brand loyalty.

Proposed methodology- A non-experimental, quantitative, and correlation design is proposed. 500 college students (subjects) from Lynn University will be selected to test the hypothesis. These subjects

are eligible because Lynn University has different sports teams (basketball, baseball, soccer) and are involved in NCAA division II. Students here might exhibit different levels of team identification to the sports teams of Lynn University.

Variables: The causal (independent) variable is team identification. The effect (dependent or outcome) variable is fans' brand loyalty. To test the hypothesis, the statistical analysis is: 1. Correlation between fans' team identification and brand loyalty using a Pearson r Correlation Coefficient.

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AUDITORS' SWITCHING: AN EMPIRICAL INVESTIGATION

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ABSTRACT

Auditors' switching is commonly examined based on statistical techniques such as discriminant analysis or logit and probit specifications. This paper employs two dichotomous statistical techniques to show both whether auditors' switching can be forecasted and which method is better fitted for the task. In Greece, the phenomenon is recent and research findings indicate that models fit better depending on the data. Essentially, auditors' switching can be forecasted and the most differentiating variables between groups of classification are Market Value of Equity/Book Value of Total Debt.

JEL: M40, M41, M41

INTRODUCTION

The market for auditing services has changed worldwide in recent years. In EEC countries, the liberalization of the profession resulted in auditors in EEC member countries facing radical changes. According to the 8th Directive (1984), minimum educational requirements were imposed in an attempt to encourage the mobility of professional auditors. In the US, changes appear in the form of the removal of restrictions on direct uninvited solicitation.

The rapidly increasing rate of gross legal costs as a percentage of revenues incurred by the "big six" accounting firms, brought litigation risk to the forefront of the battle of the audit function. Factors that explain auditor's switching (variance in stock returns, etc.) partially explain litigation risk, too. The current infant stage of the research focuses on auditor's switching in the context of business investigations similar to those of bankruptcies, mergers and acquisitions, etc. with an application of cross-classification, discrete or binary dichotomous, and limited dependent statistical techniques.

This paper compares empirical findings drawn from an application of cross-classification models in auditors' switched versus non-switched companies through an assessment of the analytical quality of ratio analysis. The rest of the paper is organized as follows. The next section reviews the literature. Section III contains the research design. Section IV discusses statistical and methodological considerations of models and data used. Section V presents empirical findings. Section VI concludes with a summary and suggestions for further future research.

LITERATURE REVIEW

Several auditing models have specifically addressed the question of why client firms switch auditors (Johnson and Lys, 1990; Dye, 1991; DeFond, 1992; Teoh, 1992; Krishnan, 1994 and Gigler and Penno, 1995). These studies have considered levels and changes in agency related client factors (board and management characteristics, growth, issuance of new stock or debt, etc.) as well as factors related to opinion-shopping, including financial stress. The interest in auditors' switching arises partly from regulatory concerns that auditors' switching might compromise financial reporting (opinion shopping) and partly from interest in how capital markets interpret auditors' switching. It has been shown (Bockus and Gigler, 1998) that approximately 6% of auditors' switches are reported as either auditor resignations or declinations to stand for re-election and that about half these instances are either not explained or are explained as resignations for cause (that is, a resignation for reasons specific to the client). The other

explanations refer to auditor-related events that make it impossible for the auditor to continue to serve the client. And since auditor resignations occur when the incumbent auditor believes it is relatively likely that the client has a hidden risk, we would expect that firms whose auditors resign have a higher incidence of adverse outcomes than other firms.

The different research design of auditor's switches makes the interstudy consistency fluctuate. For example, size did not have an effect on auditor's switching among failing firms while it has an effect on control (healthy) companies (Schwartz and Menon,1985). Recently, litigation risk has come to the front of the literature. Meanwhile,evidence shows that the increase in litigation against auditing firms does not correlate to substandard performance (Krishnan,et.al.,1997). On the other hand, litigation risk makes auditors more selective in their choice of clients (Pratt and Stice,1994). Litigation risk is approximated by factors that partially explain the auditor's switching phenomenon. These include audit failure variables (i.e. auditor's independence,ratios of inventories and receivables to assets), auditors' resignation variables (variability in stock returns), among others. Because the audit assignment is a bilateral issue, clients also play a role. Prior research indicates that clients change their auditors for a variety of reasons (Gigler et.al.,1995). An audit client's characteristic constitutes a random variable which changes overtime.

Prior research refers to replacement of client's incumbent auditor (Johnson and Lys,1990) on the notion that economic considerations dictate the alignment of clients and audit firms. The evidence shows that a firm's financial condition is often an indicator of erroneous financial statements (Kinney and McDaniel,1989). The fact that correcting firms are smaller, less profitable, with higher debt and slower growth may signal auditors' perplexities and thus auditor's changes.

Changes in corporate management, the need for additional auditing services, disagreements over reporting matters, and conflict over audit fees have frequently been cited as motivating firms to initiate a search for a new CPA (Chow and Rice,1982; DeAngelo,1982; Eischenseher and Schields, 1983). An additional critical variable influencing auditor switching is financial distress (Schwartz and Menon,1985). A major finding indicates that there is a higher incidence of auditor switching among failing firms. Besides, it has been hypothesized that the presence of long-term debt contracts creates a demand for higher-quality audits (Eichenseher and Shields,1986).

In market-based accounting research, the issuance of new securities also plays a role in auditors' perceptions. It could be either an incentive to change auditors or an indication of the nature of the change itself. An auditor's change is argued to have signalling value regarding the firm and information about the firm vis-a-vis accounting data (Titman and Trueman, 1986). Teoh(1992) shows that investors' reaction to switches depends on the context of the switch and the characteristics of the switching firm. It is the information conveyed by the audit opinion prior to the switch that plays an important role. The stock price response to the announcement of an auditor's change depends on the pre-switch audit opinion. The stock price reaction to a switch will tend to be more negative after a clean than after a qualified opinion because high value retentions are more common after a clean opinion while low value retentions are more common after a qualified opinion.

In contrast, previous studies have shown that the market reaction to auditor switches is negative because the switch signifies that the firm was attempting to influence the auditor. Since a switch after a clean opinion leads to a positive probability of qualification, a rise in the cost to the firm-if it is qualified-leads to a greater stock price decline at the announcement of a switch after a clean opinion. Besides, auditors' switching depends in part on firm value. A firm with intermediate value switches auditors in the hope of obtaining a favorable opinion, while a low value firm does not switch because there is virtually no hope of improving its position. A high value firm abstains because it is confident of a clean opinion from the incumbent auditor. Investor reaction to an auditor's switch is conditioned on the pre-switch audit opinion and other factors related to the costs and benefits of switching.

Furthermore, the decision to choose or switch auditors in a subsidiary company often occurs at the parent level and is determined by group characteristics of the subsidiary. Branson et.al.(2004) assert that apart from the traditional research on auditor choice and auditor switching “referral” the situation where the subsidiary-encouraged by the parent company-appoints the same auditor as the parent company, must be considered as an explanatory variable to understand auditor switching behavior in small open economies like Belgium.

THE RESEARCH DESIGN

The first research question leads to the suitable research method that will be employed in this study. Could switched companies be discriminated from non-switched companies, how correctly they can be classified and whether prediction can be appropriately used in decision making. A suitable research method is to compare companies that switch auditors with a control group of non-switching companies. Discriminant analysis is the most suitable statistical technique that has been successfully tested in many fields in order to discriminate between groups of companies. The pioneering work of Altman (1968) has been employed in this study due to its high performance in many similar fields (liquidations, reorganizations, mergers and acquisitions, among others). Depending on the nature of the data of the two groups of companies alternative methods such as discriminant analysis and logit or probit specifications are tested with the purpose of the appropriate selection apart from theoretical dogmas and proliferations.

Theoretically, it has been argued that if the explanatory variables are normally distributed, then one should use discriminant analysis. However, if the explanatory variables are not normally distributed, then discriminant analysis gives inconsistent estimates, and one is better off using logit analysis (Maddala, 1991). Logistic regression is considered preferable for both theoretical reasons and due to the particularities of the sample selection. Theoretically, logistic regression is usually preferable to discriminant analysis when one wants to see the contribution of each variable to differentiating between groups. It is also effective even when the main objective is classification. Because normality which plays a very important role in the performance of each method is unclear “at first glance” in our data set, such attributes are evaluated in the methodological considerations section that follows in this study.

Altman(1968) selected the following variables to discriminate groups of companies in a bankruptcy prediction paradigm. Profitability liquidity, and leverage ratios as computed below have been tested and successfully justified as the leading ratios for corporate prediction purposes. Auditors’ switch has been associated with financial distress and in turn financial distress is a main cause for a bankruptcy. In such a context, the rationale is to employ Altman’s model in order to make predictions for an auditor’s switch. The analysis is completed for a sample of companies where a need for a prediction accuracy is currently pertinent. The list of ratios are as follows:

X1 = Working Capital/Total Assets (a measure of the net liquid assets of the firm relative to the total capitalization where liquidity and assets characteristics are explicitly considered)

X2 = Retained Earnings/Total Assets (a measure of cumulative profitability where the age of the firm is implicitly considered)

X3 = Return on Assets (a measure of the true productivity of the firm’s assets)

X4 = Market Value of Equity/Book Value of Total Debt (a measure which shows how much the firm’s assets can decline in value before the liabilities exceed the assets)

X5 = Sales/Total Assets (a measure of management’s capability in dealing with competitive conditions)

The discriminant function is as follows:

$$Z = X1 + X2 + X3 + X4 + X5$$

Where

Z = Overall Index

SAMPLE SELECTION AND LIMITATIONS OF THE STUDY

Companies listed in the Athens Stock Exchange were selected for investigation in this study. The emphasis is centered on financial stress with no partitioning of the sample into resignations and dismissals. The size of the sample is based on the number of firms included in the ASE Year-book commencing with the first published data on 1996 when audit reports were first presented as a supplement to firms' financial statements. Unfortunately, audit reports have not been published since 1999 and for a long time period subsequent. Consequently, only three annual financial statements have been employed for investigation in terms of financial ratio analysis.

In order to locate a switch, auditors' reports for 1996 and 1997 were considered. The total number of firms is 227 in 1996, 254 in 1997 and 381 in 1998. The total number of firms included in the final sample is 215 which satisfy the presumption of two consecutive years before the auditor's switch and also have a full time series sequence. Subtotals based on the industrial classification code appear in Appendix I. Companies with an auditor's switch are presented by S as shown in Appendix II. They are eleven in total for the period 1996-1997, and nine for the period 1997-1998. The rest of the list in Appendix II appears with N(non-switching firms). Because the direction of the switch is an important issue it is worth noting that about the half of switched firms are changes to Big Six and mainly are changes away from the Governmental Sworn-in Auditors. The other six of eleven companies are changes to newly established private auditing firms. Two companies of the latter group are changes to the new legal form of the Governmental body which is currently called Board of Certified Auditors, SA operating as a corporation. This is evidence that liberalization of the profession had an effect on the market but the impact of the Big Six is still unclear.

DATA AND METHODOLOGY

The most usual statistical assumption (Lo,1986;Palepu,1986; Karels and Prakash, 1987; Barnes, 1990; Maddala, 1991) is the equal probability distribution between the two groups of companies. Besides, the stability of discrete models over time is another issue usually examined through a univariate analysis between groups. At first, differences between groups are considered. As shown in Table 1 there are marginal differences between groups in a variable by variable consideration. It is clear that variable X4 displays the most significant difference between groups.

The means of each variable used in the analysis, as reported in Table 2, are more illustrative of the differences between groups of companies. As the swithching decision approaches a difficulty appears with variables X2 and X4. Obviously, this is evidence that leverage ratios are the most crucial variables in the discriminating process as well as the predictive ability of models employed in this study.

Table 1: Median Altman Values in Auditors’ Switched Versus Non-Switched Companies.

| Variable | Switched | Non-Switched |
|------------------------------------|--------------|--------------|
| Panel A: One-year-before | | |
| X1 | 0.268 | 0.215 |
| X2 | 0.276 | 0.333 |
| X3 | 0.060(1.573) | 0.05 |
| X4 | 1.579 | 1.386 |
| X5 | 0.602 | 0.562 |
| Panel B: Two-years-before | | |
| X1 | 0.237 | 0.171 |
| X2 | 0.282 | 0.363 |
| X3 | 0.06 | 0.06 |
| X4 | 1.634(1.441) | 1.366(1.339) |
| X5 | 0.587 | 0.558 |
| Panel C: Three-years-before | | |
| X1 | 0.301 | 0.242(0.241) |
| X2 | 0.455 | 0.347 |
| X3 | 0.04 | 0.075 |
| X4 | 0.868 | 1.535(1.517) |
| X5 | 0.408 | 0.598 |

*This table reports median values of predictor variables. X1=Working Capital/Total Assets, X2=Retained Earnings/Total Assets, X3=Return on Assets, X4=Market Value of Equity/Book Value of Total Debt, X5=Sales/Total Assets. Switched indicates that the firms changed auditors. Non-switched indicates that the firm did not change auditors. The figure in each cell is the median. * Outliers omitted.*

Table 2: Average Ratios(Means)

| Variable | Switched | Non-Switched |
|------------------------------------|--------------|--------------|
| Panel A: One-year-before | | |
| X1 | 0.192 | 0.191 |
| X2 | 0.215 | 0.345 |
| X3 | 0.124 | 0.08 |
| X4 | 13.06(1.87)* | 2.607 |
| X5 | 0.795 | 0.627 |
| Panel B: Two-years-before | | |
| X1 | 0.182 | 0.184 |
| X2 | 0.315 | 0.354 |
| X3 | 0.052 | 0.071 |
| X4 | 10.41(3.00)* | 5.51(2.78)* |
| X5 | 0.569 | 0.641 |
| Panel C: Three-years-before | | |
| X1 | 0.3 | 0.251 |
| X2 | 0.99 | 0.414 |
| X3 | 0.02 | 0.051 |
| X4 | 2.71 | 4.82 |
| X5 | 0.58 | 0.68 |

*This table reports mean values of predictor variables. X1=Working Capital/Total Assets, X2=Retained Earnings/Total Assets, X3=Return on Assets, X4=Market Value of Equity/Book Value of Total Debt, X5=Sales/Total Assets. Switched indicates that the firms changed auditors. Non-switched indicates that the firm did not change auditors. The figure in each cell is the median. * Outliers omitted.*

A non-parametric method suitable for ordinal data specifies the most significant variables at the 5% level of significance. Specifically the Kolmogorov-Smirnov test for normality is used. The normality test is critical here because outliers may have a big influence. Prior studies have shown that non-normally distributed financial ratios are characterized by the presence of outliers. It is worth noting that one outlier in variable X1 is present in a non-switched company in all years under consideration. There is one outlier in variable X4 in auditors’ switched companies in the first and second year before the switch respectively. There are four outliers in variable X4 in non-switched firms two years before the switch, and two outliers in the same variable X4 in the third year before the switch. The number of outliers is also very small in other studies when (Deakin, 1976; So,1987; Karels and Prakash,1987).Therefore, financial ratios are studied first in a raw data set and then with outliers omitted in all cases.

As shown in Table 3 most of the variables in auditors' switched companies are normally distributed. In a consideration of the one-year-before data set only variable X4 is not normally distributed. Similarly, examining data three-years before the switch, variable X2 is not normally distributed. In contrast, variables in non-switched companies are not normally distributed in almost all years of the analysis. In any case it is a matter of non-homogeneity of the dataset that results in a limited ability of the model to differentiate switched versus non-switched firms. It is also a matter of a small number of switched firms compared with that of non-switched firms. Therefore, we test for the best fitted model along with the accuracy of predictions. The results are presented in Table 4.

Table 3: Normality Statistics

| Variable | Switched | Non-Switched |
|-----------------------------|--------------|--------------|
| Panel A: One-year-before | | |
| X1 | 0.656 | 0.260 |
| X2 | 0.656 | 0.434 |
| X3 | 0.210 | 0.000 |
| X4 | 0.013(0.575) | 0.000 |
| X5 | 0.888 | 0.061 |
| Panel B: Two-years-before | | |
| X1 | 0.631 | 0.153 |
| X2 | 0.718 | 0.759 |
| X3 | 0.951 | 0.012 |
| X4 | 0.052(0.191) | 0.000 |
| X5 | 0.084 | 0.021 |
| Panel C: Three-years-before | | |
| X1 | 0.997 | 0.169 |
| X2 | 0.044 | 0.000 |
| X3 | 0.965 | 0.000 |
| X4 | 0.088 | 0.000 |
| X5 | 0.761 | 0.015 |

This table reports the results of the Kolmogorov-Smirnov test for normality. X1=Working Capital/Total Assets, X2=Retained Earnings/Total Assets, X3=Return on Assets, X4=Market Value of Equity/Book Value of Total Debt, X5=Sales/Total Assets Numbers in parenthesis indicate outliers excluded. Switched indicates that the firms changed auditors. Non-switched indicates that the firm did not change auditors. The figure in each cell is the Klmogrov-Smernov test statistic.

Since the F probability (i.e. the p-value for the F ratio) in the one way ANOVA is less than 0.05 for variables not normally distributed in auditors' switched companies, F is statistically significant. Besides, there are very small values of F probability in many respects, so there is strong evidence for significance. Eigen valued which indicate the dependence of our results is higher in cases of switched firms but still relatively low. It is worth noting that results are significant at the 0% level in case of either the full sample or the non-switched firms. The high value of X2 reflects a real pattern in the dataset rather than mere chance. In contrast, significance is far lower in case of switched firms. In addition, the value of Wilks' lamda justifies a significant ANOVA result.

Tests for the discriminante model at various time intervals are presented in table 4. Using Kendall's statistic which is a measure of correlation, it is shown that correlation between variables differentiates between groups (switched versus non-switched companies). The highest statistically significant correlation between discriminating variables is attributed to variable X2 which is correlated with X5 one year before the switch. Similarly, X4 correlates with X1, and X3 correlates with X2 two years before the switch. Statistically significant correlation appears in the case of variables in non-switched companies between all variables except X5.

Table 4: Tests of Significance

| Variable | F-ratio | X2 | KW Statistic |
|------------------------------------|--------------|--------------|--------------|
| Panel A: One-year-before | | | |
| X1 | 0.984(0.989) | 0.425(0.459) | 0.515(0.498) |
| X2 | 0.114 | 2.379 | 0.123 |
| X3 | 0.154 | 0.937 | 0.334 |
| X4 | 0.000(0.554) | 0.064(0.071) | 0.800(0.790) |
| X5 | 0.270 | 0.147 | 0.702 |
| Panel B: Two-years-before | | | |
| X1 | 0.963(0.989) | 0.262(0.289) | 0.608(0.591) |
| X2 | 0.598 | 1.344 | 0.246 |
| X3 | 0.278 | 0.898 | 0.345 |
| X4 | 0.454 | 0.445(0.086) | 0.505(0.769) |
| X5 | 0.653 | 0.139 | 0.709 |
| Panel C: Three-years-before | | | |
| X1 | 0.709 | 0.073(0.088) | 0.787(0.766) |
| X2 | 0.009 | 0.014 | 0.907 |
| X3 | 0.623 | 1.847 | 0.174 |
| X4 | 0.645 | 1.725 | 0.189(0.210) |
| X5 | 0.605 | 0.409 | 0.523 |

*This table tests the discriminate model at various time intervals before and the auditor switch event. * Numbers in parenthesis indicate outliers excluded*

EMPIRICAL FINDINGS

The choice of the best fitting model is stressed through a discussion of all empirical findings drawn from a test of discriminant and logit analysis. In each year, a company is observed in one of two alternative states. Coefficients for each model and for each variable in one, two, and three years before the switch along with the whole data set are presented in Table 5.

