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Doctorado en Ciencias Financieras

"Exogenous Shocks and its Impact on Financial Information. Financial Ratios Contribution to Fundamental Analysis"

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Index

Graphs and Tables Index

Introduction

Collection, analysis and generation of financial information has been crucial and necessarily nowadays, inside an unpredictable financial and economic scenario where everyone needs to know their financial situation. One of the most used tools is the accounting information, which according to its principles must be trustable, opportune and truthful, so that could allow companies to get into decision-making, debt payment and resource management.

In accordance to (Romero, 2004), the systematic process of financial information constitutes a series of integrated and sequential steps, since data collection (economic-financial phenomena), processing, to financial statement auditing that such information produced.

Information generated during an economic shock and after it, has negative consequences for investors, because it is complex to generate reliable financial projections that allow the estimation of future profits, as well as design investment strategies in portfolios conformed mainly by shares of public companies listed in the stock market.

A shock of this nature can occur for example like a consequence of an economic devaluation, a strike, a terrorist attack, etc. One of the main repercussions is that the relevance of accounting information produced by the companies is reduced as a result of economic and financial changes; and it is precisely the detailed information about financial statements, which can grant the prediction of future profits like cash flow that companies can generate.

Financial statements register financial data at a specific period in time, but depending on the economic circumstances, inflation or currency devaluation, the operations made by the company lose their relevance in the short period.

Attributable to previous information, this investigation focuses on the value relevance of accounting information and the relationship between fundamental analysis, financial ratios, stock returns and macroeconomic events.

The objectives in this research are: 1) investigate the value relevance of accounting information expressed through financial ratios and its impact in stock prices in Mexico during the period 2006-2009; and 2) to examine how this relevance was affected by the financial crisis of 2008.

Chapter 1

1.1 Financial Statement Analysis

Financial information generated by companies is collected, classified, resumed, and presented through financial statements, which contain most of the available data that a company should report, especially public ones. The primary objective of the statements is to inform about the financial condition of the enterprise at a specific place and date.

Inner economic and financial analysis, every research had defined its purpose and objective, for this, a wide variety of information must be included, modelled and tested. Quantitative and qualitative data can be found in the financial statements, annual meetings reports, projections, etc.

Companies are obligated in almost every part of the world, especially if they are public to produce three basic statements: balance sheet, income statement and cash flow statement. Each one has a particular report purpose and provide different information to users. One of the particularities of these documents is that they may contain footnotes that could explain important features of accounts, business operation, M&A, investment, etc., that can help to understand every operation and transaction so that managers, owners or external institutions are able to execute better and solid decisions.

Financial statements are conformed by a specific number of accounts that reflects every operation and agreement that the company did. When the information has been resumed, it became relevant because it can translate economic factors into numbers. The results provided facilitate each business to take present and future decisions about investment, credit, growth capability, stability, financial structure and profitability.

The information revealed in the statements has special applications depending users, that is the primarily reason for its diversification. For a partner, its main concern is profitability, for the CEO not only this last concept, but also, operation, growth, internal management,

etc., for the government is a subject liable to pay taxes; in sum up, there are internal and external users and each one examines it at different levels, mostly depends on their necessities and expectations, that is the basic reason why is the information provided in these statements so relevant.

One of the main users are shareholders whom evaluate the way is being guided and directed the company. They can judge the performance of their managers and directors reviewing how efficient they are in achieving the goals proposed at the beginning of a period; but beside this, the main reason is to ensure that the business is a utility's generator and they can verify this assertion with reported earnings. There are other users that not only focuses on earnings but also in profitability like government, regulators, and investors, and this last ones require the information supplied in these documents to perform strategies, do share acquisitions, forecast, perform risk evaluation, restructures, etc.

The principal issues addressed by financial analysis are associated with loans, planning, investment and internal management. Every topic, diagnoses the internal structure of the company, liquidity and indebtedness; also, users can examine strengths and weaknesses of the corporation for decision-making.

Interpretation of financial statements is also called Financial Analysis; this is a process that involves independent calculus of percentages, growth rates, ratios, tendencies, analysis of decisions previously taken by the departments that form the firm, research about the industry that belongs, and the economy which is part of. Ou and Penman (1989) expressed that one goal of the analysis is to asses firm value from financial statements.

Formally, to perform financial analysis, there are specialized tools such as ratio analysis, cash flow analysis, the DuPont method, among others. Likewise, when investors need to observe stock price movements the acceptable instruments used in financial analysis to predict and study returns, profitability or investment, are the technical and the fundamental analysis.

1.2 Technical and Fundamental Analysis an Overview

Market analysis is the basis of these practices; it can be understood as the detailed study of the patterns and tendencies of the stock prices and its evolution inside the market, namely, supply and demand. It focuses in price movements, not in the reasons why prices change.

"Technical analysis attempts to predict stock price movements on the basis of market indicators (prior stock price movements, volume of shares traded, etc.). In contrast, fundamental analysis, attempts to evaluate the current market price relative to projections of the firm's future earnings and cash-flow generating potential." Palepu & Healy (2008).

Furthermore, this type of analysis studies how stock prices fluctuate, and try to identify behaviors and patterns that give a signal to the analyst so that helps them to predict future changes in the price of the securities and as result, obtain gains or prevent losses. Investors and analysts can observe history and determire what really happened. The information used to do this type of investigation are the stock price and the traded volume.

Technical analysis is for Edwards and Magee (2001) a science were history of stock price behavior is documented and presented in a graphic form. In such, figures patterns and trends can be observed in a certain way that investors can execute decisions.

This technique contemplate three premises defined by Charles Henry Dow, in his Dow Theory:

- *Market action discounts everything.* It means that real price is a reflection of everything that can affect the market
- *Assets prices move in trends.* There are behavioral patterns in the market that repeat a long time and therefore are meaningful
- *History repeats itself.* Graphic patterns are known and repeat constantly

The general goal of technical analysis is to identify regularities in the time series of prices by extracting nonlinear patterns from noisy data (Lo, Mamaysky and Wang, 2000). For this focal point, any factor that could affect the stock price is yet considered, so there is no necessity to check another account in the financial statements.

In contrast, fundamental analysis studies the present and future conditions of the companies, setting emphasis on its finance and economic conditions, considering all the factors that affect financial markets, and so, measure its intrinsic value. It is applied to determine if the price of a company is over or undervalued since, it is possible to study every account and combinations of them such as financial ratios estimation to do projections, evaluate the company, estimate future earnings, minimize risk or just understand the behavior of the securities. It is also commonly used to estimate the fair value of a company.

For Spooner (1984), "fundamental analysis is a method of systematically modelling facts -economic and industry statistics, financial ratios ... in order to in a logically coherent manner an explanation, hence and understanding, of observed phenomena".

For another authors like Suresh (2013), "fundamental analysis is a method of evaluating a security by attempting to measure its intrinsic value by examining related economic, financial and other qualitative and quantitative factors. Fundamental analysis attempt to study everything that can affect the security's value, including macroeconomic factors (like the overall economy and industry conditions) and individual specific factors (like financial condition and management of companies)".

In accordance with Sosa (2014), there are two methodologies inside fundamental analysis that assists in the estimation of the actual value of companies or securities: top-down and bottom-up approaches.

Top down is an approach that first observes the general characteristics of the market and variables, and later take particular features. This method has three principles better known as EIC Framework (Economic-Industry-Company Analysis) or top-down approach:

- Economic analysis
- Industry analysis
- Company analysis

The economic analysis involves the study of macroeconomic variables like interest rate, inflation, growth, etc. For industry, all users have to see the way the sector is being influenced by economy, consumer behavior, substitutes of the product or service, or evenly the inner sector growth rate. Finally, the third variable determine the role of the company inside the market and identify the specific factors that could affect it.

Bottom up analysis turns exactly the opposite from top down; investors emphasize in the stock price of the company, then compare with the market and with this information try to predict future conducts.

For Sosa (2014), the fundamental analysis techniques employing bottom up methodology, concentrate on two main groups: one associated with relative valuation that emphasis in stock market indexes and other indicators; and the second, is absolute valuation, which uses discounted cash flow method.

Fundamental analysis has been widely used for most of the users of the financial information because not only depends on two variables, but also, on different key factors like balance sheets, dividends records, sales, price statistics, forecasts, etc., and it is less subjective. Another difference between these two focus is time, technical analysis is often used for short periods, and fundamental needs to observe carefully the behavior of fundamentals in time.

This type of analysis is linked with market efficiency theory, which states that prices at any time fully reflect all available information, Fama (1970). His research reviews the literature about efficient markets model, and resume in three subsets. First, the weak form test, where only historical prices are considered; second, the semi-strong test, analyze if prices adjust in an efficient way to available information; and three, the strong form, which examine the exclusive users of financial information, who act as monopolists.

"The theory also states that as new information becomes known, it is factored into the stock's price immediately", Thomsett (1998).

In the same way, fundamental analysis is also employed to evaluate the performance of the stocks, and it does it by analyzing the accounting information contained in the financial statements to predict future earnings, the most common procedure to execute it, is with econometric tools.

1.3 Financial Ratios Analysis

Inside the third phase of top down method in the company analysis, it is necessarily to make a specific evaluation of the components of the financial statements; this can allow users to examine financial health of the companies and consider its profitability, indebtedness, and liquidity. For these items, in the financial environment, ratios estimation is the main applied tool. Some authors like Sosa (2014) comment that ratios *are the* most common used method in financial analysis due to its predictive power.

A ratio is the result of a numerical relationship between two quantities. The combination of various ratios provides valuable information to study the behavior of the enterprise decisions and changes in financial conditions.

Helfert (2003) indicates that ratios are not absolute criteria; a single ratio must not be used to explain the model or the status of an enterprise, it is better to constitute a combination to point out changes in financial conditions or operating performance over several periods and as compared to similar businesses. He also mention that many companies employ a variety of systems of ratios and standards that segregate into their components the impact of decisions affecting operating performance, overall returns, and shareholders expectations.

Thomsett (1998) considers that when two variables of the same data are compared, act like a mechanism which serves to obtain fundamental information and understand the meaning of the findings.

Financial ratios meant for Rodríguez (2012) parameters obtained through solved mathematical equations where accounts are used and have relationship with each other in order to evaluate if the result is the adequate or, if different actions should be determined to correct present or future problems.

Analysis in this matter includes different approaches to calculate ratios with the purpose of evaluate the performance of the companies, but the most relevant factor in this type of methodology is the interpretation, which brings elements to determine the better or worse for the firm.

There are two ways to realize the study, using benchmarking or temporal series. The first one compares the organization with its competitors; the second one assesses the operation across time. Some authors consider that a combination of both lines is the best choice because you can relate either the company across time versus its competitors or the market.

Gitman and Zutter (2012) point that financial ratios are divided in five categories: liquidity, activity, indebtedness, profitability and market.

Liquidity measures the capability that the firm has to pay its debts or assume its obligations in a short period of time or as documents expire with the amount and the agreed period. Activity measures the efficiency in the use of the assets, because they represent the main resource of the company to obtain gains. Indebtedness shows how the company finance itself. Profitability express the efficacy of the management to control costs and expenses, and the capability to increase sales with the aim of generate utilities; also exposes the relation between utilities and the investments made to gain them. Finally, market ratios relate market value of an enterprise, measured by its stock market price with accounting values.

1.4 Financial Information Relevance

Value relevance of accounting information refers to the ability of this information to explain the value of the company, Beaver (1968). Relevance is one of the principal characteristics of accountability and is associated with the significance of variables in decision-making and its capability to predict either prices or earnings. In addition, another element that must be considered to explain relevance is time.

For Sharma et al. (2012), "Accounting information is defined as value relevant if it has a predicted association with market values, i.e., stock returns". Many researchers had studied the relevance of the accounting information through financial statements in order to perform appropriate strategies of investment, risk, management, growth, etc.

In the research of Francis and Schipper (1999), value relevance has four approaches, for them, the value relevance is measured by the ability of the financial statement information to capture or summarize information, regardless of the source, which could affects share values. In the same work, they argued that a statistical association between accounting information is correlated with information used by investors. This means that returns are associated with the information provided by financial statements.

The most important approaches discussed in the literature about financial information relevance have two lines, one associated with net profit, and the other with shareholders equity and their influence in stock prices. Explicitly, research on profits have been concentrated primarily on the prediction of future returns for the purpose of investment, and similarly, evaluate current ones. Ball and Brown (1968) published one of the first studies about this topic; their results indicated that earnings are the variable that captures the information contained in stock prices. Years after, Ou and Penman (1989) argued that analysis of published financial statements can discover values that are not reflected in stock prices, ... intrinsic values serve as benchmarks with which prices are compared to identify overpriced and underpriced stocks. Holthausen and D.F. Larcker (1992), examine

the profitability of a trading strategy designed to predict the sign of excess returns from accounting ratios.

Other investigations that associate stocks with information relevance at different scenarios are Graham et al. (2000); Hisrchey et al. (2001); Holthausen and Watts (2001), etc. Meanwhile, Ohlson (1989, 1995) reviewed the usefulness of accounting data in business evaluation; explain that internal value of the companies can be used to identify stocks that have not been properly evaluated, and that earnings and book value are used to explain stock prices.

Some others investigations concentrated in the reaction of the market and the stock price to particular events, but focused on future earnings changes. Abarbanell and Bushee (1997, 1998), Thomas and Zhang (2001). Finally, the last one investigates the impact of changes in the accounting norms over company's stock price listed in the stock exchange, how these changes affect the enterprise inside their country or, just observe the variability before and after the new regulation comes into force. Some researchers interconnected with this methodology are Liu, et al. (2012); Tsalavoutas & Evans (2012); and Vásquez (2011).

The conclusion of previous research on this topic indicates that accounting data has lost relevance in the formation of the securities price in capitals market, mainly explained by information asymmetry, and by the increase in time needed by accounting data to become significant in the price formation process.

Furthermore, there is an association between financial crisis and value relevance; many studies introduced macroeconomic factors or events in fundamental analysis and the relevance of its components.

Lev and Thiagarajan (1993), showed that the returns-fundamentals relation is considerably strengthened when is conditioned on macroeconomic variables. Their study incorporate different economic conditions like price index, annual change in real GNP, and the annual change in the level of business inventories. Davis-Friday and Gordon (2002), investigate the relation between the firm's stock prices and their book values, earnings, and cash flows, taking into account the effect of the 1995 Mexican financial crisis, using cross sectional technique where they found that book values retain their significance and explanatory power during the crisis while earnings do not.