Because for most variables here there is relatively little difference between the normal (i.e. probit and logit specifications), it is not necessary to use a probit model in this study. Wilks' Lamda which is one of the various statistics available for weighing the addition or deletion of variables in the analysis, is generally low. In discriminant analysis many variables contribute marginally (see Table 5). Obviously, this is consistent with the small differences between groups (see Table 1 and 2). Furthermore, the low eigenvalue means that each variable alone can not sufficiently explain the model. In discriminant analysis the significance of the test provides strong evidence leading to the selection of the best statistical technique.

In contrast, logit eliminated all those variables that did not substantially affect the outcome. Using the Wald-test with a critical value of 2, corresponding to an approximate 5 percent level of significance, it is shown that mainly three variables X2, X3 and X4 (retained earnings to total assets, return on assets, and market value of equity to book value of total debt) are significant in the model.

Separation of years indicates that one year of data provides a sufficient empirical findings. In contrast, many variables contribute marginally in the significance of the model in case of the discriminant analysis with X3, X4 and X5 as indicated by positive coefficients. Discriminant coefficients are all positive in the case of bankruptcy as reported by Altman (1968). Once the values of the discriminant coefficients are estimated, it is possible to calculate discriminant scores for each observation in the sample, or any firm, and to assign the observations to one of the groups based on this score. The essence of the procedure is to compare the profile of an individual firm with that of the alternative groupings.

Table 5: Regression Coefficients (All Data)

| Factor | Discriminant Coefficients | Logistic Coefficients |
|--|---------------------------|-----------------------|
| Panel A: One-year before | | |
| Constant | | -3.588(24.498) |
| | | -3.473(20.081) |
| X1 | -0.317 | -0.833(-0.688) |
| | -0.378 | -0.629(0.308) |
| X2 | -0.305 | -1.610(1.299) |
| | -0.44 | -1.406(0.815) |
| X3 | 0.3 | 3.196(2.006) |
| | 0.653 | 3.499(2.034) |
| X4 | 0.919 | 0.053(1.902) |
| | 0.026 | -0.016(0.012) |
| X5 | 0.475 | 1.019(3.666) |
| | 0.701 | 0.919(2.635) |
| <i>Eigenvalue=0.114 (0.003), Correlation=0.320 (0.172), Wilk' Lamda=0.898 (0.971), X2=22.708 (6.243)</i> | | |
| <i>Significance=0.0004 (0.283), LC Goodness of Fit=215.23(205.11), LC X2=11.113(5.397), LC</i> | | |
| <i>Significance=0.049(0.369)</i> | | |
| Panel B: Two-years before | | |
| Constant | | -2.496(12.399) |
| | | -2.737(10.479) |
| X1 | 0.074 | -0.079(0.007) |
| | 0.622 | -0.445(0.164) |
| X2 | 0.029 | 0.064(0.002) |
| | -0.066 | 0.137(0.007) |
| X3 | 0.823 | -7.132(0.988) |
| | 0.695 | -4.798(0.387) |
| X4 | -0.649 | 0.009(0.413) |
| | -0.437 | 0.024(0.099) |
| X5 | 0.129 | -0.102(0.240) |
| | 0.031 | -0.006(0.000) |
| <i>Eigenvalue=0.010(0.005), Correlation=0.010(0.067), Wilk' Lamda=0.990(0.996), X2=2.100(0.908),</i> | | |
| <i>Significance=0.836(0.970), LC Goodness of Fit=212.250(207.814), LC X2=1.989(0.925), LC</i> | | |
| <i>Significance=0.851(0.968)</i> | | |
| Panel C: Three-years before | | |
| Constant | | -3.317(16.321) |
| | | -3.298(15.768) |
| X1 | 0.24 | 1.110(0.571) |
| | 0.305 | 1.293(0.646) |
| X2 | 0.919 | 0.502(2.901) |
| | 0.9 | -0.490(2.711) |
| X3 | -0.21 | -0.801(0.246) |
| | -0.271 | -0.914(0.304) |
| X4 | -0.258 | -0.055(0.283) |
| | -0.3 | -0.066(0.297) |
| X5 | -0.13 | -0.215(0.082) |
| | -0.132 | -0.242(0.101) |
| <i>Eigenvalue=0.039(0.040), Correlation=0.195(0.196), X2=7.592(7.599), Significance=0.180(0.180),</i> | | |
| <i>LC Goodness of Fit=202.689(200.933), LC X2=4.433(4.377)</i> | | |
| Panel D: One and Two Years Before | | |
| Constant | | -3.199(33.675) |
| | | -0.225(0.114) |
| X1 | -0.236 | -0.632(0.695) |
| | -0.608 | -1.215(1.451) |
| X2 | -0.452 | -0.880(0.717) |
| | -0.515 | 1.220(0.294) |
| X3 | 0.249 | 2.081(0.882) |
| | 0.548 | 0.013(2.150) |
| X4 | 0.837 | -0.029(0.206) |
| | 0.311 | 0.388(0.916) |
| X5 | 0.372 | 0.484(1.257) |
| | 0.622 | |
| <i>Eigenvalue=0.019(0.008), Correlation=0.137(0.091), Wilk' Lamda=0.981(0.992), X2=8.002(3.461),</i> | | |
| <i>Significance=0.156(0.629), LC Goodness of Fit=432.018(428.22), LC X2=5.368(3.196), LC</i> | | |
| <i>Significance=0.670</i> | | |

Table 5: Regression Coefficients Continued (All Data)

| Factor | Discriminant Coefficients | Logistic Coefficients |
|---|---------------------------|-----------------------|
| Panel E: One, Two and Three Years Before | | |
| Constant | | -3.245(81.993) |
| | | -3.182(66.652) |
| X1 | -0.325 | -0.265(0.228) |
| | -0.414 | -0.341(0.305) |
| X2 | 0.667 | 0.401(2.131) |
| | 0.956 | 0.433(2.566) |
| X3 | 0.103 | 0.247(0.040) |
| | 0.091 | 0.339(0.059) |
| X4 | 0.881 | -0.014(0.080) |
| | -0.122 | 0.089(0.059) |
| X5 | 0.136 | 0.114(0.104) |
| | 0.106 | 0.089(0.059) |

Eigenvalue=0.009(0.006), Correlation=0.094(0.076), Wilk' Lamda=0.991(0.994), X2=5.552(3.590), Significance=3.352(0.610) LC Goodness of Fit=638.404(637.826) LC X2=3.610(2.507) LC Significance=0.607(0.776)

*In this table regression results are reported. * Numbers in parenthesis indicate Wald Test. Figures in the second row indicate results with outliers excluded.*

In this manner, the firm is assigned to the group it is most closely resembles. Variables ordered by size indicate that the large contributors to group separation of the discriminating function vary by year before the switching decision. Specifically, variable X4 contributes more compared to X3 which is the most significant contributor in a bankruptcy paradigm (Altman,1960).

As far as the correct classification, results offered in next Table 6 justify the preference of logit over discriminant analysis. Switched firms are more correctly classified using logit. When all data (both years) are used, the percentage of correct classification is 96.02% with a logit model and 83.58% with discriminant analysis. Results are almost the same when a longer time period is employed. In contrast, when one year-before data are used results seem improved in the case of the discriminant analysis.

Table 6: Classification Table for GROUP (Percent Correct-Overall Index)

| Variable | Discriminant Analysis | Logit Model |
|---------------------------------|-----------------------|---------------|
| Panel A: One-year-before | | |
| One Year Before | 89.77 (72.30) | 93.35 (95.31) |
| Two Years Before | 60.93 (57.89) | 94.88 (95.22) |
| Three Years Before | 83.58 (83.84) | 96.02 (95.96) |
| One and Two Years Before | 77.67 (61.85) | 94.88 (95.26) |
| One, Two and Three Years Before | 77.18 (61.51) | 95.09 (95.33) |

*This table shows the comparative effectiveness of discriminant and logit analysis. * Second rate in discriminant analysis column is outliers omitted. ** Second rate in logit is with all variables. The numbers in each cell are percentages*

When two years before the switch are used the percentage of correctly classified (switched versus non-switched firms) is 77.57% and 94.86%, respectively. This finding is very close to other business paradigms (i.e. bankruptcies, mergers and acquisitions, etc.). It is worth noting that the percentage of correctly classified companies is much lower in other fields of business research such as acquired versus non-acquired companies where percentage ranges around 76% and 73% in discriminant and logit analysis, respectively.

Based on the above empirical findings, it is suggested that the prediction model is an accurate forecast of auditors' switching. The results hold not only with two years prior to the event as in other business decisions (bankruptcy, etc.), but also for other time frames. In the latter case, the accuracy diminishes as the lead time increases. Finally, normality in the data sets played a role in the success of one versus the

other model since the moderate degree of normality led to logit rather than discriminant analysis. Apart from the trend in the five predictive variables traced on a univariate basis or the years preceding a switch, the ratios of four other important but less significant ratios are listed in next Table 7.

Table 7: Average Ratios

| Variable | Switched | Non-Switched |
|------------------------------------|----------|--------------|
| Panel A: One-year-before | | |
| Current Ratio | 2.43 | 13.98 |
| Profits | 3386 | 3163.45 |
| Total Debt/Total Assets | 0.43 | 0.44 |
| Sales/Equity | 1.51 | 1.48 |
| Panel B: Two-years-before | | |
| Current Ratio | 5.51 | 10.00 |
| Profits | 2332 | 318.91 |
| Total Debt/Total Assets | 0.38 | 1.43 |
| Sales/Equity | 1.45 | 1.5 |
| Panel C: Three-years-before | | |
| Current Ratio | 4.07 | 3.95 |
| Profits | 3863 | 2328.13 |
| Total Debt/Total Assets | 1.25 | 0.47 |
| Sales/Equity | 0.98 | 1.46 |

This table shows the ability of various variables to predict auditors switching

CONCLUSIONS AND SUGGESTIONS FOR FURTHER FUTURE RESEARCH

This study examined differentiating factors between auditors' switching and non-switching firms in a new research context. This research is novel because auditors' switching data has only recently become publicly available in Greece. This also led to the small sample size employed in this study. The performance of models designed for other purposes are tested on auditors' switching decisions. Results indicate that the most differentiating factor of switched versus non-switched firms is mainly Market Value of Equity/Book Value of Total Debt. It is worth noting that using data of two years before the switch, no variable can explain the model. Annual data for two years-before the switch provide evidence similar to the case when the first year before the switch is used. That is, variable X4 is the most important discriminating factor in a logit analysis.

Application of these models tested both the determinants of a dichotomous choice in an uninvestigated area in a specific country, and the robustness of some widely used models. It provided evidence that only two variables were marginally statistically significant in a switching event. On the other hand, the matter of normality is investigated as a determinant factor in the selection of the appropriate statistical technique. Comparing cross-classification empirical findings provides a good testimony of the convergence or divergence of real empirical findings in various business contexts. The application of these models compared with empirical findings in other forms of incorporation and/or corporate governance may provide different empirical findings and represents an opportunity for further research.

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APPENDIXES

Appendix 1: The Sample

| | SOL | Auditing Firms | Big Six | Mixed | Total |
|--------------------------------|------------|----------------|-----------|----------|------------|
| Panel A: Year 1996 | | | | | |
| Banks | 9 | 2 | 1 | 1(1) | 14** |
| Insurance | 2 | - | - | 2 | 4 |
| Leasing | 2 | 1 | - | - | 3 |
| Investment | 15 | 2 | - | - | 17 |
| Holding Companies | 5 | 1 | 1 | - | 7 |
| Telecommunications | - | - | - | 1(1) | 1 |
| Passenger Shipping | 1 | - | 1 | 1(1) | 3 |
| Textiles | 11 | 6 | - | 1(1) | 18 |
| Chemical Products | 2 | 3 | - | - | 5 |
| Pharmaceutical & Cosmetics | 2 | 1 | 1 | - | 4 |
| Building Material/Cement Comp. | 2 | - | 2 | 1(1) | 5 |
| Construction & Technical | 12 | 12 | - | - | 24 |
| Mines & Metalurgical | 14 | 6 | 2 | - | 22 |
| Food Comp. | 9 | 3 | 3 | - | 15 |
| Flour Mills | 3 | 1 | - | - | 4 |
| Cold Storages | - | 1 | - | - | 1 |
| Tobacco | - | 1 | 1 | - | 2 |
| Containers & Papermills | - | 1 | 1 | - | 2 |
| Industries of Wood Products | 2 | 0 | - | - | 2 |
| Hotels | 2 | - | - | - | 2 |
| Miscellaneous Corp. | 12 | 6 | 2 | - | 20 |
| Informatics | 1 | 2 | - | - | 3 |
| Printed Information Systems | 1 | - | - | - | 1 |
| Mass Media | - | 1 | - | - | 1 |
| Parallel Market | 19 | 15 | 1 | - | 34 |
| TOTAL | 126 | 66 | 16 | 7 | 215 |
| Panel B: Year 1997 | | | | | |
| Banks | 8 | 2 | 1 | 2(2) | 14* |
| Insurances | 2 | - | - | 2 | 4 |
| Leasing Companies | 2 | 1 | - | - | 3 |
| Investment Companies | 14 | 3 | - | - | 17 |
| Holding Companies | 5 | 1 | 1 | - | 7 |
| Telecommunications | - | - | - | 1(1) | 1 |
| Passenger Shipping | 2 | - | 1 | - | 3 |
| Textiles | 11 | 7 | - | - | 18 |
| Chemical Products | 2 | 3 | - | - | 5 |
| Pharmaceutical & Cosmetics | 2 | 1 | 1 | - | 4 |
| Building Material/Cement Comp. | 2 | - | 2 | 1(1) | 5 |
| Construction & Technical | 12 | 12 | - | - | 24 |
| Mines & Metalurgical | 11 | 8 | 2 | 1(1) | 22 |
| Food Comp. | 7 | 5 | 3 | - | 15 |
| Flour Mills | 2 | 1 | - | 1(1) | 4 |
| Cold Storages | - | 1 | - | - | 1 |
| Tobacco | - | 1 | 1 | - | 2 |
| Containers & Papermills | - | 2 | 1 | - | 3 |
| Industries of Wood Product | 2 | - | - | - | 2 |
| Hotels | 1 | 1 | - | - | 2 |
| Miscellaneous Corp. | 12 | 6 | 2 | - | 20 |
| Informatics | 1 | 2 | - | - | 3 |
| Printed Information System | 1 | - | - | - | 1 |
| Mass Media | - | 1 | - | - | 1 |
| Parallel Market | 18 | 15 | 1 | - | 34 |
| TOTAL | 117 | 73 | 16 | 8 | 215 |

* Certified Public Accountants in Greece (Sworn-in Auditors) as a Governmental Body.

** Total includes Central Bank of Greece where auditors are appointed by its Governor.

Appendix 2: List of Companies

| | | | | | |
|---------------------------------|---|-------------------------------------|---|-----------------------------------|---|
| BANKS | | Selected Textile Intl. Ass. SA | N | METALLURGICAL | |
| Alpha Credit Bank | N | Britannia Wersted Ind | N | ALCATEL CABLES Hellas | N |
| Bank of Attica | N | Etma Rayon | N | Aluminium of Attica | N |
| General Hellenic Bank | N | Lanakam SA | N | Aluminum of Greece | N |
| Bank of Greece | N | Naussa Spinning Mills | N | BIOSSOL SA | N |
| Commercial Bank of Greece | N | Textile Ind. Nafpaktos G.Pol | N | O. Daring Sain | N |
| Ergo Bank SA | N | K. Doudos SA | N | Elval Aluminum Process | N |
| National Bank of Greece | N | Macedonian Spinning Mills | N | Hellenic Cables | N |
| Nibid | S | Minerva Knitwear SA | N | Light Metals Ind | N |
| Ionian Bank | N | Knitwear Factory MAXIM | N | Intracom Sa | N |
| Bank of Central Greece | N | EL.D. Mouzakis SA | N | A. Kaplinis-Simos Stl. Srv | S |
| Bank of Macedonia-Thrace | N | Nimatemporiki SA | N | N. Levederis | N |
| Bank of Piraeus | N | Tria Alpha | N | Metka Sa | N |
| Chios Bank | N | Fanco SA | N | Bitros Sa | N |
| Bank of Athens SA | N | Fintexport | N | Mytilineos Hold. Sa | N |
| | | | | Radio-Athinai Aevete | S |
| INSURANCE | | CHEMICAL PRODUCTS | | Arcadia Metal Ind C. R. | N |
| Ethiki General Insurance | N | ESHA SA | N | Sidenor SA | S |
| Aspis Pronia General Insurance | N | P.D. Papoutsanis SA | N | Pipe Works L G P SA | N |
| European Reliance General Ins. | N | Petzetakis SA | N | Fourlis SA | N |
| The Phoenix Greek Gen. Ins. Co. | N | Thrace Plastics SA | N | Halkor SA | S |
| | | Macedonian Plastics | N | Sheet Steel Comp | N |
| LEASING | | PHARMACEUTICAL COMPANIES | | FOOD | |
| Alpha Leasing SA | N | Lavipharm SA | N | A-B Vassilopoulos | N |
| Etva Leasing Sa | N | Rilken SA | N | Goody's | N |
| Ergodata SA | N | Pappaellina Gr. of Comp | N | Delta Diary | N |
| | | Gr. Sarantis | N | Elais Oleaginous Prod | N |
| INVESTMENT COMPANIES | | BUILDING MATERIAL AND CEMENT | | Hellenic Sugar Ind | N |
| Alpha Investment SA | N | Kekrops Hotel Tourist Building | N | Hellenic Bottling Comp | N |
| Alpha Finance | N | Keramia Allatini | N | Hellenic Biscuit Comp | N |
| Aelian Investment Fund | N | Heracles General Cement | N | Thessaliki Spirits | N |
| Aspis Investment SA | N | Titan Cement | N | Kambas SA | N |
| DIAS SA Closed End Invst. Fnd. | S | Halyps Cement | N | Katselis Sons SA Brd. Ind | N |
| National Investment Fund | N | | | Uncle Stathis SA | N |
| Hellenic Investment Comp | N | CONSTRUCTION ENTERPRISES | | Nikas Sa | N |
| Commercial Investment SA | N | Avax Sa Const. Co. | N | Oinerga | S |
| Exelixa Sa | N | Aegek Sa | N | Jacobs Suchard Pavlidis | N |
| Investment Development Fund | N | Athena Hellenic Engin | N | Chipita International SA | N |
| Ergo Investment SA | N | Aktor Sa Tech. Comp | N | FLOUR MILLS | |
| Interinvest | N | Atemke Sa | N | Allatini Ind and Com. | S |
| Ionian Investment | N | Atti-Kat | N | Flour Mills Loulis | N |
| Marfin SA | N | Vioter | N | Flour Mills Saran. | N |
| Piraeus Investment SA | N | General Const. Comp | N | St. George Mills | N |
| The Greek Progress Fund | N | Gekat | N | COLD STORAGE | |
| Orion Int. Invst. Trust Fnd | N | Gnomon | N | Parnassos Ent. | N |
| | | Edrasis-C. Phallidas | N | TOBACCO | |
| HOLDING COMPANIES | | Helleniki Technodomiki | N | Karelia Tobacco Comp | N |
| Alcar SA | N | Ergas Sa | N | Papastratos Cigarette | N |
| Viohalco | N | European Technical | N | CONTAINERS AND PAPER MILLS | |
| Attica Enterprises Holding | N | Themeliiodomi | N | VIS Container Mfg. | N |
| Ideal Group SA | N | C. Sarantopoulos | N | Hellas CAN | N |
| Keranis SA | N | Mesochoritis Bros | N | M.J. Maillis SA | N |
| Klonatex ICST & TCA | N | Michaniki | N | WOOD PRODUCTS | |
| J. Boutaris & Sons | N | Mochlos SA | N | Xylemporia | N |
| | | Proodeftiki Technical Comp | N | Shellman | N |
| TELECOMMUNICATIONS | | Terna Tourist Techc & Mar. | N | HOTELS | |
| Hellenic Telecom. SA | N | Volos Techniki Comp | N | Ionian Hotel Enterprises | S |
| PASSENGER SHIPPING | | Technical Olymbic | N | Lampsa Hotel Comp | N |
| Dane Sea Line | S | Technodomi M. Travlos | N | | |
| Strintzis Lines | N | MINES | | | |
| Martime Company of Lesbos | N | Silver & Baryte Ores B. Min. | N | | |
| TEXTILES | | | | | |
| Demetriades Ltd | N | | | | |
| Hellenic Fabrics SA | S | | | | |
| Elfico SA | N | | | | |

| | | | | | |
|------------------------------|---|----------------------------|---|--------------------------|---|
| MISCELLANEOUS | | ALTEC CA Inform & Com. | N | Intertyp | N |
| Athinea SA | N | DELTA Informatics | N | Selonda Acquaculture | N |
| Alisida SA | N | Intrasoft SA | N | C. Cardassilaris SA | N |
| Warehouses Comp | N | | | Corfil SA | N |
| General Com. and Ind. | N | PRINTED INFORMATICS | | Koumbas Ins | N |
| Elemec Sports Abete | N | SYSTEMS | | Kreka SA | N |
| Electrac SA | N | Inform P. Lykos SA | N | Metalloplastiki Agriniou | N |
| Emporikos Desmos | N | | | Metrolife Commercial | N |
| Hermes SA Bld. Ent. | N | MASS MEDIA | | Mouriades SA | N |
| Eskimo SA | N | Tiletypos SA | N | Babyland Toys SA | N |
| Zampa SA | N | | | Nirefs | N |
| Athens Medical | N | PARALLEL MARKET | | E. Pairis SA | N |
| Hippotour | N | Albio Biokarpet Sa | N | Piraeus Leasing | N |
| Klaudatos SA | N | Vernikos Yaghts | N | Pouliades Ass | N |
| Lampropoulos Bros | N | Gener Sa | N | Radio A. Korasside | N |
| X.Benroubi SA | N | Dis Sa | N | RIDENCO SA | N |
| Sanyo Hellas Holding | N | Diekat Sa | N | REMEK Pharm. | N |
| Sato AE | N | Ekter Sa | N | S.SIGALAS SA | N |
| S.P. Tasoglou SA | N | Elve Sa | N | SINGULAR SA | N |
| Sportsman SA | N | Hellatex Sa Syntex Yarns | N | Const. Co C. Const. | N |
| Sfakianiakis SA | N | Endyssi Sa | N | Yalco-Const. SA | N |
| | | Euromedica SA | N | FlexoPack SA | N |
| INFORMATICS COMPANIES | | Athens Medical | N | | |
| | | Imperio | N | | |

MODELS OF FINANCIAL IMMUNIZATION: BEHAVIOR ON THE SPANISH PUBLIC DEBT MARKET

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ABSTRACT

Financial immunization is a passive management strategy for portfolios comprising fixed income financial assets that aims to eliminate from such portfolios any risk arising from uncertainty concerning the future performance of interest rates. Some effort has been made to employ different models of immunization to get this objective. The purpose of this paper is to simulate the behavior of different models of financial immunization, based on information concerning the Spanish public debt market, with a view to conducting a comparative analysis.

JEL: G12

INTRODUCTION

The concept of duration attracted the attention of the business community and turned out to be an analytical as well as practical tool, which is widely used. Originally discovered more than 50 years ago, duration was defined to better reflect the length of a payment stream. A short time later, it was independently derived in an investigation into the elasticity of the price of a bond with respect to the interest rates. Soon thereafter, duration was rediscovered in the context of the immunization of portfolios comprising fixed income financial assets.

Immunization may be defined as the protection of the nominal value of a portfolio against interest rate changes. It has been shown that under idealized conditions this objective can be attained by equating the length of the investment horizon with some measure or measures of the time pattern of cash flows associated with the portfolio. This measure is commonly referred as duration.

The initial basis for strategies of financial immunization was the measure of duration introduced by F. Macaulay in 1938. In view of the limitations of the immunization model based on this measure, and in a bid to achieve greater interest risk coverage, a number of approaches have led to a good many models being proposed, which may be classified into three groups:

- Unifactorial models based on the use of single duration immunization measures.
- Models based on dispersal measures. These seek to minimize the dispersal of bond portfolio cash flows in relation to the investment horizon.
- Multifactorial models based on the simultaneous use of a set of immunizing measures of duration.

The purpose of this paper is to explore empirically the potential for improved immunization using those models. In the next section, we realize a literary review of the analyzed models. Later we describe the database used to develop the empirical work. Finally, we show the results of this study and the reached conclusion.

LITERATURE REVIEW

The financial immunization theorem, proposed in 1971 by Fisher and Weil, proved that a strategy to protect investors with fixed income portfolios from unexpected changes in interest rates during an

investment horizon could be devised. This strategy consists on equalizing the duration of the portfolio to this time-period. To reach this conclusion, these authors start from two very restrictive assumptions: the fulfillment of the unbiased expectations hypothesis and the limitation of the possible displacements from the yield curve to variations in parallel.

The casuistry around the interest rates' behaviour is more complex. With the objective of trying to overcome the previously commented limitations, different immunization models have been proposed based on the use of several duration measures.

The unifactorials models of immunization are based on the use of unique duration measures to reach the proposed objectives. In the same way as the model of Fisher and Weil, this models assume the fulfilment of the unbiased expectations hypothesis and each of them suppose that the yield curve can only move following a concrete behaviour pattern. Related with these models, there are proposals carried out by authors like Bierwag (1977), Bierwag and Kaufman (1977), Khang (1979) and Bierwag, Kaufman, Schweitzer and Toevs (1983). The best part of these models is their simplicity, reason for which they are broadly used in the professional field. Their main problem is that they do not allow capturing as a whole the movements of the yield curve. For this reason, they do not provide a complete cover of the interest rates risk.

With the objective of reaching a higher precision in the measurement of the interest rate risk, the multifactorial models substitute the unique duration measure for a vector or group of durations. The proposals carried out that follow this position are diverse: Cooper (1977), Prisman and Shores (1988), Reitano (1991), Ho (1992), Klaffky, Ma and Nozari (1992), Dattatreya and Fabozzi (1995), Willner (1996) and Nawalkha and Chambers (1997).

As alternative to these models, or as a complement to them, different authors have proposed to establish the strategies of financial immunization through the minimization of some measures that quantifies the cash flows dispersion of the portfolios regarding the investment horizon. The objective pursued with the financial immunization would be easily reached if coupon zero bonds, whose terms of maturity coincides with the investment horizon, exist. These models want to achieve the approximation to the coupon zero bonds. See Fong and Vasicek (1984), with the measure M^2 and Nawalkha and Chambers (1996) with the M-absolute measure. The problem of these models is that they summarize the risk of immunization in a unique measure, making hard the disintegration of the risk associated to each yield curve movement for its treatment in an individualized way.

As higher is the complexity of the models proposed to eliminate the interest rates risk, better should be the results obtained in the covertures. Nevertheless, the setting in practice of these models is more complex and more expensive, being necessary to analyze if the results obtained with them improve significantly those reached applying the simplest models.

METHODOLOGY AND DATA

The Spanish Public Debt Market: Models Tested

In this paper, basically, we examined immunization models in all three of the abovementioned categories. As regards unifactorial models, we simulated the performance of three models based respectively on shifts in the temporal structure of additive, multiplicative and maturity-related multiplicative interest rates.

To verify the importance of cash flow dispersal in bond portfolios in relation to the investment horizon, for each of the three models contrasted and for each of the terms assumed, we composed three types of portfolios:

- Bullet portfolios, comprising, of the bonds available, the two with durations closest to the investment horizon only.
- Barbell portfolios, also comprising two bonds, but in this case the ones with the longest and the shortest duration of those available.
- Ladder portfolios, comprising all available bonds under the criterion of maximum diversification.

In view of the importance some authors (Bierwag, Fooladi and Roberts (1993)) give to the inclusion in portfolios of the bond maturing closest to the investment horizon, we tested the additive duration model including in the portfolios the two bonds with a duration longer and shorter than the investment horizon but with maturity closest to it.

The second group of models tested was based on the use of methods of dispersal. We formed immunized portfolios by applying the model proposed by Fong and Vasicek (1983) which aims, out of all the possible portfolios with a specific duration, calculated on the basis of an additive shift in the term structure of interest rates, to find the one with the lowest cash flow dispersal in relation to the investment horizon, measured by the M^2 variable.

Finally, we formed immunized portfolios by applying one of the multifactorial models proposed. We replaced the single measure of duration with a set of durations, each of which quantifies the risk of bond prices in the event of a specific shift of the term structure of interest rates. To define such shifts we analyzed the movements in the term structure of interest rates in Spain between January 1991 and August 1997, applying the principal component analysis; we defined the immunization measures of duration based on the results obtained. Displacements during that period may be explained basically by 3 factors. The first factor explains 72.83% of all shifts, the second 24.17% and the third 2.32%. Three cases were analyzed; account being taken of one factor, two factors and three factors in each respectively, the criterion of maximum diversification in portfolio formation being followed.

For the models mentioned so far, simulation was conducted without considering the possibility of taking short-term positions in spot trading on Spanish Public Treasury bonds and securities, since such operations cannot be conducted in the Spanish public debt market. Nevertheless, such positions could be taken by using derivatives, thereby facilitating substantial changes in the results obtained by the portfolios. To analyze this possibility, we simulated the performance of two groups of multifactorial immunization models on the assumption that it is possible to take up short-term positions on the spot market. The lack of information on futures markets, and the sheer number of adjustments in portfolios necessary to meet the initial margins, and the mark to market persuaded us to use this hypothesis. These models were: the first of the multifactorial models seen above, based on the shifts in the term structure of interest rates over a long period in Spain, taking account once again of 1 to 3 factors, and the polynomial duration model proposed by Prisman and Shores (1988) and Nawalkha and Chambers (1997), which, starting from the possibility of defining the term structure of interest rates from a polynomial, defines the conditions immunized portfolios should comply with as follows:

$$D_j = \frac{\sum_{t=1}^n t^j FC_t e^{-h(0,t)t}}{\sum_{t=1}^n FC_t e^{-h(0,t)t}} = m^j \quad (1)$$

Where:

D_j : Immunization duration factor j

FC_t: cash flows generated by the portfolio at each moment t, t=1, 2, 3, ...n
 h(0,t): spot interest rate in term t, in an instant

We formed immunized portfolios following this model with 3, 4 and up to 5 durations respectively, following the criterion of maximum diversification in forming portfolios. Prisman and Shores (1988) and Nawalkhan and Chambers (1997) demonstrated that establishing immunization strategies on the basis of minimizing M² eliminates the risk of immunization from parallel changes in the term structure of interest rates, minimizing the risk of a multiplicative variation of it occurring. A multifactorial model of two factors is therefore implicitly being applied, based on additive and multiplicative shifts in the term structure of interest rates. Table 1 shows the most important characteristics of the models tested.

Table 1: Immunization Strategies Tested

| TERMS TESTED | IMMUNIZATION MODELS | PORTFOLIO STRUCTURE | |
|--|---|---|---|
| 2 YEARS | Unifactorial Immunization Models | Bullet: 2 bonds, ones with durations closest to investment horizon. (BUL) Barbell: 2 bonds, ones with greatest & least duration of those available (BAR) Ladder: maximum diversification. (LAD) | |
| | Additive duration (ADI) | | |
| | Multiplicative duration (MUL) Mat.-related multiplicative duration (MULVT) | | |
| | Without Short-term Positions | Multifactorial Models: Main Components | Maximum diversification |
| | | 1 Factor (ACP 1) 2 Factors (ACP 2) 3 Factors (ACP 3) | |
| | | Model M² | |
| | | Additive duration and minimum M ² (M ²) | 2 bonds with minimum M ² |
| | | Unifactorial Model with Bond Maturity | 2 bonds with maturity closest to investment horizon |
| | Additive duration (BONOVTO) | | |
| | 3 YEARS | Multifactorial Models: Main Components | Maximum diversification |
| 5 YEARS | 1 Factor (ACP CORT 1) 2 Factors (ACP CORT 2) 3 Factors (ACP CORT 3) | | |
| | Multifactorial Models: Polynomial | Maximum diversification | |
| 2 Factors (MULTICORT 2) 3 Factors (MULTICORT 3) 4 Factors (MULTICORT 4) 5 Factors (MULTICORT 5) | | | |

Principal characteristics of the models of financial immunization tested.

As regards maturity terms, we compared the performance of these models for investment horizons of 2, 3 and 5 years.

Establishing financial immunization strategies entails regularly restructuring portfolios to attempt to comply at all times with the conditions necessary to obtain the expected results. We applied the criterion used in similar articles by other authors of restructuring portfolios once a week. Further, intermediate cash flows generated by portfolios (either through coupon payments or the return, on maturing, of the principal of some bonds) were reinvested in the portfolios, thereby maintaining their structure at the moment these cash flows were received. We assumed transaction costs in portfolio restructuring operations did not exist.

Data

To run the simulation we used data published by the Bank of Spain on simple spot transactions between January 1993 and March 2004 of bonds issued by the Spanish Public Treasury. The simulation used average daily trading prices for these operations. In some cases, on specific dates when some bonds were not traded or negotiated, we had to calculate the theoretical price of the bonds involved applying theoretical spot interest rates calculated by the Svensson method. Rather than use all the assets available in the simulation, we only employed those with a reasonable level of liquidity. This we did to prevent bond prices being influenced by the existence of premiums designed to offset lack of liquidity and to avoid problems when restructuring portfolios. To select portfolio-friendly bonds we used a procedure based on monthly asset trading frequency. For each security, we calculated the percentage of days effectively traded with regard to the total number of working days in each month, from January 1993 to March 2004, provided the stock was live. With this parameter, the criterion used in judging a bond or security as having sufficient liquidity, always from a weekly perspective, was for it to have been traded at eighty per cent-plus frequency in at least four months of the preceding semester. The semester was taken as the evaluation period as portfolios were also restructured every six months. For our purposes, semesters begin in January and July every year. The idea behind this criterion was to profile portfolios with bonds and securities whose high liquidity levels made them easy to trade.

Target portfolio yield was calculated using the Svensson model (1994) for establishing spot interest rates, based on quotations of public debt securities issued by the Spanish Treasury. To ensure we had a sufficiently large number of portfolios for each strategy, portfolio investment periods overlapped, except in periods of a semester. As a result, we analyzed the results of 19 portfolios considering an investment horizon of 2 years, 17 with a three-year horizon and 13 with a term of 5 years. For the multifactorial model based on the main component analysis to quantify shifts in the term structure of interest rates, our analysis covered 10 portfolios at 2 years, 8 at 3 years and 4 at 5 years. This was because the model was applied based on shifts in the term structure of interest rates in Spain between January 1991 and August 1997, as we began to form portfolios from the latter date.

We used the financial law of compound interest in annual terms to evaluate the yield initially expected from the portfolios and final portfolio yield. We also used 365/365 as a time base for the calculations. We calculated the target portfolio yield using Svensson's model (1994) to determine spot interest rates based on the quotations of the debt securities issued by the Spanish Treasury.

Interest risk coverage will be more effective the nearer the final yield obtained by the immunized portfolios is to the yield initially planned when they were formed. We analyzed the efficiency of the coverage based on the degree of proximity between achieved yield and the yield initially expected for the portfolios. For this, we used the following statistics:

Corrected Euclidean distance. The Euclidean distance is only useful for comparing different models when analyzing portfolios with the same maturity. So we needed to correct the Euclidean distance (DEC) if we wanted to have a statistic we could use to compare the degree of suitability of immunization models for which a different number of observations are available. This was calculated as follows:

$$DEC = \sqrt{\sum_{i=1}^N (x_i - y_i)^2} \times \frac{1}{N} = DE \times \sqrt{\frac{1}{N}} = \frac{DE}{\sqrt{N}} \quad (2)$$

Where:

- x_i , is the yield obtained for semester i by the immunized portfolio
 - y_i , is the target yield for the same period for the target portfolio
 - N , the number of observations available (semesters) for each pair of variables (model-target)
- we want to test the corrected Euclidean distance is one of the most robust statistics of those used, since it does not permit the possibility of offsetting the positive differences against the negative, between yield achieved and final yield.

The correlation coefficient between target yields and achieved yields. The standard deviation between the yield of the immunized portfolios and the target portfolios. The problem with this measurement is that it allows sign offsetting. Even so, it is useful for determining, on average, the sense they take from the deviation between achieved portfolios and target portfolios.

RESULTS

Although all the statistics introduced gave interesting information, the Euclidean distance was basically the most relevant in our study, since offsetting errors was not permitted. In any case, the greater the precision, the greater the correlation between variables, and the shorter the Euclidean distance.