Swanson and Juárez-Valdes (2003) analyzed the value of financial statement information to investors after the December 1994 currency devaluation. They found that after a devaluation, fundamental signals based on changes in selling and administrative expenses and changes in gross margin are significant in several analysis, including predictions of future earnings, analysts forecast revisions and errors. They conclude by stating that there is an opportunity after a devaluation to perform a zero trading strategy and then produce substantial earnings.

The effect of the Asian crisis on the value relevance of earnings and book value was studied by Davis-Friday et al. (2006) concentrating its examination in four Asian countries. They found that this changed during the crisis. In addition, value relevance on book value of equity increases, while the value relevance of earnings declines depending on the corporate-governance mechanisms and also, on the accounting system of each country.

The present study relates fundamental analysis through financial statement analysis including ratios estimation, returns, and macroeconomic shocks. This last represent an exogenous factor that could affect the information reported, and therefore, symbolize the loss of the relevance in the variables. The insertion of external events represents a contribution to fundamental analysis, specifically for those studies whose focus had been the evaluation of value relevant accounting fundamentals in the context of a return fundamental relationship.

Chapter 2

2.1 Macroeconomic Scenario 2006-2009

World Economy as shown in graphic 1 at the beginning of 2006 according to the IMF[1] and the World Bank was in expansion but at lower levels than at the beginning of the decade (2000). In addition, it can be observed, that in the subsequent years almost all countries beside the downward of 2001 had in general stable growth rates, particularly it can be noted that Mexico and the United States sustained high growth rates. In most of these countries, one of the main sectors that contributed to the increase in GDP[2] was the housing sector.

Graph 1
GDP Growth (annual %)
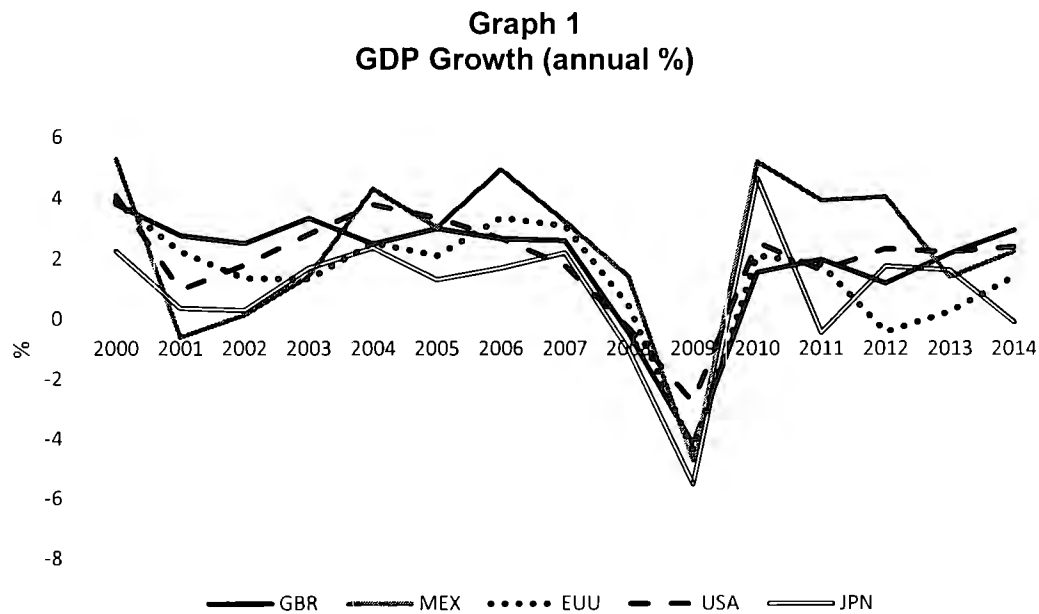
Source: Own, with data provided by World Bank

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[1] International Monetary Fund
[2] Gross Domestic Product

Emergent markets like Mexico as it was detailed previously and some other underdeveloped countries were also growing in the same period. Nevertheless, beside this scenario, inflationary pressures were glimpsed particularly due to the increase in oil and metals prices; this circumstance affected especially underdeveloped countries, which were and still are importers of this goods.

In developed countries during 2006, the unemployment rates decreased. An example of this condition is revealed in the 2007 report of the US Department of Labor Bureau of Labor Statistics -Graph 2- where the unemployment rate for the United States is down at the end of the period as compared from its last peak in 2003. In Graph 3, it can be observed in Europe and Japan the same path[3]. Nevertheless, as the year went forward, labor market started to present difficulties, mainly because job creation declined and in some countries high rates of unemployment began to appear, rising between other variables poverty levels.
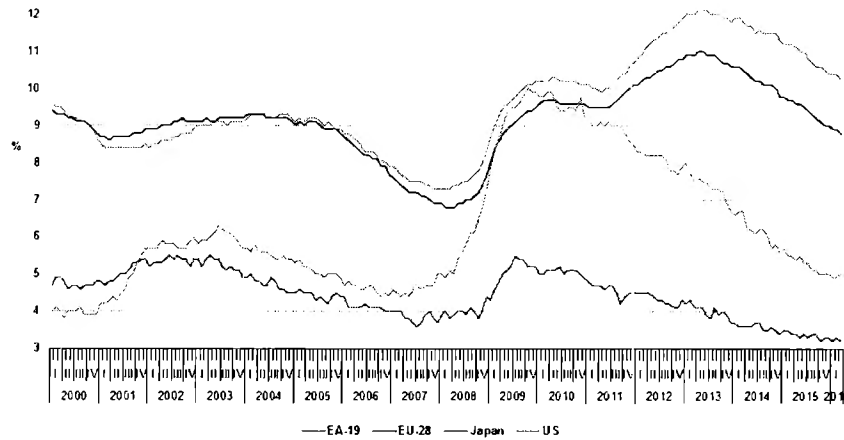
Graph 2
Unemployment Rate in the US

Source: Bureau of Labor Statistics

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[3] EU: European Union, EA – Europe Area

Graph 3
Unemployment Rates EU and EA as compared with Japan and US

Source: Eurostat

Inflows of Foreign Direct Investment (FDI) according to the UN[4] World Investment Report of 2006, which is the initial year of the study period, reported high levels of growth and expansion around the world. In 2004 was over 27%, and in 2005 of 29%, this consecutive performance was considered as a worldwide phenomenon, which in most was due to an increase in mergers and acquisitions (UN, 2006)

Before 2006, low interest rates combined with consumer expectations about higher incomes, amplified the boom of house acquisitions and contributed to strengthening the lending-borrowing financial system. This, combined with the volatility in oil prices, forced central banks to apply a change in monetary policies; the result was a strict position mainly because an increase in the interest rates disposed by the FED[5] and the European Central Bank. In addition, one of the principal objectives was to control inflationary pressures.

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[4] United Nations
[5] Federal Reserve

In 2006, the United Nations suggested in its report World Economic Situations and Prospects (2006) that "the vulnerability of the global economy is also derived from the possible burst of the house price bubble in some countries. A number of economies have experienced substantial appreciation in house prices over the past decades, with the appreciation particularly strong in recent years. Housing indicators in those countries, such as the affordability ratio, price-to-rent ratio, mortgage loans-to-GDP ratio, and ownership ratio are at historical highs, suggesting a peak in the value of houses relative to the underlying economic fundamentals.

Moreover, indications of possible bubbles in house prices, at least in some countries, are also visible from the increase in speculative activities. In the United States, turnover in housing markets has increased, the share of investment-oriented house purchases has risen and novel mortgage products such as interest-only loans, innovative forms of adjustable rate mortgages and the allowance for a limited amount of negative amortization have been proliferating, thus enabling many marginally qualified and highly leveraged borrowers to purchase homes at inflated prices".

After achieving a historical price in July, oil prices continued to fall the succeeding months until January of 2007, where an elevated volatility persisted. On the other hand, exporters profited with this context while importers experimented a shortfall in the trade balance.

Despite global growth in first semester of 2007, the expectative for the end of the year was a deceleration, essentially because of a lower growth rate in the United States caused by a decrease in the housing sector growth rate. Final reports in this year indicated that the real level was of 4.9 percent, however, in the last quarter the evidence of a decrease was noticeable.

In addition, Europe and Japan economic structure was not strong enough to maintain the conditions required for the world GDP to keep on growing. Countries like China and India preserved its sustained development predominantly because of its reforms and the privatization of sectors and industries. China grew 11.5 percent in 2007 as declared by

the IMF, becoming the principal contributor in the world and continued growing in 2008 and 2009 at similar levels. Same conditions applied to India, growth rates of 9 percent in 2007, 8.9 and 8.4 respectively for 2008 and 2009. In fact, China's exchange rate with a surplus in the current account remained stable because of its controlled regime.

However, the scenario for underdeveloped countries was riskless due to its strong dependence of the principal economies. Food prices incremented as a result of its use as biofuels and because of scarcity; this boost reduce real income, especially in those countries, which consume is in a great number associated with feeding.

The FMI in its World Economic Outlook report for 2007 indicated that, "global credit market conditions had deteriorated sharply since July as a repricing of credit risk sparked increased volatility and a broad loss of market liquidity. Rising delinquencies on U.S. subprime mortgages led to a spike in yields on securities collateralized with such loans and to a sharp widening in spreads on structured credits, particularly in the United States and the euro area".

By August, uncertainty in financial markets and the credit instability of the housing sector, produced a fall in the returns of stock markets, and a lack of liquidity in the interbank financing markets, subsequently, investors took away its equity to better scenarios. Central banks started to inject liquidity through open market operations to stabilize interest rates and consequently markets. Third quarter represented the official start of the mortgage meltdown and the credit crunch.

At the end of 2007 and the beginning of 2008, financial institutions began to report losses because of its investment decisions in mortgages and riskless assets. A financial crisis had started and the decrease in credit and liquidity worse the financial market and its deleveraging. Nevertheless, the subprime mortgages were not the only root of the problem, the excessive leverage, lack of regulation, hide of information in financial statements, led to form a more complex financial sector.

United States expectative was not auspicious, the deceleration of the economy persisted, and its growth was almost of 1 percent during the first trimester of the year, this was a consequence of the investment housing sector contraction. In addition, a decrease in consumption must be aggregated mainly by oil prices, and trimmings in the interest rate, which discouraged investors. This scenario produced a decline of the dollar against other currencies like Euro and Yen. In the meantime, Europe suffered also a deceleration, in part for its own economic characteristics, the actions took by central banks, the crisis inside US, high oil prices; every indicator provided either for central banks, the IMF or the World Bank, followed the same prospect, especially for the last quarter.

Inflation in almost every nation raised at very high levels, in some cases exceeding the historical ones. The IMF published the cumulative world rate inflation and it reached 8.25% by August of 2008. Some other emergent countries achieved up to two digits of inflation rates, this fact was a consequence of food prices market instability.

However, high prices for several kinds of assets stabilized by the end of the year, first, due to the deceleration of the economy, and second, because some emergent and underdeveloped countries who depend substantially from these goods avoided its consumption in such a way that demand for these decreased.

The world experimented the effects of the crisis by means of volatility in the equity markets and in the widening of the yields spreads in the debts. Developed countries withstood the crisis hit due to previous years of continuous growth and accumulation of foreign reserves. Exchange rate markets also changed because of financial conditions.

The fragility in the financial markets around the world according to the United Nations in its report for 2009, is linked to an unsustainable global growth pattern based on a strong dependence in demand of consumption assets, an increase in debt for not only homes, but also, business and governments, this represent a change in the banking structure.

Uncertainty persisted around the world, credit access kept on limited and the projection for financial markets were that longer time was needed to achieve stability; unemployment stayed low, just as consumption and investment. Inflation remains at lower levels accordingly to price contention policies. These different pictures formed the scenario for almost the first months of the year.

As the last months of the year, growth remained low but trying to recover from the downward. The IMF mentioned in its Global Financial Stability Report (2009) that financial institutions continued to face three main challenges: strengthening earnings as business models adapt to the new operating environment, rebuilding capital, and reinforcing funding profiles.

2.1.1 Mexico Macroeconomic Scenario

Elected Mexico's new president Felipe Calderón started his term in 2006, with a macroeconomic scenario robustly supported in a GDP with an annual growth of 4.8%, the highest in the country since his political party PAN[6] had been on the power (Graph 4). This characteristic in the economy was achieved because cf the strength of consumption, the thriving character of investment, and the good behavior of external demand. Moreover, the rise was accomplished attributable to the expansion of the three main sectors of the economy.

Graph 4
GDP growth (annual %)
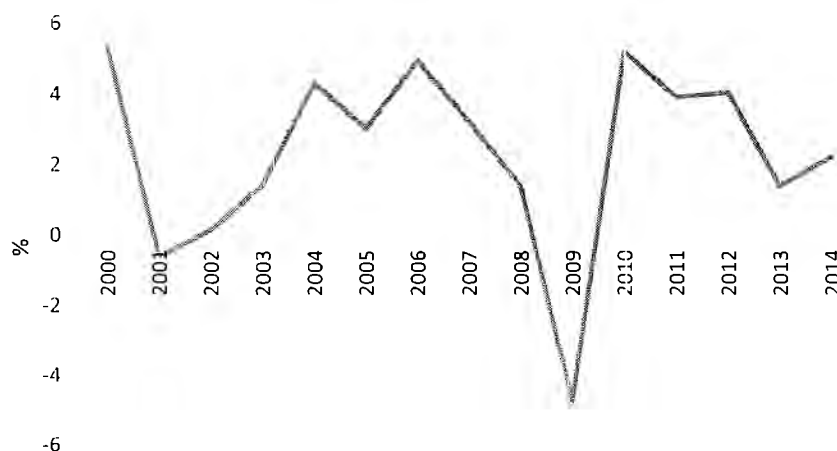
Source: Own with data provided by World Bank

In sectorial terms, growth was performed in a balanced way, as existed an augment in the agricultural activities, services, industries, above all the manufacturing production and construction. "The strength of the economic activity dimmed on the second semester, resulting in the most significant deceleration in the fourth trimester of 2006." Banxico (2006).

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[6] Partido Acción Nacional

Another factor to take into consideration in the macroeconomic indexes was inflation; its behavior during the first half of the year followed a pattern of decreases and attained levels near 3 percent.