Table 2: Summarizing Statistical Results

| Immunization model | Portfolios Maturing at 2 Years | | | Portfolios Maturing at 3 Years | | | Portfolios Maturing at 5 Years | | |
|----------------------|--------------------------------|------------------|---------------------|--------------------------------|------------------|---------------------|--------------------------------|------------------|---------------------|
| | Corr ^b | DEC ^c | E(dif) ^d | Corr ^b | DEC ^c | E(dif) ^d | Corr ^b | DEC ^c | E(dif) ^d |
| BULADI | 0.9975** | 0.0023 | 0.109% | 0.9927** | 0.0040 | 0.206% | 0.9942** | 0.0030 | 0.161% |
| LADADI | 0.9420** | 0.0096 | -0.125% | 0.9822** | 0.0051 | -0.050% | 0.9916** | 0.0055 | -0.274% |
| BARADI | 0.6602** | 0.0242 | 0.507% | 0.8892** | 0.0137 | 0.571% | 0.9579** | 0.0079 | 0.153% |
| BULMUL | 0.9975** | 0.0023 | 0.115% | 0.9914** | 0.0043 | 0.219% | 0.9943** | 0.0030 | 0.158% |
| LADMUL | 0.9661** | 0.0073 | 0.073% | 0.9896** | 0.0045 | 0.029% | 0.9889** | 0.0051 | -0.240% |
| BARMUL | 0.6625** | 0.0241 | 0.500% | 0.8903** | 0.0136 | 0.559% | 0.9582** | 0.0079 | 0.134% |
| BULMULVT | 0.9874** | 0.0050 | 0.227% | 0.9856** | 0.0058 | 0.363% | 0.9924** | 0.0041 | 0.320% |
| LADMULVT | 0.9709** | 0.0069 | 0.167% | 0.9834** | 0.0052 | 0.113% | 0.9863** | 0.0051 | -0.059% |
| BARMULVT | 0.4713* | 0.0322 | 1.360% | 0.7659** | 0.0235 | 1.586% | 0.9007** | 0.0155 | 1.271% |
| M² | 0.9975** | 0.0023 | 0.127% | 0.9917** | 0.0040 | 0.194% | 0.9936** | 0.0031 | 0.155% |
| BONOVTO | 0.9873** | 0.0049 | 0.210% | 0.9886** | 0.0050 | 0.277% | 0.9909** | 0.0041 | 0.236% |
| ACP 1 | 0.7195* | 0.0085 | 0.603% | 0.7718* | 0.0112 | 0.599% | 0.9274 | 0.0142 | 0.586% |
| ACP 2 | 0.7898** | 0.0082 | 0.570% | 0.1475 | 0.0122 | 0.668% | 0.9950** | 0.0149 | 0.406% |
| ACP 3 | 0.8229** | 0.0065 | 0.413% | 0.2264 | 0.0118 | 0.569% | 0.9954** | 0.0141 | 0.669% |
| ACP CORT 1 | 0.8082** | 0.0086 | 0.606% | 0.8575** | 0.0655 | -2.034% | 0.9702* | 0.0683 | -2.941% |
| ACP CORT 2 | 0.4297 | 0.0136 | 0.814% | 0.3026 | 0.0657 | -1.911% | 0.8243 | 0.0683 | -3.001% |
| ACP CORT 3 | 0.1756 | 0.0135 | 0.194% | -0.1843 | 0.0661 | -2.103% | 0.3408 | 0.0686 | -3.373% |
| MULTICORT 2 | 0.9933** | 0.0043 | 0.135% | 0.9966** | 0.0035 | 0.146% | 0.9949** | 0.0031 | 0.293% |
| MULTICORT 3 | 0.9933** | 0.0033 | 0.085% | 0.9966** | 0.0024 | 0.048% | 0.9939** | 0.0021 | 0.120% |
| MULTICORT 4 | 0.9851** | 0.0050 | 0.131% | 0.9900** | 0.0045 | 0.122% | 0.9944** | 0.0036 | 0.256% |
| MULTICORT 5 | 0.9861** | 0.0048 | 0.129% | 0.9912** | 0.0040 | 0.113% | 0.9894** | 0.0043 | 0.157% |

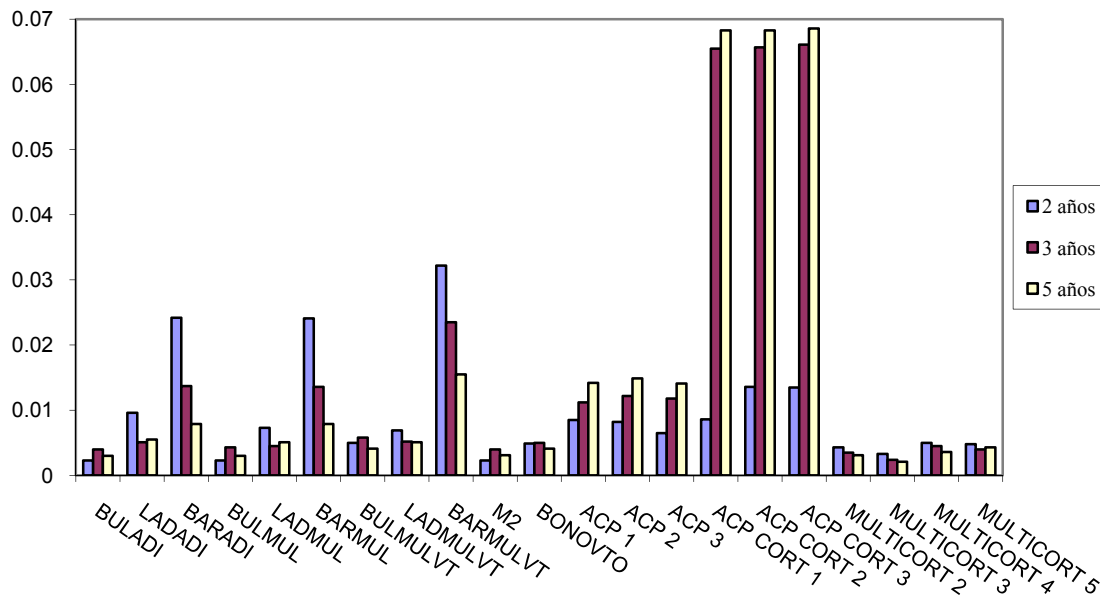
* Significant at level 0.05 (bilateral) ** Significant at level 0.01 (bilateral)
 Results of models of financial immunization analyzed

In all, we did 63 analyses: 21 models and 3 different maturity terms for each one. Table 2 shows the results, the most revealing of which were:

First, after conducting the Kolmogorov-Smirnov comparison for all yield distributions analyzed, in no case could we rule out the variables not behaving differently from the normal distribution Secondly, with

regard to unifactorial models, it should be noted that addressing bond portfolio structure exclusively, the best performers were bullet or concentrated portfolios, independently of the immunization model chosen and of the portfolio maturity or time horizon, followed by the ladder and barbell portfolios, the barbells performing worst of all. The correlation coefficient was greater for all models and maturities tested, the greater the degree of concentration of portfolio cash flows. The corrected Euclidean distance was lower in bullet than in ladder or barbell portfolios. In light of these results, it is fair to say that ladder and barbell portfolios are more inefficient in achieving the objective of immunization than are bullet portfolios. Figure 1 shows the values of the corrected Euclidean distance for all models analyzed.

Figure 1: Corrected Euclidean Distance between Yields Obtained and Target Yields for All Models and Terms Analyzed



This figure shows the Corrected Euclidean Distance between the target and the yields obtained for the models and terms analyzed

Continuing with unifactorial models, and limiting ourselves exclusively to bullet portfolios (the best performers), the model of financial immunization based on shifts in the term structure of multiplicative-type interest rates according to term of maturity was by far the worst in adjusting. Any of the statistics calculated gave a less favorable value for this model as opposed to the other two. There were very few differences between the additive duration and multiplicative duration models, the results being more favorable to one model or the other depending on the term of portfolio maturity and the statistic employed.

Considering the models analyzed as a whole, portfolio maturity-related results were more satisfactory the greater the investment horizon considered. However, if one concentrates exclusively on the best performers, i.e. bullet portfolios and additive and multiplicative durations, it becomes clear that the time factor did not play a significant role in the decision to choose one immunization model or another. Although the best results were obtained with a two-year portfolio horizon, no clear tendency was discernible here, as while portfolios with a three-year horizon performed less well than two-year ones, five-year portfolios broke the tendency by obtaining better results than the three-year maturity portfolios.

In the third place, two important facts need underscoring with regard to the model based on the minimization of portfolio cash flows in relation to investment horizon M^2 . Portfolios constructed using this model achieved very high adjustment levels, comparable to the levels of the best portfolios achieved

under the unifactorial model. For a two-year maturity term, the results were virtually identical in unifactorial models with bullet profiles and additive and multiplicative durations and in the M^2 model. For three- and five-year maturity terms, differences between the three models were very low, one or other model performing better depending on the statistic chosen to quantify results.

As occurred in the unifactorial models, portfolio maturity was not particularly representative, it being possible to order them from better to worse as follows: two, five and three years.

In the fourth place, results for portfolios immunized against additive shifts in the term structure of interest rates including bonds maturing closest to the investment horizon were fairly satisfactory, although no better than those obtained by bullet portfolios and additive and multiplicative durations or than the results obtained by portfolios immunized by minimizing cash flow dispersal. In short, the inclusion of the bond maturing closest to the investment horizon did not, in the cases analyzed, guarantee yields closer to those initially forecast.

Fifth, the following may be said about multifactorial models. The results obtained using the model with durations defined based on the historic shifts in the term structure of interest rates, our ACP models, were at best very discreet, and were even worse if the possibility of taking short-term positions on the spot market was taken into account. These results were comfortably surpassed by portfolios based on unifactorial models, when portfolios were “bullet-shaped”, by portfolios based on M^2 minimization and even by the portfolio including the maturity bond. A major drawback found on testing these models, and which might help to explain the results, was the lack of observations, as the model construction process entails losing data on the first nine semesters.

Results for the Prisman and Shores model, the ones we named MULTISHORT models, were similar to those achieved with the best unifactorial models and the M^2 model. For a maturity of 2 years, regardless of the number of factors considered, the results did not exceed those of the models mentioned. However, in some cases such results were improved on with three- or five-year maturities.

Immunization as opposed to a larger number of factors did not necessarily mean an improvement in results. Focusing on the Prisman and Shores model, results were more satisfactory when 3 factors were taken into consideration, the portfolios being less well immunized when 4 or 5 factors were involved. Furthermore, for investment horizons of 3 and 5 years, the portfolios best immunized were obtained using this model and considering 3 factors.

To end, some mention must be made of the limitations of this study. The first comes through using Svensson's model for deciding spot interest rates for establishing target yields for immunized portfolio. Some of the differences between real immunized portfolio yields and the expected yields may be explained by the model's possible errors of estimation.

Finally, the number of portfolios considered in the study is very low. Low liquidity on the public debt market prior to January 1993 prevents us from conducting a more exhaustive analysis of the problem.

CONCLUSIONS

The unifactorial financial immunization models facilitating greater proximity between yields achieved by portfolios and target yields are those based on measurements of duration arising from additive or multiplicative changes in the term structure of interest rates and supported in bullet portfolios. In these models, the best results are obtained with portfolios with shorter investment horizons.

For three- and five-year investment horizons, the best results are obtained building portfolios using the Prisman and Shores multifactorial model when three factors are considered. Although slightly poorer,

results for an investment horizon of 2 years are remarkably similar to those obtained by bullet-shaped unifactorial models of additive and multiplicative duration. Including the fourth and fifth factors does not improve the results.

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HOW WOULD A POSSIBLE U.N. SANCTION AFFECT THE IRANIAN ECONOMY?

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ABSTRACT

Though Iran's economy has experienced various types of sanctions post revolution and during the war with Iraq, the latest series of economic sanctions by the U.N. Security Council, based on Resolutions 1737 and 1747, seems to have adversely affected the Iranian economy in a multi-faceted manner. These sanctions have led to higher inflation rate, rationing of gasoline, lower non-oil exports, and less foreign direct investment. A major difference between the current sanctions imposed by the U.N. Security Council and those imposed during the war is that recent series of sanctions are in some ways supported by the international community, which places greater pressure on the Iranian economy, effectively tying the hands of policymakers and encouraging them to react in a more accurate way. However, Iranian authorities believe that since economic sanctions have already been imposed on Iran and the country has weathered these hardships in the past, it is able to minimize the negative outcomes of new actions. For example, they argue that sanctions have increased the country's self-sufficiency, and have led to reallocation of resources into development projects. Nonetheless, certain opportunity costs are associated with these supposedly positive aspects. Indeed, the sanctions affect the Iranian economy through different transmission mechanism channels. The most important ones that we emphasize in this paper are inflationary expectations, exchange rate volatility, financing surcharges, real estate prices, foreign direct investment, total factor productivity and the economic growth.

JEL: F40

INTRODUCTION

The Iranian economy has been confronted with different sorts of sanctions post revolution era and during the eight years of war with Iraq, leading to rationing of essential goods and commodities. Before the 1979 Islamic revolution, the United States was Iran's number one commercial partner. The first formal U.S. sanction in 1980 banned all U.S. exports to Iran. After the revolution, the relations between two countries deteriorated as a group of students detained 52 American hostages in the US embassy in Tehran. This crisis led to a break-down of political relationship between two countries in April 1980. Subsequently the U.S. initiated a series of sanctions against Iran in order to release the American hostages.

After the end of the American embassy crisis in 1981, the sanctions were lifted; however, in 1984 the sanctions were reinstated. All exports of products with military applications and armaments to Iran were specifically banned. Nonetheless, U.S. oil companies continued to extract Iran's crude oil for import to the U.S. The imports of all Iranian goods and services to the United States were banned in 1987 and the U.S. oil companies were prohibited from importing Iranian oil for domestic consumption.

The U.S. expected its allies to support the sanctions by boycotting the purchase of Iranian oil, but none of them really did. Indeed, they had too much interest in Iran to follow the U.S. policy. Their trade volume with Iran was substantially higher compared to the U.S. In 1994, Germany exported four times more to Iran than the U.S. did, and Japan and Italy exported twice as much as the U.S. Moreover, they did not believe that the sanctions could persuade Iran to change its policy. As a result, in April 1995, President Clinton announced that the U.S. would cut off all trade and investment ties with Iran, including purchase

of Iranian oil. The new sanctions complemented the previously imposed ones and constituted a full embargo against Tehran.

These sanctions forced Tehran to seek new allies and suppliers in Europe. Trade relations with smaller Islamic and non-aligned nations grew significantly. The control over international trade was facilitated by a series of selective bilateral agreements. The government of Iran reduced its trade imbalance with some of OECD countries by restricting its imports to a predetermined proportion of exports. To deal with the sanctions imposed by the United States, Iran developed a closer relationship with Russia, China and India, among others.

Consequently, the US was induced to take more measures in order to impose more pressures on other countries to cooperate in the sanctions against Iran. Hence a bill (S.1228) was proposed in the US Senate to penalize foreign entities who exported petroleum products, natural gas or related technology to Iran. This bill was later signed into law by President Clinton in August 1996, and became known as the Iran-Libya Sanctions Act (ILSA). Under ILSA, companies that invest more than \$20 million in Iran's oil and gas sector are penalized. The penalty includes the denial of the U.S. government contracts, loans and export credits. Indeed, the U.S. sanctions aimed at halting the development of Iran's oil industry were amplified in 1997. The sanctions on Iran have deteriorated the US economic relations with Europe and Japan because Europe has extended its business with Iran and Japan has agreed to sign a contract for development of Iran's largest oil field Azadegan despite U.S. opposition. Indeed, as illustrated in Table 1, Iran has been successful to substitute other countries instead of the U.S. for its commercial needs. Iran's imports from other countries including China and Russia substantially rose from 17% pre-revolution (1975-78) to 48.6% in 2006.

Table 1: Iran's Trading Partners by Source

| Time period | United States | Western Europe | Japan | Others |
|---------------------------------------|---------------|----------------|-------|--------|
| 1975-1978 (Pre-revolution) | 18.5 | 48.7 | 15.8 | 17.0 |
| 1979-1988 (Revolution & Iraq War) | 1.8 | 47.8 | 13 | 37.4 |
| 1989-1992 (Postwar Reconstruction) | 2.1 | 52.1 | 11.4 | 34.4 |
| 1993-1996 (Dual Containment) | 3.3 | 45.8 | 8.3 | 42.6 |
| 1996-2006 (Iran-Libya Sanctions) | 0.0 | 44.9 | 6.4 | 48.6 |

Source: Jeffrey J. Schott (2006), *Economic Sanctions, Oil and Iran*, Peterson Institute.

Indeed, the intensified trade and investment sanctions against Iran since the early 1990s have significantly affected the nature of international competition for Iranian business. However, according to the above table, the American companies have far more suffered the effects of sanctions than their non-American rivals.

The financial firestorm began in September 2006 when the United States took the unprecedented step of cutting off one of Iran's largest banks - Bank Saderat - from the American financial system. Over the next 13 months, the United States systematically froze the assets of Iran's four most significant banks and deprived them from any remaining access to New York, a financial nerve center of the global economy. Emboldened by the success of U.S. action, the international community has joined the combat. The Financial Action Task Force - a group of experts from the world's leading economies (including Russia, China and the Gulf Cooperation Council) - issued a striking statement in October 2007 telling member countries to advise their banks about Iran's worrisome financial practices. Though the recent U.N. sanctions based on Resolutions 1737 and 1747 imposed in February and March of 2007 were aimed to

prohibit financing activities for nuclear and related items, the sanctions put greater pressures on the international community to boycott the Iranian economy as a whole, imposing severe financial restrictions on Iran and specifically freezing the assets of its fifth-largest bank. This drumbeat of financial warnings has touched a nerve in the global banking community. Profoundly sensitive to reputational risk, several major global banks such as UBS and Deutsche Bank have reduced their dealings with Iran. This global coalition has put a measurable pressure on Iranian financial system. Indeed, due to U.N. Security Council Resolutions 1737 and 1747 and the support of the international community, Iran's access to western technology, supplies and particularly financial facilities has been considerably limited. As a result, the sanctions have contributed to the state of economic hardship as reflected in higher inflation rate, financing surcharges, real estate bubble and depreciation of Rial against major currencies.

Amazingly, despite benefiting from a great amount of trade with Iran, the European Union has imposed its own sanctions, limiting the alternative financial resources to Tehran to a few. In addition, many EU countries have avoided financing Iranian LCs since the passage of the UN resolutions. More importantly, some of the European government agencies have avoided issuing governmental insurance for their financing activities in Iran.

The threat seems to be so intense that the Iranian government has decided to resort a rationing system for some essential goods, including gasoline. However, this unpopular distribution policy, which the country experienced during the 1980s, is unlikely to respond to the current over-consumption of gasoline due to its intrinsic inefficiencies.

The rest of the paper is organized as follows. The First Section is allocated to literature review. In the Second Section we investigate the positive effects of the sanctions as proposed by the Iranian authorities. In the Third part we try to capture the quantitative effects of the sanctions on nominal and real macroeconomic variables. Finally, the last part draws up and concludes.

LITERATURE REVIEW

To address the abovementioned issues, we briefly review some of research studies that have investigated the effects of sanctions on Iran's economy. Many experts, as well as Iranian officials, say that decade-long U.S. sanctions—sharply limiting U.S. trade and investment in Iran and penalizing foreign companies that invest in Iran's energy sector—have not crippled Iran's economy but have had an impact. Hamid Reza Baradaran Shoraka, former head of Iran's Management and Planning Organization (MPO) has publicly stated that sanctions by Washington have hindered the economic progress. Takeyh and Pollack believe Iran's oil industry has particularly suffered from U.S. sanctions. Iran, whose oil fields are old and their installations are badly damaged, has done little exploration since the 1970s.

Many experts believe the effects of sanctions on the Iranian economy depend on the scope of sanctions as well as their type. Any sanction that doesn't include oil will not have serious effects says, Millani co-director of the Iran Democracy Project at Stanford University's Hoover Institution. But most experts believe such sanctions are highly unlikely so long as oil prices remain above \$70 per barrel. Further, sanctions could backfire and rally the Iranian population around its leadership. "Harsh sanctions would punish the Iranian people—not the regime, the army, or the police," write Gary Clyde Hufbauer and Jeffrey Schott of the Institute for International Economics.

Jahangir Amuzegar (1997a and 1997b) argues that the US sanctions have neither fulfilled the anticipated results nor have been effective enough to transform the Islamic regime. Among others, Clawson (1998) indicates that the sanctions have not persuaded Iran to change its policy. Preeg (1999) claims that the net assessment of the economic impact of U.S. sanctions on Iran is negative and believes the United States should unilaterally lift the sanctions. Alikhani (2000) has conducted a general study of the sanctions against Iran from a political and historical standpoint. He concludes that the sanctions have failed

politically to influence Iran's performance. Askari et al. (2001) examine the effects of economic sanctions on Iran. They believe despite significant costs to both countries, Iran has not changed its policies, and therefore, the United States should be more cautious. Torbat (2006) has measured the impact of U.S. sanctions on financing surcharges, non-oil exports, imports of intermediate goods and the welfare losses. According to his estimation, Iran suffers \$82.5 million, equivalent to 0.11% of its GDP, from not being able to import the necessary goods from the U.S. Financial sanctions may be more effective than unilateral trade sanctions, argues Torbat, because oil is a fungible commodity; that is, Iran can just find alternate customers namely China and Russia to replace the United States. Yet Torbat says Iran's economy is not faring poorly when compared to its Middle Eastern neighbors. After all, annual growth hovers around 5 to 6 percent, Iran has \$60 billion in foreign exchange reserves and it boasts a current accounts surplus. Unemployment figures officially around 10 percent are also on par with the region, Torbat says.

Rachel Loeffler (2007) believes Iran's financial appetite is a double-edged sword: The global banking network it has cultivated to facilitate trade and commerce is vulnerable to market skittishness when foreign banks pull the plug. No matter how high the price of oil climbs, Iran's petro-dollars, petro-euros or petro-yen must be invested in some lucrative fashion. If Iran cannot move its money around, it remains the equivalent of a rich man in a pauper's prison, Loeffler says.