As mentioned before in the global overview, 2006 was a year with prices severely impacted by weather conditions; due to them, some agricultural products had a negative impact on their prices. From July up to the end of the year, inflation presented an ascending conduct, this impact manifested in the next years.

This demeanor was given thanks to the "raise in the prices of sugar and the maize during the second trimester" Banxico[7] (2006).

Graph 5
Inflation, consumer prices (annual %)
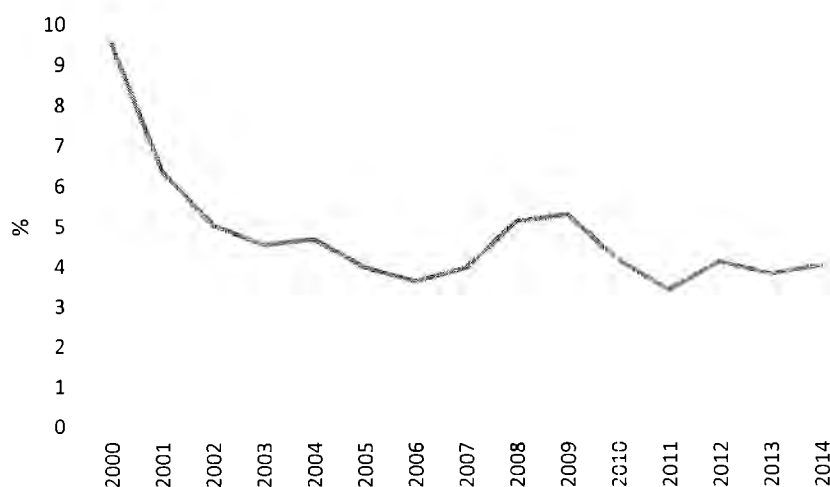
Source: Own with data provided by World Bank

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[7] Banco de México

Some other macroeconomic indicators like the two components of the demand showed significant growth; factors like higher availability of financial aid, improvement in labor and growth in real terms of the remuneration in diverse sectors followed the same trajectory; in a similar state, remittances supported the dynamism of the expenditure in private consumption. Investment showed a higher increase rate than the one of the product because of the augmentation in public and private investment expenditure, being the capital importation goods the one that showed the most.

As for the exports of both, goods and services, there was an improvement in 2006 as sales levels abroad increased despite the mid-year fall showed by the United States imports. In Graph 6 exports of goods and services are shown as a percentage of GDP, the period from 2003 up to 2006 behave similar following ascendant path. On the other hand, consumers, analysts and manufacturers confidence, yielded higher results than the previous years.
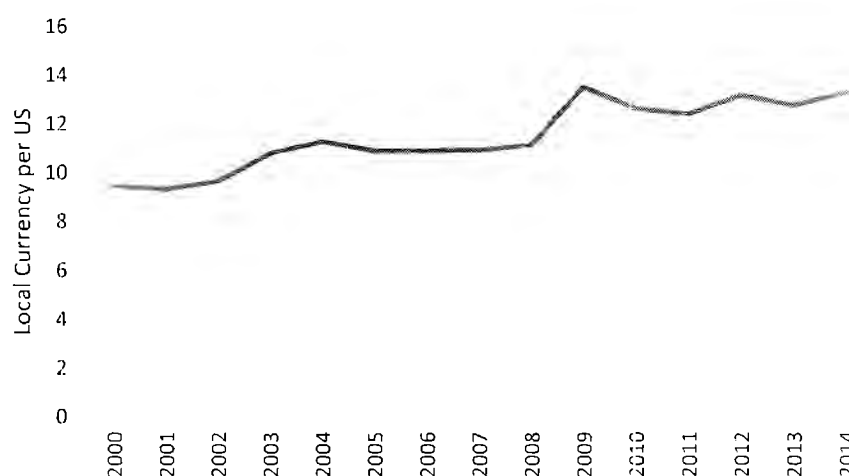
Graph 6
Exports of goods and services (% of GDP)
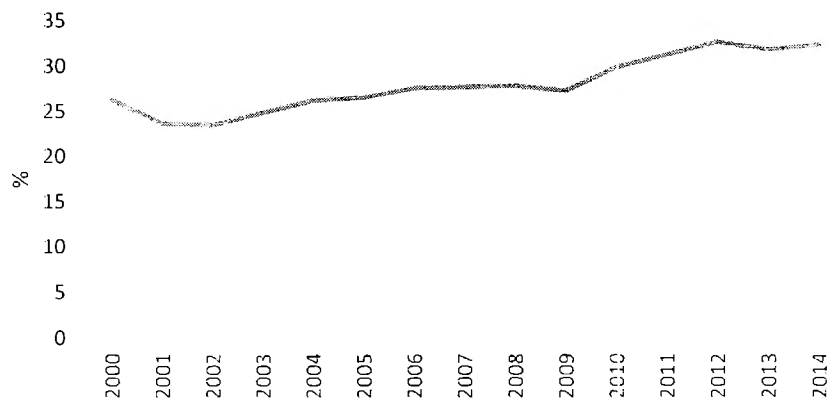
Source: Own with data provided by World Bank

Another fundamental factor was employment. According to the central bank in Mexico, a number of factors contributed to strengthen it; a substantial increment of workers affiliated to IMSS[8], vacancy rates in Mexico were very similar to the ones presented the year before, and finally, an expansion of formal workspaces in all the states of the country. Precisely, this increase was not affected by the shortage of qualified human resources.

Graph 7
Exchange Rate (period average)

Source: Own with data provided by World Bank

Lastly, the exchange rate as displayed in Graph 7 continued with the appropriate conditions of previous years provided by financial markets in the international sphere due to the relative confidence they had in the macroeconomic environment. However, inside Mexico uncertainty prevailed about the electoral process, which lead to an upward adjustment of interest rates, same that was translated as irstability in the exchange rate or volatility, it was effective in the short term only covering the second quarter and was diluted in the third returning interest rates to previous levels before volatility.

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[8] Instituto Mexicano del Seguro Social, for its acronym in Spanish. Mexican Social Security Institute

The behavior of inflation this year had some negative impact due to the rise in different international raw material quotes, in particular those that had to do with food production. Throughout 2007, the economic activity was characterized by lower growth rates, as well as the expansion of the demand comprised of internal and external components. On the other hand, private consumption expenditure also decelerated, affecting aggregate demand; other variable that influenced aggregate demand was goods exportation, the fundamental reason was the start of the financial problems inside United States and its consequent lack of consumption.

Exchange rate in 2007 remained constant during the first half of the year while world financial conditions were favorable; nonetheless, the second half of the year presented high volatility levels, which generated an aversion to risk motivated by shareholders. Given an environment where international prices of several commodities rose due to an increase in spreads on interest rates relative to the United States, the exchange rate in different emerging economies was affected because their exports were further raw materials, so, this condition helped to the appreciation of their national currencies.

In 2008, Mexican economy weakened because of the adverse international environment that prevailed at that time. The first three quarters of the year a strong decline of the economic conditions presented, mainly due to deterioraton of the external demand, affecting the good markets that were sold abroad. However, at the end of third quarter and the final one, affectations ranged from outside the private component of domestic spending, which showed a negative growth rate in this period.

According to Mexico's central bank, the main features of the performance of economic activity in the country were diverse. Private expenditure was quite different to public spending substantially, while consumption and investment in the private sector were weaker with the passing of time in the year, public expenditure component maintained a positive trend, primarily in investment.

Gradually private consumption was decelerating down to negative levels in the annual variation in the last quarter of the year. This behavior was due to several factors between which they emphasize the decline in the pace of growth in consumer finance and declining revenue to the country by family remittances; in addition, it was observed a reduction in the indicators of consumer confidence.

Concerning the annual evolution of the GDP, it presented a fall within their tradable components and flagging of correspondence in its non-tradable goods. In the last quarter, goods registered a fall in activity levels. The negative effect that occurred during 2008, affected negatively producing a decrease in labor demand, particularly in the formal sector.

The last year of the study for Mexico faced important slumps in a matter of demand produced via a decrease in manufacturing exports, as well as other lines of income in the current account which fell to the existence of a severe restriction of external financing, and a shock to the terms of change derivative from the reduction in oil export prices.

Economic recovery began in the second quarter, productive activity levels shrank due to the fall in external demand and the transmission to the domestic market along with some additional factors.

2.2 Financial Crisis 2008

The previous scenario for this crisis started for some researchers in the 1990's when the Federal Reserve (FED) reduce its interest rates allowing an excess in liquidity that generate the leverage of the investment banking and an open way to have access to cheap loans .

In 2003 when the president of the Federal Reserve, Alan Greenspan began to talk about the danger of deflation, promoted with his statement a drastic fall on the price of the money to 1%, which resulted in a massive injection of liquidity in the economy and a softening on the credit. In addition, the central bank increases the money supply.

With an excess of liquidity, banks began to grant state loans to a major number of people because with the official price of money so low, barely remain utility margins in either deposits or accounts. In a brief period, banks were conceding liar loans that not only did not accomplish the necessary requests to access them, but also, there were falsehoods about their incomes. Almost everyone could have access to a credit loan or a mortgage.

The scenario seemed to be going well for consumers, but not for financial sector, deeply inside, a high instability was ascending. In conjunction with an increased risk, banks decided to sell these mortgages transforming this debt in bonds that later were allocated at the equity market. With this strategy, risk was diversified and risk-rating agencies gave excellent ratings to those assets. Several financial institutions bought securities based on mortgages, an action that only caused a bigger leverage in their finance.

Months later, there was evidence in the news and literature that banks took out of their balance sheets, those bonds based on mortgages creating conduits or special investment vehicles, which were entities related to banks but legally independent from them.

At the same time, the banks began to make loans to other financial institutions using as guarantee those mortgages credits. Finally, hedge funds appeared, taking the same investment strategy. The result of all these factors lead to sophisticated markets because of the inclusion of complex instruments.

From 2004 up to 2006, the FED began to increase interest rates gradually, however, at the end of 2006, the combination of higher interest rates and the end of the lack period in many mortgages began to affect those who had contracted subprime credits, also affected financial instruments that enter into default.

Another component that contributed to this crisis was the rising period of oil prices, so that exporting countries, which had an excess in money and by consequence of liquidity, invested in international markets that can give them high rates of returns. However, this action created and speculative bubble especially in stock markets. Reyes & Moslares (2011).

For Nuñez and De La Cruz (2011), credit crunch in 2007 and 2008 appeared because banks and hedge funds had compromised their assets in riskless mortgages, which started a lack of trust between investors and the fall of brokerage firms.

The facility to obtain a mortgage credit had two effects. The first one was that the families were dedicated to speculate plentifully with real estate prices and with the mortgages costs. The speculation led origin to a real estate bubble that magnified the price of the assets considerably. The second was an after effect: the value of homes was the backup of the mortgages, including the subprime. As prices rose, also rose the number of mortgages.

The financial crisis officially began when Lehman Brothers filed for bankruptcy. Since that moment, the interaction of sectors inside the United States and with other worldwide financial institutions, started a faster dissemination of the crisis, especially to developed

countries. In fact, economies around the world were affected by lack of credit; the solvency of the financial sector had no recognition.

Twelve of the most prestigious financial institutions in the United States could bankrupt, and because of the international spread, other organizations were in the same situation. For the United States, September and October were the worse months of financial crisis

Some actions to confront and overcome the crisis were that the FED reduce to historical levels interest rates in order to generate liquidity in the market, also, provide money to support securities holders with the higher credit score, and by the end of 2008 gave another public guarantee of half billion for the purchase of the assets related to mortgages. Fiscal policies became restrictive in order to control aggregate demand and force a decrease in prices; moreover, several governments announced as a measure, financial rescue packages, and distinctively in the US, a stimulus package was used.

Since these events, a major need of control and regulation of financial institutions arise. New regulations stipulated by international organisms had been followed by developed and emergent countries and example of this regulation are the Basilea agreements.

Chapter 3

3.1 Formal Econometric Model

3.1.1 Model Definition

A model is a simplified representation of reality, when the econometric factor is added, the model relates mathematical and economic aspects trying to understand and represent actuality. Inside every representation exist two types of variables, endogenous and exogenous, the first ones refers to those explained by the model. The second ones are those, which values influence the model from outside.

Mathematics classified models by linear or nonlinear. Linearity implies a function that can be represented as a straight line where two variables are connected with each other. This feature applies to parameters such as variables.

Inside statistics, a model can be used to describe, predict, and elaborate causal analysis. In all cases, the particularity is the relation between variables, namely, observe how a dependent variable is affected by one or more independent variables.

3.1.2 Econometric Models

Econometrics is defined as "the social science in which the tools of economic theory, mathematics, and statistical inference are applied to the analysis of economic phenomena". Goldberger (1964)

Traditional methodologies set the econometric ones based on the following precepts: hypothesis approach, mathematical and econometric model specification, data collection, parameters estimation, hypothesis proof, prediction and model use for the specified purpose.

Econometric models considering the type of information utilized are classified as:

- Models with temporal series or chronological data
- Models with cross section data

Models considering temporal series, observe how the information or perform of the variable behaves along a specific period; or it could also be defined as the values that a variable can take at different times.

On the other hand, cross section focuses on the information provided for different subjects on a given moment. "Cross section are data on one or more variables collected at the same point in time". Gujarati (2009). Another type of database is repeated cross section, which is a set of different cross section information observed at different periods. Finally, panel data or longitudinal, is a subtype of cross section data where same variables are followed through time.

3.1.3 Regression Analysis

"Regression analysis is concerned with the study of the dependence of one variable, the dependent variable, on one or more other variables, the explanatory variables, with a view to estimating and/or predicting the (population) mean or average value of the former in terms of the known or fixed (in repeated sampling) values of the latter". Gujarati (2009).

When only one dependent or explanatory variable is reviewed, the regression analysis is simple, also known as linear regression model of two variables or bivariate model. However, when it implies several more it is known as multiple regression analysis.

Linear regression models are estimated in most of the analysis because when the parameters follow linearity adjust better to explain the model. This kind of model can be used to fit a predictive model to an observed data set, also, can be employed to quantify the strength of the relationship between independent and dependent variables in order to evaluate which ones are no significates or did not contribute to explain the model.

The classical linear regression model arises from the bivariate model where a relation exists between a dependent variable and an independent one; however, the relation is not fully deterministic because it contains a stochastic perturbation.

Numerous methods had been designed for inference and parameter estimation in linear regressions. The main ones are least squares, maximum likelihood, and additionally Bayesian, principal components, quantile, etc. The most common approach employed to estimate linear regression models are least squares method.