Gordon P. (2007) believes that winning greater European support for isolating Iran is difficult but not impossible. For all the European reluctance to pursue sanctions, the combination of rising American pressure, EU3 leadership and Iranian behavior has led to an increase in the economic and political isolation of Iran. European banks – including Deutsche Bank, HSBC and BNP Paribas – have largely stopped doing business with Iran. However, the greater challenge is with China and Russia. Although both surprised Iran with their willingness to agree to Chapter VII UN Security Council resolutions making Iranian uranium enrichment illegal, they have resisted further economic pressure, despite Iran's continued lack of compliance, Gordon says.

Beehner L. (2007) believes that Iran's economy is reliant on foreign capital and investment to develop its untapped oil fields and fledgling nuclear energy sector. By denying Iran extensions of credit and other financial assistance, Iran's primary industry, oil and gas might be adversely affected by the sanctions. Iran may be forced to obtain loans with less favorable terms and at higher interest rates. And some western investors may decide doing business in Iran is not worth the risk.

In sharp contrast to above studies, Hossein Askari (2007) believes that the sanctions have not worked. The only discernible result of US sanctions on Iran has been to delay Iran's development of its energy resources. The U.S. has impeded the development of at least two known large oilfields in Iran (Azadegan and Yadavaran), which together could have proven reserves exceeding 35 billion barrels and produce more than a million barrels per day of crude at their expected peak; the sanctions have hindered oil and gas supply by playing the countries of the region against each other. Indeed, the sanctions have led to higher energy prices. Continued impediments to oil and gas development in Iran could reduce Iranian exports by the oil equivalent of more than 5 million barrels per day over the next decade. The U.S. policy is based on the premise that lowering Iranian oil and gas exports would hurt Iranian revenues. But the U.S. policy has in fact buoyed oil prices, which have increased Iranian revenues, albeit at lower export levels. Economic sanctions have come at a huge cost to the United States. The oil market is in essence a global market. Because of sanctions, the U.S. does not buy Iranian oil and gas, but if Iranian energy supplies come to the market this would, in turn, afford the U.S. more supplies from other countries and lower prices globally. The increased availability of Iranian energy supplies could make a big difference to energy prices and to the security of the region over the next decade. All sanctions, even the comprehensive ones, are notoriously porous. In addition, sanctions imposed by a "coalition of the willing" will only become an international embarrassment for the US, potentially placating a segmental

domestic constituency but succeeding in further alienating Iranians and the continuation of U.S. costly interventions in the region. Finally, and most importantly, it is almost certain that Iran would react to any UN or coalition-of-the-willing sanctions by cutting oil exports by at least 50%, driving oil prices above \$100 per barrel, with Americans paying close to \$5 a gallon (about \$1.30 per liter) for gasoline; presuming that a total stoppage of Iranian oil exports (3.2 million barrels per day) would drive oil prices well above \$150 per barrel.

A novel feature of our study compared to the above studies is that it tries to underpin the quantitative effects of sanctions on nominal and real variables. In fact, the economic sanctions induced some financial measures that prevented Iran from financing activities, export credits and loan guarantees. Since the sanctions have already limited the financing activities of many Iranian banks, including Sepah and Saderat, and may include other banks and entrepreneurs in the third stage, it is of great importance to investigate the transmission mechanism channels through which the sanctions affect the Iranian economy.

METHODOLOGY

Hypothesis

The hypothesis in this study is whether, and to what extent, the U.N. Security Council's economic sanctions affect the Iranian economy. In Section A, as emphasized by Iranian authorities, we shall consider the qualitative positive effects of the sanctions on the economy. In Section B, we try to measure the opportunity costs of the sanctions on nominal variables including inflation, exchange rate volatility, real estate prices, and financing surcharges. Finally, in Section C, we underpin the effects of sanctions on real variables including total factor productivity (TFP), foreign direct investment (FDI), and economic growth. Since the sanctions historically have excluded the oil sector, we do not investigate changes in the oil price on the economy.

Data

To capture the effects of sanctions on economic variables we have employed annual data for 1974 through 2006 published by the Central Bank of Iran as well as the International Financial Statistics (IFS). However, since nominal variables are affected in shorter intervals, quarterly data have been used for the years 1999 to 2007 to measure the effects of inflationary expectations on nominal variables.

The list of variables used in this study is as follows:

CPI, consumer price index, *M2* quasi money supply, *GDP* Gross Domestic Product, *E* market exchange rate, *M2** quasi money in the European Union, *Divid* dividend yield in the Tehran Stock Exchange, *Libor* London interbank offer rate, *Ph* housing prices in urban areas, *Loan* banking facilities to the housing sector, *EER* effective exchange rate, *i* effective interest rate on banking deposits, π inflation, *L*, labor force, *K* capital stock, $\frac{NX}{GDP}$ non-oil exports growth times the ratio of non-oil exports to GDP, *IMP* imports of intermediate goods, *Ind* industrialization index measured by the value added of the industry sector times the ratio of industry sector in GDP, *DUMY1* dummy variable for the periods the sanctions have been applied, *DUMY2* dummy variable for the period of war, *Openness* index of imports plus exports over GDP, *TOT* terms of trade, *Sch* schooling, *LE* life expectancy, *FDI* foreign direct investment, *HR* human capital measured by the secondary schooling population, *TFP* total factor productivity, *wage* wage index.

The methodology used in this paper is to test the relationship between the economic sanctions and nominal as well as real variables; including inflation rate, exchange rate volatility, real estate prices,

financing surcharges, foreign direct investment (FDI), total factor productivity (TFP), and economic growth.

A-Positive Effects of the Sanctions on the Iranian Economy

Many Iranian authorities assert that the sanctions have had positive effects on the economy. Indeed, as experienced during the war with Iraq and the reconstruction period, the sanctions have been ineffective in changing Iran's performance. Iran is in a special geopolitical location and is endowed with great amounts of natural resources and talented labor force that helps the country to confront the hardships of economic sanctions. Among the positive effects of sanctions Iranian authorities emphasize the followings:

- 1- The sanctions help the country to benefit from its comparative advantages, contributing to the improvement of sectors relying on domestic resources like textile and electronic industries, moving towards self-sufficiency.
- 2- With the increase in the oil revenues, the total import into the country has increased substantially, amounting to \$40 billion per year. Since a large portion of imports has been allocated for luxury goods, the sanctions incite the authorities to reallocate the resources to development and infrastructure projects, contributing to higher economic growth.
- 3- During the war with Iraq, Iran has recorded noticeably low oil revenue of \$8 per barrel without any major effect on its economy. This fact underlines the ability of the country to survive even under great economic pressure.
- 4- Despite the fact that Iran had to surmount many obstacles created by western world, it has been successful in inquiring new technologies including the nuclear program for its civilian projects. This achievement highlights the ability of Iranians to participate in innovative projects and be members of modern world society.
- 5- The sanctions shall induce the policy makers to focus more on the subsidies for the vulnerable groups and to carry out other essential financial and economic reforms that may have otherwise been ignored.
- 6- The benefits of the sanctions might far exceed their costs because the policy makers may resort to instruments like shadow budget, foreign exchange reserve cushioning, rationing and other policies that had been employed during the war.
- 7- As quoted in the *Economist* in July, Iran's risk ranking has not changed. Iran has succeeded in obtaining the 67th ranking in the list despite the imposed U.N. sanctions.

Though the country might enjoy these benefits, the sanctions are also costly because they influence the economy through different transmission channels. In the following sections, we measure the effects of sanctions on economic variables in two different parts. In Part B we measure the effects of sanctions on nominal variables, and in Part C we pay particular attention to real variables including FDI, productivity and economic growth.

RESULTS:

B-Monetary Sector

B-I: Inflationary Expectations and Inflation Rate- Iran's economy has experienced double-digit inflation rates in the postwar period as a result of a large budget deficit financed through high-powered money. Indeed, the Iranian economy suffers from the lack of monetary policy discipline. The loose monetary

stance has led to a record high inflation of 40% in 1995. Nonetheless, having not dropped below 15% since 2004, the inflation has relatively declined since the inception of the new millennium.

The Central Bank has tried to combat the inflation by containing the budget deficits through better management of Oil Stabilization Fund (OSF); however, it has not been very successful in doing so due to the lack of a well-defined stabilization policy. Indeed, the OSF has been substantially exploited due to higher financing premium charges and carrying out the projects through middlemen, consequently its balance-sheet has deteriorated dramatically. Moreover, the sanction has adversely affected the OSF balance-sheet, since a greater part of oil revenues shall be allocated to finance the higher than expected price of imports.

Indeed, not only have the sanctions limited the financing resources, but they have also led to higher financing surcharges. In addition, the imposed sanctions on the Iranian banks, including Sepah and Saderat, have intensified the inflationary expectations, leading to a wage-price spiral. In the past six months, the threat that these sanctions shall reduce the imports of essential goods has overheated the inflationary expectations, leading to 25% inflation in some sectors, including the real-estate. Though the government seems determined to contain inflation through the rationing system, the effectiveness of this system is ambiguous.

To measure the effects of sanctions on the inflation rate, we implement a monetary model with a dummy variable for the periods the sanctions have been applied. Using quarterly data for the years 1999-1 to 2007-1 enables us to estimate the following model:

$$CPI = + 2.43 + 0.72 M_2 + 0.31 CPI(-1) + 5.6 DUMMY_1$$

(2.70) (3.33) (1.67)

R-squared=0.98 Adjusted R-squared=0.98 D.W=2.8

The results indicate that imposing of sanctions by the U.S. leads to an inflation rate of 5.6% in the CPI.

B-II Foreign Exchange Rate Volatility- The foreign exchange reserves seem to decrease dramatically due to the reduction in non-oil export revenues and higher financing expenditures. Since the sanctions have made the foreign banks and intermediaries reluctant to interact with the Iranian banks, the effective interest rates for financing the LCs, as well as for project financing have substantially increased, leading to higher financing premium charges and lower foreign exchange reserves.

The current exchange rate regime in Iran is a crawling pegged, with frequent Central Bank's interventions in the market. The reduction in non-oil exports and inflationary expectations due to sanctions has led to depreciation of domestic currency, exploiting foreign exchange reserves.

To capture the effects of sanctions on the exchange rate, we apply the Hooper and Morton model. The model helps us to measure the effects of sanctions on depreciation through inflationary expectations. Using quarterly data for the years 1999-1 through 2007-1, the following model has been estimated.

$$E = 11.07 + 0.24(M_2 / M_2^*) + 0.23CPI(-1) + 0.03GDP - 0.46Divid - 0.08Libor$$

(18.67) (6.45) (1.63) (1.99) (-4.2) (-2.21)

R-Squared=0.98 Adjusted R-squared=0.97 D.W= 1.64

Since the interest rate has been controlled in the Iranian banking system during the mentioned period we dropped the domestic interest rate from the model. As it is seen, all the coefficients are significant and of

the expected signs. The coefficient on *CPI* is significant at 5% level of confidence with the expected positive sign. As we saw in the previous section the results suggest that economic sanctions leads to 5.6 percent increase in CPI leading to 1.3 percent depreciation of the exchange rate, which is negligible.

B-III: Real-Estate Prices- Among different monetary transmission mechanism channels emphasized in the finance literature, an important one is the housing prices. As postulated by Mishkin (2001) among others, housing prices may affect the economy through three main transmission channels, household wealth, housing expenditures and banks' balance sheets. The aim of this study is to explore to what extent and through which channels economic sanctions have affected real estate prices. Not only have the difficulties of import financing due to imposed sanctions on the Iranian banks led to reallocation of resources to the real-estate sector, but the inflationary expectations of the sanctions have led to irrational exuberance in this market. Indeed, the sanctions have increased the costs of import financing, leading to reallocation of resources from the foreign sector to the real-estate market, particularly given the stagnation in the Tehran stock market.

Indeed, the TSE has experienced a bubble burst since 2005, and the market has not yet recovered. The Money and Credit Council has recently approved the proposal of the president to limit the interest rate in the banking system with a ceiling of 17%. The foreign exchange market has also been manipulated through the central bank's intervention to stabilize the dollar, leading to overvaluation of the Rial against major currencies. In fact, the rate of returns in parallel markets, including banking system, TSE, and foreign exchange market, have dramatically been suppressed compared to the real estate market.

The following model has been estimated to capture the effects of sanctions on the real estate prices. The lower the rate of return in the banking system, the more resources shall be reallocated to the housing sector, leading to higher real-estate prices.

$$Ph = -18.9 + 0.33 Loan + 0.093 EER - 0.701 i + 0.336 \pi + 2.45 GDP$$

(-3.47)
(3.9)
(1.48)
(-2.06)
(3.57)
(4.99)

R-squared=0.99 Adjusted R-squared=0.99 D.W. =1.66

As it is seen in the above equation, the coefficient on inflation suggests that a one percent increase in inflation rate leads to a 0.33% increase in the housing prices. Since the sanctions lead to 5.6% increase in the real inflation, one may conclude that the inflationary expectations lead to a 1.8% increase in the real estate prices. In addition, 1.3% depreciation of the exchange rate, as a result of sanctions, leads to a 1.2% increase in the real estate prices. As a result, the total effect of the sanctions through inflation and exchange rate on the real estate prices amounts to 2.5%.

B-IV: Effects on Financial Activities- As it is observed in the past three months, the United States has used all its forces to attract its allies in order to limit the access of Iran to international banking facilities. The political and economic instability of the country has led to higher financing margins due to a higher risk after the sanctions. The foreign entrepreneurs face the risk of boycott if they trade with Iran. In the absence of sanctions Iran could have obtained much better terms and conditions on its loans and financing facilities.

One of the novel features of this study is that it attempts to capture the effects of sanctions on financial charges through estimation of financial interest rate as a function of foreign debt and the country risk rating. The following model has been estimated to measure the effects of sanctions on financing premium charges.

$$i = 2.3_{(1.45)} + 0.09 Debt_{(1.67)} + 0.15 Risk_{(2.1)}$$

R-squared=0.72 Adjusted R-squared=0.70 F=25.9 D.W=1.85

As the estimated results indicate a one percent increase in the country risk increases the interest rate premium by 0.15%.

C-Real Sector

C-I: Imports, Non-oil Exports, and Economic Growth- The Iranian economy is heavily dependent on the oil sector. Indeed, the non-oil export has not exceeded \$5 billion in the past three decades. However, the U.N. sanctions have adversely affected the willingness of foreign companies to interact with their Iranian counterparts. As a result, the non-oil export has decreased by 17% in the first three months of the Iranian year compared with the same period in the previous year. To capture the effects of non-oil exports reduction on economic growth we apply the Feder model.

$$GDP^0 = 6.83_{(2.57)} + 1.32 L^0_{(1.75)} + 0.92 K^0_{(2.84)} - 0.47 NX^0_{(2.75)} + 0.09 IMP^0_{(2.90)} + 1.69 IND_{(2.32)} - 5.10 DUM_{(2.46)} - 0.17 TREND_{(2.34)} + 0.29 MA_{(1.74)}$$

R-squared= 0.68 Adjusted R-squared=0.68 D.W=1.92

The estimated results help us to have a better understanding on the effects of non-oil exports reduction on GDP growth. Contrary to our expectations, the estimated coefficient on non-oil exports is negative. Indeed, the more resources reallocated to export sector, the lower the productivity growth in the internal sector will be, contributing to lower GDP growth.

In addition, since the U.N. sanctions reduce the imports of intermediate goods, it adversely affects the prospects for economic growth. The sanction imposed on the Iranian banks' financing activities, particularly opening LCs, not only has lengthened the import process but has increased the financing expenditure due to higher economic risk. Using an average sanction multiplier of 0.25% for the imports of intermediate goods as suggested by Torbat (2006) shall lead to 2.2% reduction in economic growth prospects, hindering Iran's economy.

Moreover, the reduction in imports of intermediate goods, as a result of sanctions, shall reduce the degree of openness in the country, leading to lower economic growth. To capture this effect, the following model has been estimated as proposed by Barro, among others.

$$GDP^0 = 16.7_{(1.19)} + 0.009 Openness_{(0.21)} + 0.85 Sch_{(1.15)} - 0.020 \pi_{(1.45)} - 1.3 LE_{(0.36)} + 1.3 E - 06 TOT_{(2.37)} - 0.034 DUM_{(0.88)} + 0.67 MA(1)_{(3.99)} + 0.77 AR(1)_{(5.9)}$$

R-squared=0.96 Adjusted R-squared= 0.95 D.W=1.89

The estimated results suggest that a one percent increase in inflation rate reduces the growth rate by 0.02%. Since the sanctions lead to a 5.6% increase in inflation, the GDP growth drops by 0.11%. In addition, a one percent decrease in the degree of openness reduces the GDP growth by 0.01%. Assuming

a 20% decrease in the degree of openness, as a result of sanctions, shall lead to 0.2% reduction in GDP according to our results.

C-II: Foreign Direct Investment (FDI) and Economic Growth- Compared to other developing countries, high political and economic risk in Iran has led to lower levels of Foreign Direct Investment (FDI), limiting it almost to \$7 billion annually. The new series of sanctions imposed by the U.N. Security Council has aggravated the current situation, resulting in lower levels of FDI. Not surprisingly, the FDI has decreased from \$1.5 billion to \$0.7 billion in the first three months of the Iranian year compared to the same period in the previous year.

The effects of FDI on economic growth is captured through the model developed by Alfaro et al. (2006), proposing a mechanism that emphasizes the role of local financial markets in enabling foreign direct investment (FDI) to promote growth through backward linkages. Indeed, replicating the Alfaro model for the Iranian economy enables us to capture the effects of FDI on economic growth. This model has the ability to capture the effects of openness of the economy besides the effects of FDI on economic growth prospects.

$$GDP = 7.8 + 0.21FDI + 0.018Opennes + 0.21HR + 0.003(M_2 / GDP) - 0.12DUM$$

(2.3) (6.4) (1.7) (1.7) (1.6)

R-squared=0.68 Adjusted R-squared=0.66 D.W=1.9

The estimated results suggest that a one percent decrease in FDI reduces economic growth by 0.2%. Assuming that FDI is expected to decrease by 10% as a result of sanctions, it shall affect the economic growth by 2.1%. In addition, since the sanctions affect the degree of openness they shall also reduce the economic growth indirectly. Assuming 20% decrease in the degree of openness shall reduce the economic growth by 0.4%. In sum, the total effect of sanctions through reducing the FDI and the degree of openness leads to a 2.5% reduction in GDP growth.

C-III: Total Factor Productivity (TFP)- The productivity growth in Iran stands at very low levels compared to the international standards. The U.N. sanction not only has adversely affected the productivity growth owing to reallocation of resources from R&D to other activities, but has led to a reduction in the productivity growth, through a drop in the foreign direct investment (FDI).

In this section, we try to measure the effects of reduction in FDI on TFP as conjectured by Haskel et al. (2002). Since it is expected that FDI in Iran drops substantially due to U.N. sanctions, it affects TFP in turn. The following model has been implemented to capture the effects of FDI on TFP. Needless to say that TFP data has been proxied through estimation of residuals of a Solow growth model.

$$TFP = 6.7 + 0.23FDI + 0.78wage - 0.36DUM$$

(1.7) (2.3) (1.3)

R-squared=0.67 Adjusted R-squared=0.65 D.W=1.8

The results indicate that a one percent decrease in FDI reduces the TFP by 0.23%. Assuming that FDI is expected to decrease by 10% due to U.N. sanctions, it shall in turn, reduce the total factor productivity by 2.3%.

CONCLUDING REMARKS

Iran's economy has experienced various sorts of sanctions during the post revolution era and in the recent war with Iraq, though with comprehensive support of international community, the new series of

economic sanctions imposed by the U.N. Security Council via Resolutions 1737 and 1747 seem to have adversely and multidimensionally affected the Iranian economy.