3.2 Regression Model with Panel Data

Linear regression models are used either in economics or in finance to explain the behavior and the relationship between variables to solve a problem or to explain a specific topic. "Linear regression's success is owed to two key features: the availability of simple, closed form estimators and the ease and directness of interpretation" (Sheppard, 2013)

As stated before, one of the conventional employed methods to estimate the parameters in a linear model is Least Squares (LS). The main objective in this method is to choose the parameters in such way that minimize the squared sum of the residuals.

In a linear econometric model when several variables are added, becomes a multiple regression model and this expresses the dependent variable as a linear function of the explanatory ones, and an error. Wooldridge (2002) expresses that the error term u can consist of a variety of things, including omitted variables and measurement error.

The multiple regression model could be seen as:

$$y_i = \beta_1 x_{i,1} + \beta_2 x_{i,2} + \beta_3 x_{i,3} + \cdots + \beta_k x_{i,k} + \varepsilon_i \qquad i = 1,2,\dots,n$$

The adjustment by LS consists in choose the estimators vector of β such that the sum of the square residuals could be minimized.

The information recollected to conform databases and that is employed for estimations could be classified in: Cross Section, Time Series, Repeated Cross Section and Panel Data.

A panel database or longitudinal data set contains one or more variables over time for the same individuals or companies. Also, in short, panel data have space as well as time dimensions (Gujarati, 2003)

The advantages of panel data over cross section or time series are listed by Baltagi:

1. Since panel data relate to individuals, firms, states, countries, etc., over time, there is bound to be heterogeneity in these units. The techniques of panel data estimation can take such heterogeneity explicitly into account by allowing for individual-specific variables, as we shall show shortly. We use the term individual in a generic sense to include micro units such as individuals, firms, states, and countries.

2. By combining time series of cross-section observations, panel data give "more informative data, more variability, less collinearity among variables, more degrees of freedom and more efficiency."

3. By studying the repeated cross section of observations, panel data are better suited to study the dynamics of change.

4. Panel data can better detect and measure effects that simply cannot be observed in pure cross-section or pure time series data.

5. Panel data enables us to study more complicated behavioral models.

6. By making data available for several thousand units, panel data can minimize the bias that might result if we aggregate individuals or firms into broad aggregates.

3.3 Model Specification

The database[9] used in this investigation include four years, from 2006 to 2009. This period was selected because one of the main objectives is to observe the relevance of the accounting information previous, during, and after the last economic and financial crisis of 2007-2008. The base is formed by quarterly data obtained from financial statements[10] of the 84 public companies that listed in the Mexican Exchange (BMV[11]) during the observed period[12], same that come from different economic sectors. From all the above there are 336 observations per year.

The variables employed in the model are earnings per share (EPS) and stock returns. The additional variables like current assets, sales, equity, long-term debt, etc., served to estimate financial ratios.

These relations or proportions were selected because companies commonly used them in their own analysis, in order to understand, evaluate and perform corrective actions that help the business to improve. Also, allow investors to observe specific issues of the perform of the company at liquidity, leveraging, and profitability levels.

The financial ratios used in this investigation are:

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[9] The information was obtained from S&P Capital IQ data, Bloomberg and Economatica.
[10] Income Statement, Balance Sheet and Capital Structure Summary
[11] Bolsa Mexicana de Valores
[12] Financial Institutions like banks, insurance, brokerages and landlords will be treated apart in further investigation, because the information as reported, were not the same as the other companies, for so, comparison between enterprises became difficult

Table 1

Profitability	Earnings Per Shares (EPS)	Is a measure to which management and shareholders observe because it is used to valuate common stocks, determine changes in EPS over a period of time, and serves as the basis to set corporate objectives and goals. EPS are announced in the financial statements. Also, is the standard to compare financial results of public companies
	Net Income/Sales[13]	Represents the management's ability to operate the business profitability. This percentage is used to determine the proportion of income derived from all operating, financing, and other activities that an entity has engaged in during an accounting period
	Earnings Before Taxes/Total Worth	Indicates stockholders earnings before taxes will be paid. It can be interpreted as how much is the enterprise earning for each monetary unit they had invested
Liquidity	Current Assets/Current Liabilities	Shows the safety of current debt holders claims in case of default
	Cash Flow From Operation/Total Assets	The cash flow from operations ratio can be used to determine the extent to which cash flows differs from the reported level of either operating income or net income
Capital Structure	Long Term Liabilities/Shareholders Equity	Creditors investors, commonly use this ratio when have a need to observe if the company is going to finance their operations with debt

---

[13] Sales also found in many books and materials as Revenue

		and not with equity. A high ratio indicates high risk of default[14]
Debt Service Coverage	Earnings Before Taxes/Interests	Represents how much earnings has the company before interests' deduction with respect of total income. EBT acts like an indicator of the company performance
Turnover	Sales/Total Assets	Measures the capability and efficiency of the company to generate sales from the use of its assets
	Sales/Accounts Receivables	One of the main problems of the companies when granting credit is to transform in a short period that credit into money. This ratio allows companies to take decisions about accounts receivable turnover, this means deduce the time of collection
	Cost of goods/Inventory	Inventory represents in most of the cases one of the biggest accounts inside working capital. Also it is one of the lowest liquidity accounts of the current assets. This measure help to observe if there are gradual reductions in the rate of turnover which can help managers, directors, etc., to take corrective/preventive actions required to diminish an excess in the stock of inventories

Source: Own design using information from Helfert (2003) and Bragg (2002)

An important quotation is to notice that EPS and stock returns were deflated by the price of the stock at the beginning of the period, in order to maintain variables at real values.

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[14] Some authors like Bragg (2002) refers that this ratio can exclude situations where short term debt, like revolving credit lines cannot be paid off in the short term and most eventually be converted into long term debt, increasing its amount.

Chapter 4

4.1 Estimation Model Methodology

Based on previous research by Riahi-Belkaoui (1998), the first estimation model was defined. As discussed earlier, the first stage of the analysis consists in the gathering of the financial fundamentals of 84 companies that are publicly listed on the Mexican stock exchange. This assures us the veracity of the financial data, since these companies must comply with the international regulations of financial information reporting (IFRS[15]) and the Mexican financial information standards (NIF[16]).

The data gathered consists of quarterly reports from 2006 to 2009, in order to capture the full scope of the financial crisis the world faced during the first decade of the twenty first century. This information was compiled on several databases in order to make the statistical analysis easier; each database corresponds to a specific quarter of each year and lists the specific fundamentals the analysis will require.

The first part of the analysis consisted of running a least squares regression using quarterly stock returns of each share, against the change in earnings per share recorded in every period, both of this variables were deflected by the beginning of the period stock price (as in the model of Riahi-Belkaoui).

$$R_i = \alpha_i + \beta \Delta E_i + U_i \qquad (1)$$

Where:

R_i= Quarterly sotck returns of firm i

ΔE_i= Quarterly change in earnings per share excluding extraordinary items

i = Number of firms

---

[15] International Financial Reporting Standards, published by the International Accounting Standards Board
[16] Normas de Información Financiera, emitted by the CINIF

Many researchers considered that earnings is the fundamental variable to explain any change in stocks prices and as consequence its returns. The logic back to this is that companies measure its profitability with this account and thus take decisions.