The novel feature of this paper is that it embraces the pros and cons of the sanctions on the Iranian economy. Many research studies, including those conducted by Clawson (1998) indicate that the sanctions have not persuaded Iran to change its policy. Preeg (1999) claims that the net assessment of the economic impact of U.S. sanctions on Iran is negative and asserts the United States should unilaterally lift the sanctions. Torbat (2006) has estimated the impact of U.S. sanctions on excess financing charges, non-oil exports, intermediate imports and welfare losses. Hossein Askari (2007) believes that the sanctions have not worked. The only discernible result of U.S. sanctions on Iran has been to delay Iran's development of its energy resources. The U.S. policy is based on the premise that lowering Iranian oil and gas exports would hurt Iranian revenues. But the U.S. policy has in fact buoyed oil prices, which have increased Iranian revenues, albeit at lower export levels. Economic sanctions have come at a huge cost to the United States.

As opposed to many western commentators, Iranian authorities assert that sanctions have had positive effects on the economy since the sanctions help the country to reallocate the resources to development of infrastructure projects, contributing to higher economic growth rates as has been the case in the past. In addition, the sanctions help the country to benefit from its comparative advantages. The benefits of the sanctions might far exceed its costs because they enable the policy makers to refurbish instruments like shadow budget, foreign exchange reserve cushioning, and other policies once adopted during the war. However, these benefits might be costly since the sanctions affect the economic variables through different transmission mechanism channels. To complement the findings of other studies, this paper has measured the effects of sanctions on nominal and real variables including inflation rate, exchange rate volatility, real estate prices, financing surcharges, total factor productivity, foreign direct investment, and economic growth.

The estimated results indicate that due to inflationary expectations aroused by the U.N. sanctions the CPI will increase by 5.6%, however, the exchange rate is expected to depreciate by 1.3%. The effects of sanctions on the real estate prices amount to 2.5%. In the real sector, the estimated results suggest that economic growth will drop by 2.2% as a result of the reduction of intermediate goods according to Feder model. In addition, a reduction of 10% in FDI, as a result of the sanctions, will reduce the economic growth by 2.2%, and in turn lowers the total factor productivity by 2.3%.

As seen through the results of this paper the impact of the sanctions on Iranian economy is not of considerable degree. Iran's economy is enjoying a \$36 billion of oil revenue and GDP of \$185 billion and will be able to survive these sanctions with minimal costs. As we will see in our future paper the total loss is not only on the shoulders of Iranians but on the western world, since there will be a substitution effect from the western world to China and Russia, making the European and American entrepreneurs more vulnerable. Indeed, the results suggest that the European and American authorities should avoid the escalation of the crisis by leaning towards peaceful negotiations to resolve this confusion between both sides. Not surprisingly, there is a viable alternative to imposing more stringent sanctions that is engaging in a true dialogue. Iran could be an appropriate intermediate in allowing the US to solve most of its problems in the Middle East, achieving peace and stability in the region, and enhancing the global energy market.

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EXECUTIVE COMPENSATION AND MACROECONOMIC FACTORS: INTEREST RATES AND CORPORATE TAXATION

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ABSTRACT

It is frequently argued that effective executive compensation should contain some performance-based remuneration. We lack, however, serious understanding of the characteristics of the many patterns of variable compensation in use. It is too often assumed that these different methods of compensation are (at least approximate) substitutes. In this paper, we develop a simulation model of executive compensation, in which both equity and option compensation is utilized, in order to analyze the effect of macroeconomic factors, namely, interest rates and the level of corporate taxation, on optimal executive compensation. The model forecasts that, as the risk free rate of interest increases, there is a general shift toward equity compensation; by contrast, as the level of corporate taxation increases the shift is toward option compensation.

JEL: G30, H2, H25, J33

INTRODUCTION

Performance-based measures are the basis for much of executive compensation and most of the ensuing controversy. While both academics and practitioners typically recommend such compensation, little consideration is given to the manifold patterns of variable compensation and their differing incentive effects; beyond a fixed salary, executives receive, among many other forms, bonuses, options, premium-priced options, performance shares, performance units, restricted equity, phantom equity and dividend-based compensation. (The effect of executive compensation is one of the six unanswered questions in Abowd and Kaplan (1999).) The implicit supposition that different methods of variable compensation are close substitutes is too naïve. To expand our understanding of the complexity of the different forms of compensation, this paper investigates the effect of changes in the macroeconomic environment on the choice between equity and option compensation for executives. It develops a simulation model in which executives, motivated by a combination of equity and option compensation, set the investment, financing and payout policies of the firm and then studies the effect of macroeconomic factors, namely, interest rates and the level of corporate taxation, on optimal executive compensation. The model simulated here predicts that an increase in the risk free rate of interest will predispose firms toward awarding equity compensation, whereas a similar increase in the corporate tax rate will stimulate the firm toward awarding option compensation. The latter effect is accompanied by a rise in the value and use of debt that amplifies the risk of the firm. Unfortunately, the risk-averse executive has an upper bound to acceptable risk. When optimal financial policies would jointly exceed this bound, one or more optimal policies must be abandoned.

Equity holders delegate most business decisions of the firm, including the investment, financing and payout policies, to executives, while retaining for themselves control over the compensation of those executives. To motivate executives, equity holders must introduce forms of variable compensation, e.g., equity participation and options (Coles, Daniel and Naveen (2006) shows the sensitivity of CEO wealth to equity volatility induces riskier corporate policies. This is further substantiated by studies showing that the level of managerial compensation is higher in firms with more risk (Per, 1999)). This study examines how the ability of these types of compensation to motivate executives varies under different macroeconomic factors (Schrenk (2006) applies this same form of analysis to examine how compensation

varies for firms with different characteristics, e.g., bankruptcy costs, in contrast, to the analysis here of macroeconomic factors.). It demonstrates when one form of compensation is superior to another, how the optimal form of variable compensation changes as the exogenous economic parameters change, and the implications of these changes for the resulting investment, financing and payout policies of the firm.

LITERATURE SURVEY

The tradition within which this study is developed stresses that the executive is risk-averse—in contrast to well-diversified equity holders—and this engenders an agency problem. Compensation must alter the incentive structure given to executives, so that their (unobservable) actions are aligned with equity holder goals. While studies indicate the need to offer variable compensation (Antia and Mayer (1984) and Smith and Watts (1982)), few explicitly characterize, as is done here, the specific forms for the optimal compensation. For the risk-averse executive, Jensen and Smith (1985) identify three significant areas of sub-optimal behavior: investment policy (the executive may invest in projects of insufficient risk), financing policy (the executive may issue insufficient debt), and payout policy (the executive may disburse an insufficient dividend). In the case of underinvestment, a range of models analyze managerial risk-taking behavior and the effect upon it of differing compensation design. Most have argued that managers have little opportunity to diversify their wealth portfolio (Murphy, 1999). Studies have examined both equity (e.g., Bizjak, Brickley and Coles, 1993) and option compensation (e.g., Hirshleifer and Suh, 1992). None of these, however, considers the effect of alternate forms of variable compensation in solving an underinvestment problem. The literature also recognizes that risk-averse executives have an incentive to issue less than optimal debt (Firth (1995) and Mehran (1992)) and are inclined to the over-retention of earnings (Smith and Watts (1982), Jensen and Smith (1985)). Unfortunately, the effect of equity holder-executive conflicts and compensation design on financing and payout policies has been largely neglected. While individual studies have considered each of these agency conflicts in isolation, none has addressed the multitasking question nor has any offered a rationale for choosing between different forms of variable compensation.

THE MODEL

We investigate the comparative statics of the problem to determine the sensitivity of optimal compensation and corporate policies to changes in macroeconomic parameters, i.e., interest rates and corporate taxation. The model endogenizes the firm's investment, financing and payout policies as well as the compensation decision, so we can vary each exogenous economic parameter to examine the effect of economic environment on compensation and how these different economic conditions alter the incentive effects of compensation on the investment, financing and payout policies of the firm.

The model represents the interaction of two agents: equity holders and executives. Each operates with different economic assumptions: equity holders are well diversified and invest in a complete markets environment, while executives are risk-averse and receive all of their wealth from their human capital 'invested' in the firm. Information is incomplete: equity holders know the risk preferences, etc. of executives and they can (with certainty) determine how executives will set the policies of the firm for any given compensation. Equity holders, however, do not themselves have the specialized knowledge to form optimal investment, financing and payout policies; thus, equity holders must select the compensation plan which is the best response to the predictable decisions of executives under a set of exogenous parameters. We seek the Nash equilibrium between compensation and the investment, financing and payout policies.

The Firm

The firm begins with an initial equity value, and executives, by implementing different investment, financing and payout policies, may alter that value. In investment policy, the firm has the opportunity to accept a finite number of risky, positive net present value projects that are infinite and irreversible. The executive selects the aggregate level of risk by choosing the volatility of total investment. Further, executives choose the financing of the firm by choosing the debt coupon level. Finally, there is an exogenous benefit to a dividend payout (as there is ample evidence of a positive benefit to the payout of dividends due to informational and agency problems (cf. Lease, John, Kalay, Loewenstein, and Sarig, 1999)). As with investment risk and debt, there is an optimal dividend yield that maximizes the unlevered firm value. Both because of the exogenous benefit of dividends, and because the executive is risk-averse and without access to a complete market, this formulation differs from the traditional Miller-Modigliani (1961) result that dividend policy should not matter. Once the corporate policies have been determined, the value of the firm follows a geometric Brownian motion. We assume that the equity and bonds are issued by the firm in a complete market and use the no arbitrage framework of Leland (1994) to calculate values for the firm's equity and debt: a fundamental differential equation eliminates the stochastic component through a replicating portfolio and values instruments deriving from that security.

Agent Characteristics

Executives are risk-averse and maximize the utility derived from their compensation. They obtain all of their wealth from their employment by the firm and do not save. Thus, they do not hold independent portfolios and therefore cannot hedge the risk of variable compensation (Ofek and Yermack (1999) show that managers may 'unwind' positions if they can sell shares which they already own. Ozerturk (2006) studies the effect of this on executive incentives.). Equity holders, by contrast, are diversified and lonely concerned with the expected value of equity. This environment is an application of the general model of Mirrlees (1976), Holmström (1979), and Grossman and Hart (1983).

The executive evaluates compensation with a power utility function. This specification displays constant relative risk aversion and decreasing absolute risk aversion, that is, 1) the agent always takes the same 'relative risks' (in a portfolio context, for example, they would place the same proportion of wealth in risky assets), and 2) the agent is less risk-averse at higher valued payouts. The last is theoretically more plausible (than absolute or decreasing risk aversion), since we are evaluating potentially large variations in wealth. (Himmelberg and Hubbard (2000) make a similar use of this utility function.)

The Forms of Compensation

While there are, in practice, many forms of variable compensation, we consider the two most typical. First, executives may receive compensation in the form of equity participation in the firm. This models a restricted equity plan: conditional upon the solvency of the firm, executives receive dividend cash flows throughout their employment, but only obtain capital gains at the terminal date. Second, executives may receive options in the form of European call options that can be exercised at the termination date. These specifications are consistent with what managers typically receive (Kole (1997) and Murphy (1998)). Equity and option compensation differ along two relevant dimensions: they have different incentive effects on the behavior of executives, and they have different compensation costs to equity holders. In general, these two factors will have opposing effects, i.e., the forms of compensation that more readily align executive-equity holders interests are the most costly to grant, since risk-averse executives discount their value more severely. The lower valuation by executive can be considerable: Meulbroek (2000) estimates, for example, that the value of option compensation to executives in the case of internet firms is only 53% of the total cost to the firm. The key trade off is between the efficacy of compensation in motivating executives to execute optimal corporate policies and the cost to equity holders.

Each agent has choice variables corresponding to the areas of corporate policy under their authority. Executives have control over investment, financing and payout policies: they may choose the level of aggregate investment risk, the level of debt (as represented by the debt coupon) and the dividend yield. Equity holders establish the compensation of executives: equity participation in the firm and options on the firm's equity. The objective function constructed from these elements is complex, but in general structure it follows the traditional agency model (cf. Campbell, 1995)—except that it is not slacking, but sub-optimal policies that equity holders seek to ameliorate. Unfortunately, a closed form solution to this stochastic control problem is not possible, so we find numerical solutions for a discrete analogy to this problem using the benchmark values in Table 1.

Table 1: Benchmark Values

| Parameter | Value |
|--|----------|
| Value of the Unlevered, Risk Free Firm | \$50.00 |
| Risk Free Rate of Interest | 5% |
| Corporate Tax Level | 35% |
| Bankruptcy Cost | 10% |
| Optimal Investment Risk | 20% |
| Optimal Dividend Yield | 5% |
| Time to Expiration (i.e., length of model) | 10 years |
| Exercise Price for Option Compensation | \$50.00 |

The loss due to a lack of congruence between the objectives of principals (equity holders) and agents (executives) is typically described as an agency cost (for a general and throughout discussion of this issue, see Jensen and Smith (1985)). We distinguish between the opportunity costs of sub-optimal corporate policies and the loss due to the costs of compensating the executive. The former are incentives costs associated with the inability to prompt the executive to set optimal policies, i.e., the first-best policies; the latter are compensation costs from the payment of compensation to executives. The optimal compensation design is a trade off between the costs of compensation and the resolution of incentive costs.

Model Mechanics

The model seeks the Nash equilibrium between executives maximizing their own utility and equity holders maximizing equity value. We optimize the problem by utilizing a two-level grid search: At the first optimization (executive) level (given the exogenous parameters in Table 1), we employ a grid search to find the corporate policies (investment risk, debt coupon and dividend yield) that maximize executive utility for a specified combination of equity and option compensation. For example, using the exogenous parameters in Table 1 and setting equity compensation at 4E-7% of firm value and option compensation at 5E-5% of firm value, the utility maximizing policies set by the executive are an investment risk with a standard deviation of 20%, a debt coupon of \$4.51 and a dividend yield of 5%.

At the second optimization (equity holder) level, the first grid search is iterated for a range of equity and option combinations to produce a two dimensional surface representing the executive's utility maximizing reaction to different combinations of equity and option compensation. The optimal compensation is the equity holders' best response to the utility maximization (first level grid search) by the executive; that is equity holders will select as optimal compensation the point on the two dimensional surface maximizing equity value. Equity value is maximized when net gain from corporate policies less the cost, i.e., present value, of executive compensation is greatest. Thus, over the range of compensation possibilities, i.e., the

results from the first grid search, equity holders select the compensation that maximizes the value of equity as the optimal compensation to offer the executive.

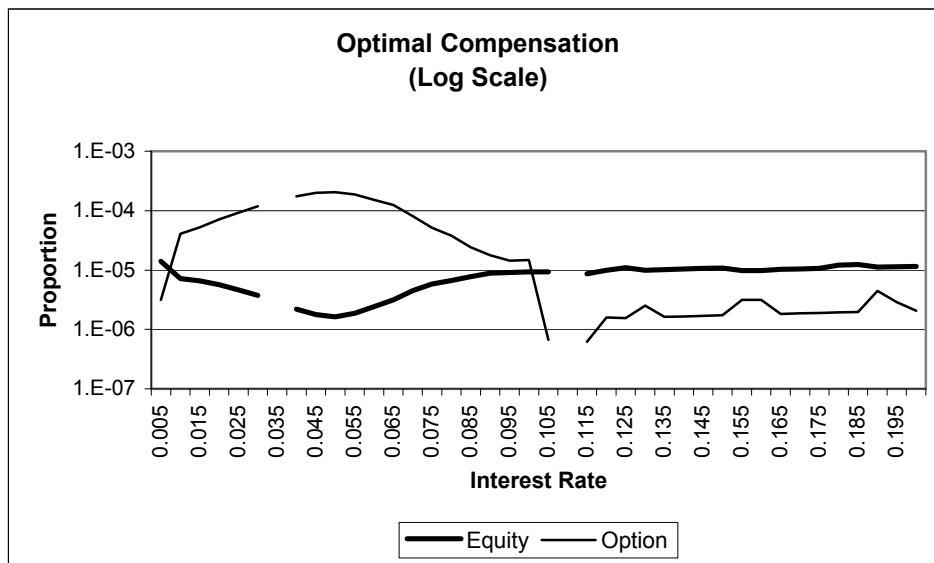
RESULTS

We examine the sensitivity of optimal compensation to two characteristics of the economy, the risk free rate of interest and the level of corporate taxation. In analyzing these sensitivities, it is important to distinguish two ways in which changes in exogenous parameters may alter the optimal compensation. First, there is an effect on the utility and the cost of forms of compensation: the changes in exogenous economic parameters change the value of the equity issued by the firm and, consequently, on any derivative securities written upon that equity. Such effects directly modify the value of compensation based on these financial instruments. But, second, there are indirect effects: changes in exogenous parameters alter corporate policies which modify the utility and cost of compensation. We consider both the direct impact on the value of compensation and the indirect effect through changes in firm policies.

The Risk Free Rate of Interest

The risk free rate of interest has pervasive implications for the results of the model, since almost every feature is, to some degree, a function of the risk free rate. First, for example, the basic value of the firm follows a geometric Brownian motion, so that its upward drift is increasing in the risk free rate. Second, the executive may receive value from two types of financial securities written on the firm: equity grants and options. *Ceteris paribus*, the value of the equity will move upward with the risk free rate, since it a direct function of the firm value. Further, options are dependent on the risk free rate in two ways: their value is increasing in the equity value and a rise in the risk free rate will decrease the present value of the exercise price thereby escalating the value of the options. But there are also contravening effects: First, a rise in the risk free rate will add to the intertemporal discount rate causing the utility derived from compensation to decline. Second, a rise in the risk free rate may alter the optimal investment, financing and payout policies. Our concern is the net effect on the optimal mix of option and equity compensation.

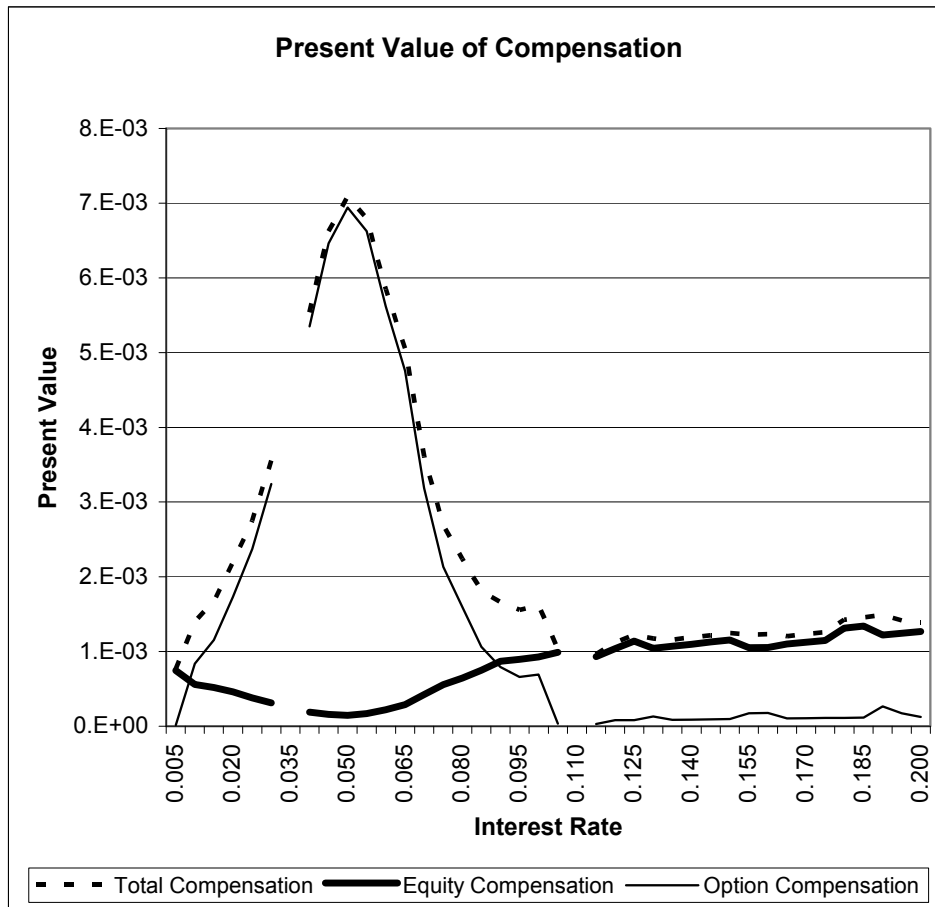
Figure 1: Optimal Compensation as a Log Function of the Risk Free Rate of Interest



The optimal compensation design displays a clear change in behavior at higher interest rates: when the risk free rate is low, option compensation dominates, but as the interest rate goes up, equity compensation

dominates. (Note that the model is a complex, discrete analogy of a continuous time model, and the breaks in the lines in Figure 1 and 2 indicate values for which there are difficulties in obtaining a numerical solution.) The net effect of an increase in the interest rate is to move compensation toward equity compensation. The explanation lies in the effect of the interest rate on executive behavior—executives will discount their utility more severely. Since equity compensation produces dividends and has a lower duration, the utility of equity compensation inclines with the interest rate.

Figure 2: Compensation Cost as a Function of the Risk Free Rate of Interest



As the risk free rate increases, the shift from option and toward equity compensation is accompanied by a net decrease in the total cost of compensation (Figure 2). Since option compensation is riskier than equity compensation, a far larger value must be awarded to generate similar utility for the executive. The model predicts a gradual transfer from option to equity compensation will occur as the risk free rate of interest goes up as well as a decrease in the total cost of compensation. This is contrary to the corresponding result for the risk neutral setting, where option value is increasing in the interest rate.

The Corporate Tax Level

The level of corporate taxation is also factor in the valuation of debt and the consequent capital structure.

The relative allocation to option compensation rises with the level of corporate taxation. The change in the tax level most directly affects financing policy, since the tax benefit creates the value of debt. Consistent with this, the level of debt is also increasing in the level of corporate taxation (Figure 4):

Figure 3: Optimal Compensation as a Log Function of the Corporate Rate of Taxation

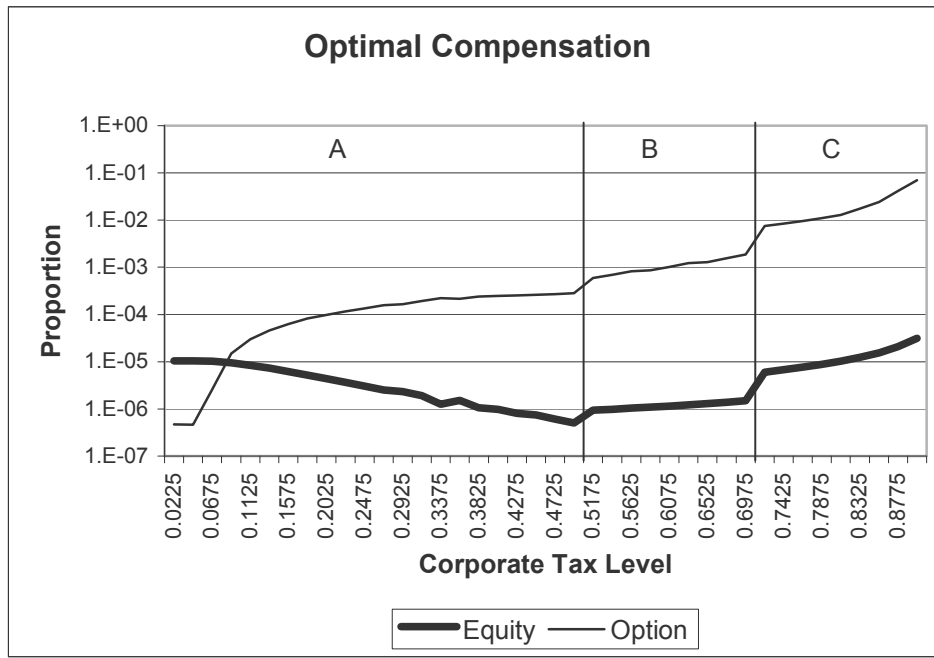
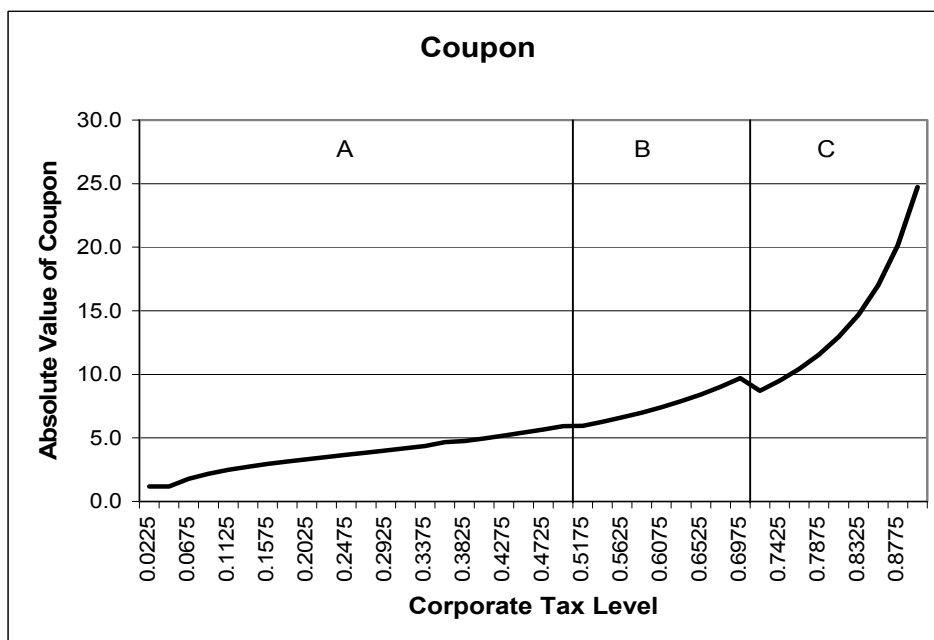
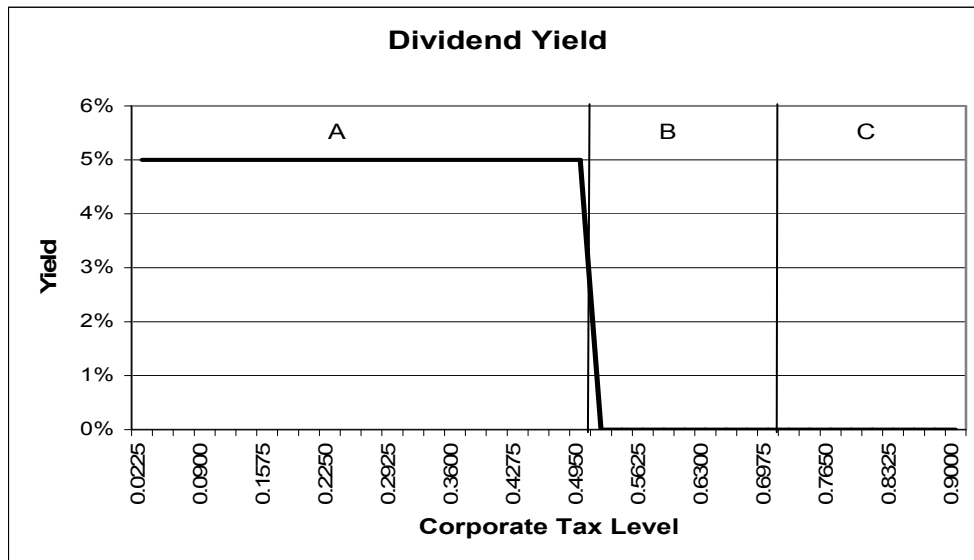


Figure 4: Debt Coupon as a Function of the Corporate Rate of Taxation



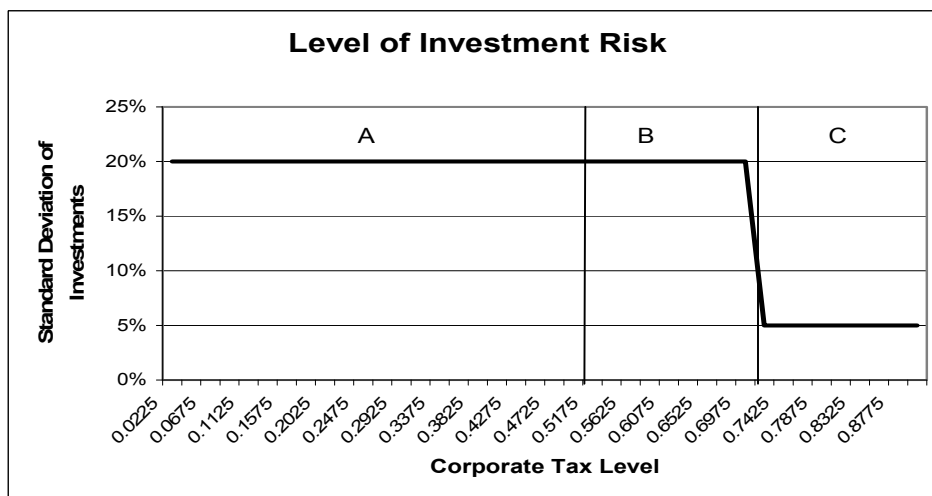
Within our multi-tasking environment, however, we also consider the effects on investment and payout policies. As a higher tax level induces more debt, the firm becomes more risky; however, a risk-averse executive, due to the concavity of their utility function, tolerates only limited risk. Once that limit is reached, then the risk engendered by one corporate policy can only be exacerbated if the risk from another is lessened. In this case, as the tax benefit of debt adds greater value, risk must be lowered in investment and dividends to accommodate the higher level of debt and its ensuing risk. In both cases, the higher tax rate, by increasing the benefit to debt, introduces incentive costs. Figure 5 shows the effect:

Figure 5: Dividend as a Function of the Corporate Rate of Taxation



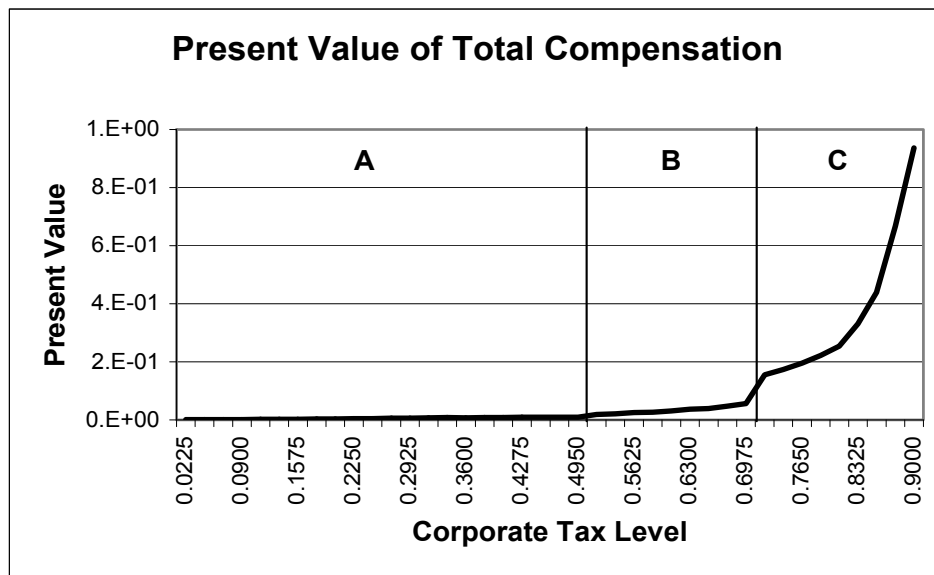
At low levels of net firm risk (Region A), the executive can be motivated to set first-best policies in all policy areas, but the existence of a risk-averse executive effectively places a ‘cap’ on the aggregate level of risk a firm can support. Additional debt financing adds value to the firm through the creation of tax shields, but it also augments the total risk of the firm. The latter forces the executive to abandon the first-best payout policy (Region B) in order to allow more debt and reap the benefits of the debt tax shields.

Figure 6: Investment Risk as a Function of the Corporate Rate of Taxation



After the first-best payout policy has been abandoned, a continued raise in the debt level then forces the executive to abandon the first-best investment policy (Region C): the marginal value of debt eventually surpasses both the marginal value of dividends and investment risk. The cost of compensation is also rising due to the greater reliance on option compensation (Figure 7).

Figure 7: The Compensation Costs as a Function of the Corporate Rate of Taxation



In sum, option compensation (and the cost of total compensation) will increase as the level of corporate taxation gets higher. Higher tax rates will make higher leverage of the firm’s capital structure optimal and induce incentives costs.

CONCLUSION

The model has noteworthy implications for the effect of exogenous parameters, the risk free rate of interest and the level of corporate taxation, on the compensation optimally awarded to the executive and the behavior of that executive in setting corporate policies. As the risk free rate of interest increases, there is a change to equity compensation. This shift appreciably decreases the present value of compensation. The importance of the prediction is further augmented by being counter to the intuition of models that price options in a risk neutral environment, where the boost in the risk free rate of interest would (by lowering the present value of the exercise price) raise the value of a call option. Once risk-aversion is introduced, however, the analysis becomes more complex: the utility implications for option compensation of a higher risk free rate are ambiguous. First, there will be the aforementioned increase in the value of the option compensation, but there will be, second, a more steep discounting of the utility in each period. Since equity compensation produces dividends and has a lower duration than option compensation, the relative utility of equity compensation is increasing in the interest rate. This suggests that the utility loss from higher discounting exceeds the gain in the value of option compensation.

As the level of corporate taxation rises, there is an increase in the value of debt financing and, consequently, greater use of debt. The risk of the firm goes up, but for the risk-averse executive there is an upper bound to acceptable risk. When optimal policies would exceed this bound, one or more of those policies must be forsaken: as higher taxes levels add to the value of debt, the optimal payout policy and

then the optimal investment policy are discarded. As the firm becomes more risky, more option compensation is needed to motivate the executive, so the cost of compensation is greater.

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BIOGRAPHY

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ESTIMATING THE S&P FUNDAMENTAL VALUE USING STAR MODELS

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ABSTRACT

This paper develops a new empirical measure of the S&P fundamental value under the rational expectation hypothesis. Thus, using the linearization of Campbell and Shiller (1988) and referring to the developments of Challe (2002), we extend the Dividend Discount Model (DDM) by introducing nonlinearity in estimating the expected future dividends and the discounted rate. Among many nonlinear models, we retained the STAR (Smooth Transition Autoregressive) models.

JEL: C2, C5

INTRODUCTION

The fundamentalist approach is essentially and originally a contribution of Williams (1938). This author introduced the intrinsic value notion which leads to evaluate an asset price in function of its expected future results (e.g. Cash Flows). Otherwise, this reasoning, called “fundamentalist analysis”, suggests that each asset has a fundamental value around which its price fluctuates. Thus, this asset is over-valued when its price is above this value; it is under-valued if the price is under the intrinsic value, while the stock market is efficient when the price is equal to the fundamental value.

The estimation of this fundamental value has then been the subject of several studies and has raised a number of discussions (e.g. (Campbell and Shiller, 1988) and (Manzan, 2003)). Indeed, this value which is defined as the discounted sum of expected future cash flows raised several questions: Which cash-flows must we retain? How do we define the discount rate? What is the expectation process like? Is dividend growth constant or variable?

In practice, previous studies focusing on this topic had proposed different alternatives and the DDM, amongst the rational expectations hypothesis, was the most frequently used model. However, no study has ever introduced nonlinearity in estimating fundamental value, despite the persistence associated with dividend distribution which is essentially due to the coexistence of heterogeneous managers and shareholders.

This paper investigates whether introducing nonlinearity could improve the evaluation of the fundamental value. In particular, nonlinearity is introduced while estimating the expected future dividends and the discount rate. This nonlinearity can be justified differently. On the one hand, the presence of transaction costs could induce discontinuities in arbitrage, a band of inaction, asymmetry and inertia effects in the stock price adjustment dynamic. On the other hand, the coexistence of different shareholders and managers could imply heterogeneous dividend policies and different investment decisions. Finally, the mimetic behavior effect would lead operators to have different expectations about the fundamental and to define different intrinsic values that, in practice, depend on the strengths of the middle opinion of the market (e.g. (Jawadi, 2006)).

This paper is organized as follows. Section 2 presents a brief literature review. Section 3 presents the empirical fundamental value model and the STAR modelling. Section 4 discusses the empirical results. Section 5 presents the conclusions.

LITERATURE REVIEW

Fundamental value estimation has been the subject of several studies ((Shiller, 1981), (Campbell and Shiller, 1988), (Manzan, 2003), (Black *et al.*, 2003), (Jawadi, 2006), (Boswijk *et al.*, 2006), (Jawadi and Prat, 2007)). These studies retained many hypotheses and several results were obtained but there is no unanimous conclusion on fundamental price determinants. Indeed, fundamental value estimation is often restricted by some assumptions (i.e. discount rate, cash flows and expectations process) and no fundamental value modeling is chosen unanimously. Furthermore, these previous studies mainly confronted the following questions: Which discount rate is appropriate? Which expectation process is necessary to measure the expected future cash flows?

Overall, the dividends were often used to measure cash flows and the perfect or/and rational expectation hypothesis was retained. For example, Shiller (1981) used the DDM to estimate the fundamental value through a constant and variable discount rate. He showed the smooth character of the fundamental value and concluded on a “*volatility puzzle*” for the S&P500. Leroy and Porter (1981) and Froot and Obstfeld (1991) also used the DDM to estimate the S&P fundamental value. The authors justified the stock price deviations towards fundamentals by the hypothesis of bubbles, but concluded on nonlinearity while suggesting that “*even if one is reluctant to accept the bubble interpretation, the apparent nonlinearity of the price-dividend relation requires attention*”, (Froot and Obstfeld (1991, p.1208). Pesaran and Shin (1996) also focused on fundamental value estimation and used the persistence profile approach to study stock price adjustment. Saltoglu (1998) applied Pesaran and Shin’s approach on the annual data of the S&P 500 over the period 1871-1987 and they showed that the stock price adjustment speed is smooth. This smoothness was justified differently by the presence of heterogeneous transaction costs, the presence of distinct dividend policies and the coexistence of heterogeneous investors and expectations.

More recently, Black *et al.* (2003) focused on the estimation of the S&P fundamental value over the period 1947:2 – 2002:2 using the price output ratio. The authors used benefits to measure cash flows and retained the hypothesis of constant discount rate. The authors used a linearization methodology similar to that of Campbell and Shiller (1988) and showed, as in Shiller (1981), that the estimated fundamental value is more persistent than the observed stock price. Their results are constant even with a variable discount rate and a risk premium. Manzan (2003) also estimated the S&P fundamental value on annual data over the periods: 1871-1990 and 1871-2001. To achieve this, the author first used a simple version of the Gordon model. Secondly, he allowed discount rate and dividend growth to be variable. But overall, Manzan (2003) showed that the stock price was not mean-reverting after 1990. This study has been extended by Boswijk *et al.* (2006) over the period 1871-2003. The authors demonstrated that the fundamentals couldn’t justify the recent stock price evolution. Besides, they suggested the presence of two regimes: The chartist regime which was occasionally activated before 1990 but persisted after 1990 and a fundamentalist regime which was activated at the beginning of the period and had an important role at the end of the period implying the mean reversion in stock prices.

However, overall, these studies retained restricted hypotheses while estimating the S&P fundamental value (i.e. constant risk-free and constant dividend growth). The authors also assumed that the investors perfectly expected future cash flows. In this paper, we propose an alternative empirical study of the stock price fundamental value under the rational expectation hypothesis. Furthermore, we propose a new methodology using a dynamic DDM and introducing nonlinearity while measuring the expected fundamentals that define the stock price fundamental value. In particular, STAR models are used to propose new nonlinear fundamental value estimation. STAR models are particularly appropriate to reproduce the nonlinearity and the persistence characterizing dividend and discount rate dynamics.

The originality of this paper may thus be associated with the introduction of nonlinearity while estimating the variables that measure fundamental values. Indeed, the least recent studies were limited to linear fundamental value estimation.

THE MODEL

The Empirical Fundamental Value Formulation

Let P_t and D_t be respectively the asset price and its dividend; r^* is the average return and g is the average dividend growth. The return relative to the detention of the asset between t and $t+1$ is defined as follows:

$$r_{t+1} = \frac{P_{t+1} + D_{t+1}}{P_t} - 1, \text{ where } r_{t+1} \text{ is the expost return} \tag{1}$$

Following Campbell and Shiller (1988), the linearization of this equation can only be done around stationary variables. However, P_t and D_t are often I (1). Thus, we could linearize it around the growth rates of these variables. Besides, we retained two hypotheses in order to simplify the approximation procedure. H_1 : The Dividend Yield Ratio ($\Gamma_t = \frac{D_t}{P_t}$) is stationary. H_2 : Dividends rise with a memorised rate. These hypotheses imply that the growth rates of P_t and D_t are both equal to g , while the equation (1) defines the average dividends yield ratio as follows: ($\Gamma_t^* = \frac{r^* - g}{1 + g}$), meaning that the memorised dividends would be projected at the same growth rate.

The equation (1) can be reformulated as follows:

$$1 + r_{t+1} = \frac{P_{t+1}}{P_t} + \frac{D_{t+1}}{D_t} \times \frac{D_t}{P_t} \tag{2}$$

If we assumed that the dividends are I (1) and that Γ_t is stationary, all the ratios of the second relation are stationary and the average dividends and stock price growth ratios are identical ($E(\frac{P_{t+1}}{P_t}) = E(\frac{D_{t+1}}{D_t})$).

Thus, the first-order Taylor approximation of the relation (2) which was also developed by Challe (2002) to test the efficient hypothesis yields the following equation:

$$r_{t+1} - r^* = \left(\frac{P_{t+1}}{P_t} - 1 - g\right) + (1 + g)(\Gamma_t - \Gamma_t^*) + \Gamma_t^* \left(\frac{D_{t+1}}{D_t} - 1 - g\right) \tag{3}$$

This relation is rewritten in terms of average proportional deviations as follows:

$$\frac{1 + r_{t+1} - (1 + r^*)}{1 + r^*} = \left(\frac{1 + g}{1 + r^*}\right) \left(\frac{\frac{P_{t+1}}{P_t} - 1 - g}{1 + g}\right) + \left(\frac{(1 + g)\Gamma_t^*}{1 + r^*}\right) \left(\frac{\Gamma_t - \Gamma_t^*}{\Gamma_t^*}\right) \left(\frac{1 + g}{1 + r^*}\right) \Gamma_t^* \left(\frac{\frac{D_{t+1}}{D_t} - 1 - g}{1 + g}\right) \tag{4}$$

However, as g and r_t are often small, it is possible to approximate $\ln(1 + g)$ and $\ln(1 + r_t)$ respectively by g and r_t . Thus, the log-linearization of the relation (1) around the growth ratios of P_t and D_t and the average dividend yield ratio gives:

$$\begin{aligned} r_{t+1} - r^* &\approx \rho(\Delta p_{t+1} - g) + (1 - \rho)(\lambda_t - \lambda^*) + (1 - \rho)(\Delta p_{t+1} - g) \\ &= (\lambda_t - \lambda^*) - \rho(\lambda_{t+1} - \lambda^*) + (\Delta d_{t+1} - g) \end{aligned} \tag{5}$$

Where: $p_t = \ln(P_t)$, $d_t = \ln(D_t)$, $\lambda_t = \ln(\Gamma_t)$, $\lambda^* = \ln(\Gamma^*)$ and $\rho = \frac{1+g}{1+r^*}$.

This relation can also be rewritten as:

$$\lambda_t - \lambda^* = (r_{t+1} - r^*) + \rho (\lambda_{t+1} - \lambda^*) + (\Delta d_{t+1} - g) \tag{6}$$

Under the assumption of absence of rational bubble, $\lim_{i \rightarrow \infty} \rho^i \lambda_{t+i} = 0$ and the previous relation is specified as:

$$\lambda_t - \lambda^* = \sum_{i=0}^{\infty} \rho^i (r_{t+1+i} - r^*) - \sum_{i=0}^{\infty} \rho^i (\Delta d_{t+1+i} - g) \tag{7}$$

While introducing the expectation hypothesis for each member of this equation, we obtained the following rational expression for the ratio Γ_t :

$$d_t - p_t = \lambda^* + \sum_{i=0}^{\infty} \rho^i E_t (r_{t+1+i} - r^*) - \sum_{i=0}^{\infty} \rho^i E_t (\Delta d_{t+1+i} - g) \tag{8}$$

This expression is a generalization of the Gordon-Shapiro model and it generates the following empirical fundamental price formulation:

$$p_t^f = -\lambda^* + d_t - \sum_{i=0}^{\infty} \rho^i E_t (r_{t+1+i} - r^*) + \sum_{i=0}^{\infty} \rho^i E_t (\Delta d_{t+1+i} - g) \tag{9}$$

Where: p_t^f is the fundamental price in logarithm.

This relation defines the fundamental value as an increasing function of expected future dividends and a decreasing function of discount rate. Nevertheless, the future dividends are not observed and we need an assumption on the expectation process used to estimate future dividends. Furthermore, we have to introduce another assumption on the investment horizon in order to get a measurable fundamental value expression. Thus, we express the fundamental price on (t+1) and we calculate the relation $(\rho p_{t+1}^f - p_t^f)$. Then, under the law of iterative expectations, the allowance is made for revisions of expectations of future dividends and discount rates and the hypothesis of infinite horizon is eliminated. Thus, we obtained:

$$p_{t+1}^f = -\lambda^* + d_{t+1} - \sum_{i=0}^{\infty} \rho^i E_{t+1} (r_{t+2+i} - r^*) + \sum_{i=0}^{\infty} \rho^i E_{t+1} (\Delta d_{t+2+i} - g) \tag{10}$$

Then, while computing the relation $(\rho p_{t+1}^f - p_t^f)$, we obtained the following relation:

$$\rho p_{t+1}^f - p_t^f = (1-\rho) \lambda^* + (g - r^*) + \rho d_{t+1} - d_t + E_t (r_{t+1}) - E_t (\Delta d_{t+1}) \tag{11}$$

Therefore, the following recurrent relation gives the fundamental price:

$$p_{t+1}^f = \frac{1}{\rho} p_t^f + \frac{1-\rho}{\rho} \lambda^* + \frac{g - r^*}{\rho} + d_{t+1} - \frac{1}{\rho} d_t + \frac{1}{\rho} E_t (r_{t+1}) - \frac{1}{\rho} E_t (\Delta d_{t+1}) \tag{12}$$

Equation (12) is the key relation, explaining the fundamental price at t+1 in terms of the fundamental price at t, log dividends at t and t+1, period-t expectations of period t+1 returns, and period-t expectations of the growth in log dividends between t and t+1. This is obtained by inverting an expression that explains the stock price at time t in terms of future prices (at t+1) and the various returns and dividends variables. Thus, it has taken what is fundamentally a forward-looking relationship, which explains today's stock

prices in terms of expected future prices, dividends, and discount rates, and turned it into a backward-looking relationship, which explains today's stock price in terms of yesterday's. Of course, this is based on allowance that is made for revisions of expectations of future dividends and discount rates.

In practice, this empirical formulation of the fundamental price is not directly measured. We need, on the one hand, to define an initial value for the fundamental price p_0^f to start the recurrent relation. On the other hand, we have to specify an expectation process for future expected dividends and discount rate. Thus, we retained the rational expectation hypothesis and we defined the expected sets of the above relations as follows:

$$E_t(r_{t+1}) = r_{t+1} + \varepsilon_{t+1} \tag{13}$$

$$E_t(\Delta d_{t+1}) = \Delta d_{t+1} + \varepsilon_{t+1} \tag{14}$$

Future sets would be generated while using STAR models while under the above assumption ε_{t+1} do have the properties of a white noise process. Using STAR models is justified by the asymmetry, the persistence and the structural breaks induced by the presence of transaction costs, the behavioural heterogeneity, the different dividend policies and the heterogeneous beliefs (e.g. Driffill and Sola (1998)).

Furthermore, our derivation of the fundamental value makes the assumption that the log of dividends has a constant growth rate in the long run, and that the discount rate has a constant long-run value, and, finally, that they both fluctuate around these in the short run. This may be consistent with the STAR model as we suppose that the STAR model may not imply that the long-run growth rate of log dividends and the long-run value of the discount rate depend on the regime. Similarly, we suppose that the response of the stock price to an innovation in dividends does not differ as between the two regimes.

Otherwise, different initial values p_0^f were proposed. First, we retained $p_0^f = p_0$ to generate a fundamental value series. Then, other values are tested and the optimal one is the value that minimizes the following statistic: $Q = \sum_{i=0}^{\infty} (p_t - p_t^f)^2$.

The STAR Model

STAR models and their statistical properties were developed by Teräsvirta (1994). STAR models can be seen as a combination of two linear representations that are linear per regime but nonlinear over the period. They define two regimes that are dependent with a transition function $F(\cdot)$ that is continuous and bounded between 0 and 1. Their main statistical property is that the transition between regimes is smooth and then more appropriate than the TAR (Threshold Autoregressive) model to reproduce financial series adjustment, because of the presence of many individuals or firms, each of whom switches sharply but at different times.

Formally, a univariate STAR representation is given by:

$$y_t = (\alpha_0 + \alpha_1 y_{t-1} + \dots + \alpha_p y_{t-p}) + (\beta_0 + \beta_1 y_{t-1} + \dots + \beta_p y_{t-p}) \times F(y_{t-d}, \gamma, c) + \varepsilon_t \tag{15}$$

Where: γ is transition speed ($\gamma > 0$), y_{t-d} is transition variable, d is the delay parameter, c is the threshold parameter, $F(\cdot)$ is the transition function and $\varepsilon_t \rightarrow N(0, \sigma^2)$.

Teräsvirta (1994) retained two types of transition functions: logistic and exponential functions that define respectively the Logistic STAR (LSTAR) model and the Exponential STAR (ESTAR) model.

The Logistic function is defined by $F(s_t, \gamma, c) = (1 + \exp\{-\gamma (s_t - c)\})^{-1}$, $\gamma > 0$, while the Exponential one is given by $F(s_t, \gamma, c) = 1 - \exp\{-\gamma (s_t - c)^2\}$, $\gamma > 0$. LSTAR models have often been used to reproduce the asymmetry characterizing industrial production series and unemployment rate sets (e.g. Teräsvirta (1994)), while ESTAR have been used by several studies to reproduce financial series adjustment (i.e. Manzan (2003)). Jawadi (2006) more explicitly presented the STAR modeling.

EMPIRICAL RESULTS

Our empirical study is centred on the monthly American stock index (S&P500) over the period January 1871 – June 2002 and the data come from Shiller's database which is described on the following website http://www.econ.yale.edu/~shiller/data/ie_data.xls. This choice helps us to compare our results to those of Shiller (2000) and Manzan (2003). All data are real and are transformed in logarithm. In practice, while using three unit root tests (ADF, PP and KPSS), we first checked the conditions of the Campbell and Shiller linearization and we then showed that P_t and D_t are I (1) while Γ_t is stationary. The second step is relative to STAR modeling for r_t and Δd_t .

Thus, we first specified the linear AR model and determined its p order while using the *AIC*, the autocorrelation function and the Ljung-Box tests. Therefore, we retained an AR (6) and AR (3) respectively for r_t and Δd_t . Secondly, we tested the null hypothesis of linearity against the alternative of STAR nonlinearity for different values for d ($1 < d < 3$ for Δd_t and $1 < d < 6$ for r_t). Linearity hypothesis is rejected for both series for all these values and it is more strongly rejected for $\hat{d}=4$ for r_t and for $\hat{d}=1$ for Δd_t indicating thus the presence of nonlinearity, different regimes and structural breaks in the processes generating adjustment dynamics of S&P dividends and returns series. These results are important and are also in line with those of Driffill and Sola (1998), Sarantis (2001) and Manzan (2003). They confirmed the use of the STAR model to calculate expected series. Thirdly, the last step in STAR specification is to choose the appropriate transition function while using the Fisher tests. Results indicated that for both series, the exponential function is retained. Therefore, ESTAR (6,4) and ESTAR (3,1) are respectively estimated by the NLSM for r_t and Δd_t . The results are presented in Table 1.

The second column's equation presents the ESTAR (ESTAR (6,2)) estimation for the S&P returns. Our results are in line with those of Sarantis (2001) who also retained an ESTAR (6,1) to study the S&P return. In particular, we showed that the American return dynamics are nonlinear and are well reproduced by a two-regime ESTAR model. Most estimators are significant at either 5% or 10%, while the Durbin Watson (DW), the Augmented Dickey Fuller (ADF), and the Jarque-Bera (JB) tests showed that residues have the appropriate statistical proprieties.

The third column reproduces the estimation of the S&P dividends by an ESTAR (3,1). Our results also showed that as in Driffill and Sola (1998) the S&P dividend adjustment dynamic is nonlinear and well reproduced by a two-regime ESTAR model. Both estimations significantly showed the superiority of ESTAR models in relation to the linear model.

Overall, these results confirmed both those of Driffill and Sola (1998) and Sarantis (2001) as ESTAR models seem to be more appropriate than linear process in reproducing the adjustment dynamics of the S&P dividends and returns. In particular, $\hat{\gamma}$ and \hat{c} are significant at 5% and 10% showing that adjustment is nonlinear, asymmetrical and smooth. The misspecification tests showed that $\hat{\epsilon}_t$ are stationary and have

the appropriate statistical properties, then confirming the rational expectation hypothesis for which ε_t should be near a white noise.

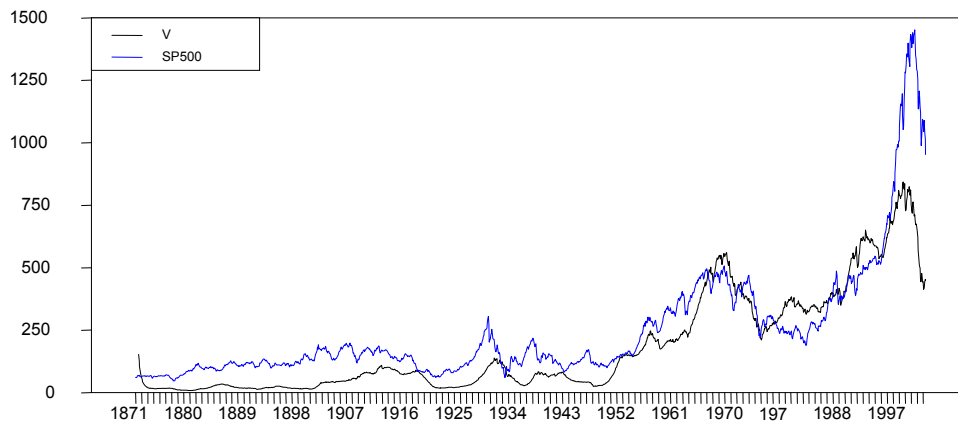
Table 1: ESTAR Estimation

| Model | ESTAR (6,4) for the S&P Returns | ESTAR (6,4) for the S&P Dividend |
|--------------------------------------|---------------------------------|----------------------------------|
| (p, d) | (6,4) | (3,1) |
| α_0 | 0.04 (0.72) | 0.011 (1.29) |
| α_1 | 0.22 (1.85)** | 0.54 (2.86)* |
| α_2 | -0.17 (-1.96)* | 0.11 (1.79)** |
| α_3 | -0.51 (-1.95)** | -0.07 (-1.74)** |
| α_4 | 6.68 (0.65) | - |
| α_5 | 1.16 (2.88)* | - |
| α_6 | -0.37 (-1.99)* | - |
| β_0 | 0.03 (10.9)* | -0.0002 (-0.41) |
| β_1 | 0.13 (12.7)* | 0.39 (13.5)* |
| β_2 | -0.006 (-0.23) | 0.16 (4.77)* |
| β_3 | -0.02 (-1.77)** | 0.11 (3.04)* |
| β_4 | 0.04 (1.74)** | - |
| β_5 | 0.08 (2.83)* | - |
| β_6 | 0.04 (1.74)** | - |
| γ | 0.49 (1.81)** | 0.0009 (1.69)** |
| c | 0.005 (7.82)* | -0.0032 (1.98)* |
| DW | 1.98 | 2.01 |
| ADF | -28.15 | -15.56 |
| JB | 4.79 | 8.79 |
| ARCH (4) | 18.73 | 16.67 |
| $\frac{\sigma_{ESTAR}}{\sigma_{AR}}$ | 0.7 | 0.66 |

This table shows the ESTAR estimation of the returns and dividend growth. Values in bracket are the t-ratios. (*) and (**) designate respectively the significance at 5% and 10%.

Finally, in order to propose a new estimation for the S&P fundamental value, we retained the deterministic estimation of STAR models of r_t and Δd_t . Then, we expressed estimation in $(t+1)$ to deduce $E_t(r_{t+1})$ and $E_t(\Delta d_{t+1})$ and we estimated the S&P fundamental price given in the equation (12). Yet, in order to start the recurrent relation, we retained $p_0^f = p_0$. The estimated fundamental price and the observed S&P index are reproduced in Figure 1.

Figure 1: Stock Price and Fundamental Value



This figure shows the observed S&P Price and its estimated fundamental value.

As in Manzan (2003), we showed that changes in fundamental factors are not large enough to explain changes in observed price. Indeed, the American index was over-valued at the beginning of the period. However, it fluctuates around its fundamental value until 1990, but it has experienced a considerable run-up after 1990, indicating the absence of mean reversion in American stock prices in this period. This persistence characterizing stock price deviations after 2000 is explained by the irrational fads in the investor's sentiment and by irrational exuberance. Otherwise, results showed that stock price generally deviates at short term from fundamentals, notably in periods of crises (e.g. 1929, 1973) and Crashes (e.g. 1987, 2001), but then reverts back in the long-run under the influence of fundamentalist interaction and market strengths.

CONCLUSION

The main contribution of this paper is to develop a new empirical measure of S&P fundamental value while extending the DDM by introducing the nonlinearities in estimating the fundamental value. We showed, on the one hand, that nonlinear models are more appropriate than linear models to reproduce return dynamics and expected future dividend evolution. On the other hand, we found that the stock price is nonlinearly mean-reverting. Indeed, the stock price could deviate and spend most of the time away from the fundamental at short term, but while transaction costs and the size of its deviations from fundamental are increasing, a strong evidence of mean-reverting in American stock price is found.

More importantly, this study proposes an original contribution to literature related to the stock price fundamental value modeling, while introducing nonlinearity in estimating the determinants of the intrinsic value. Contrary to the previous studies, the hypotheses of this study are less strong and restraining. However, it would be important to generalize this study to cover a more original application field (i.e. the G8 countries). It would also be interesting and promising to use this result to study the S&P deviations toward this estimated fundamental value in a nonlinear framework and to determinate the periods of under and overvaluation of the American stock market and, finally, to check whether the stock price is mean-reverting or not.

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