Normality tests were executed to assess if the model was correctly specified. Also, different tests were performed to review if the residual estimated variance of a regression depends on the values of the independent variables. Particularly the Breusch-Pagan test was designed to detect any linear form of heteroskedasticity.

After these tests were run, the model was corrected in accordance with theory using the robust error methodology, trying to amend possible heteroskedasticity since the subject of this study presents a wide range of variances that can be attributed to the size of the firms analyzed. This method is widely accepted to correct this kind of mismatch on the data scales and will be used in order to expand the scope of the ordinary least squares error regression used in the analysis.

Performing a deeply review inside statements and the daily analysis and operation of companies, it can be detected that there are some other factors that could explain the stock returns of the firms. Thus, a new model was constructed; it includes the proposed ratios calculated with the obtained data from their financial statements. This model utilized panel data.

$$R_i = \alpha_i + \beta_1 x_{1,j,i} + \beta_2 x_{2,j,i} + \cdots + \beta_n x_{n,j\,i} + U_i \tag{2}$$

Where:

$X_{n,j,i}$ = Fundamental signals proposed as financial ratios for each firm, j=1,...,10

The decision of taking panel data is that due to the nature of the information the model and by consequence, the estimations become more consistent.

Before the regression analysis was conducted, the data underwent normality tests to ensure there were no problems regarding this matter. As commented before, the data was obtained from financial statements (Balance sheet and Income Statement) of each of the 84 companies considered in the study. After that, ratios were estimated with the purpose to have all variables expressed in the model not as numbers but as ratios, this procedure helps to compare information and also, will be used to explain the value and performance of a company through the period.

As general aspects, it was found no statistically significant evidence of multicollinearity and autocorrelation; this allowed the rest of the analysis to be conducted in a regular approach. After the process, the results faced a series of tests to determine if the model presents heteroskedasticity or autocorrelation problems.

4.2 Results

For the first defined equation, as indicated cross sectional regressions were estimated for each quarter of every year of the defined period. To ensure that the model is the well constructed for a normal distribution and that it contains the best estimators, normality tests were executed[17].

2006

Quarter 1

First regression model

```
reg  rtoaccionesdeflactado anualchangeinepsdeflactado;
```

Source	SS	df	MS		Number of obs =	80
					F(1, 78) =	1.72
Model	.208763617	1	.208763617		Prob > F =	0.1937
Residual	9.47556342	78	.121481582		R-squared =	0.0216
					Adj R-squared =	0.0090
Total	9.68432703	79	.122586418		Root MSE =	.34854

rtoaccionesdeflactado	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
anualchangeinepsdeflactado	.0114071	.0087017	1.31	0.194	-.0059166	.0287308
_cons	.0214792	.0391166	0.55	0.584	-.0563959	.0993543

```
. hettest;

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
        Ho: Constant variance
        Variables: fitted values of rtoaccionesdeflactado

        chi2(1)      =     0.04
        Prob > chi2  =   0.8389
```

Correction test

```
. reg rtoaccionesdeflactado anualchangeinepsdeflactado, robust;
```

Linear regression				Number of obs =	80
				F(1, 78) =	4.49
				Prob > F =	0.0373
				R-squared =	0.0216
				Root MSE =	.34854

rtoaccionesdeflactado	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
anualchangeinepsdeflactado	.0114071	.0053831	2.12	0.037	.0006903	.0221239
_cons	.0214792	.0389156	0.55	0.583	-.0559958	.0989543

---

[17] For more detailed analysis, the normality tests are shown in the Appendix 1

Quarter 2

First regression model

```
reg  rtoaccionesdeflactado anualchangeinepsdeflactado;
```

Source	SS	df	MS		Number of obs =	81
					F(1, 79) =	0.09
Model	.008011893	1	.008011893		Prob > F =	0.7595
Residual	6.70765094	79	.084906974		R-squared =	0.0012
					Adj R-squared =	-0.0115
Total	6.71566284	80	.083945785		Root MSE =	.29139

rtoaccionesdeflactado	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
anualchangeinepsdeflactado	.0028803	.0093764	0.31	0.760	-.015783	.0215435
_cons	-.0922448	.0324118	-2.85	0.006	-.1567589	-.0277338

```
. hettest;
```

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
        Ho: Constant variance
        Variables: fitted values of rtoaccionesdeflactado

        chi2(1)      =      1.18
        Prob > chi2  =    0.2783
```

Correction test

```
. reg rtoaccionesdeflactado anualchangeinepsdeflactado, robust;
```

Linear regression		Number of obs =	81
		F(1, 79) =	0.24
		Prob > F =	0.6271
		R-squared =	0.0012
		Root MSE =	.29139

rtoaccionesdeflactado	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
anualchangeinepsdeflactado	.0028803	.0059061	0.49	0.627	-.0088756	.0146361
_cons	-.0922448	.0321317	-2.87	0.005	-.1562014	-.0282883

Quarter 3

First regression model

```
reg  rtoaccionesdeflactado anualchangeinepsdeflactado;
```

Source	SS	df	MS
Model	.10988964	1	.10988964
Residual	7.20779252	80	.090097406
Total	7.31768216	81	.090341755

```
Number of obs =      82
F( 1,    80) =    1.22
Prob > F      =  0.2727
R-squared     =  0.0150
Adj R-squared =  0.0027
Root MSE      =  .30016
```

rtoaccionesdeflactado	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
anualchangeinepsdeflactado	.015617	.0141409	1.10	0.273	-.0125242	.0437532
_cons	.1206313	.0347157	3.47	0.001	.0515449	.1897177

```
. hettest;

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of rtoaccionesdeflactado

         chi2(1)      =     2.29
         Prob > chi2  =   0.1299
```

Correction test

```
. reg rtoaccionesdeflactado anualchangeinepsdeflactado, robust;

Linear regression
```

```
Number of obs =      82
F( 1,    80) =    4.49
Prob > F      =  0.0372
R-squared     =  0.0150
Root MSE      =  .30016
```

rtoaccionesdeflactado	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
anualchangeinepsdeflactado	.015617	.0073719	2.12	0.037	.0009465	.0302875
_cons	.1206313	.0359089	3.36	0.001	.0491703	.1920923

```
. reg rtoaccionesdeflactado sumvar;
```

Source	SS	df	MS
Model	.786320175	1	.786320175
Residual	6.53135398	80	.081641925
Total	7.31768216	81	.090341755

```
Number of obs =      82
F( 1,    80) =    9.63
Prob > F      =  0.0026
R-squared     =  0.1075
Adj R-squared =  0.0963
Root MSE      =  .28573
```

rtoaccione~o	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
sumvar	-.0003592	.0001157	-3.10	0.003	-.0005895	-.0001289
_cons	.1233718	.0318806	3.87	0.000	.0599274	.1868163

```
. hettest;

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of rtoaccionesdeflactado

         chi2(1)      =     0.24
         Prob > chi2  =   0.6232
```

Quarter 4

First regression model

```
reg  rtoaccionesdeflactado anualchangeinepsdeflactado;
```

Source	SS	df	MS			
Model	.026044156	1	.026044156	Number of obs =	82	
Residual	3.54588514	80	.044323564	F(1, 80) =	0.59	
				Prob > F =	0.4456	
				R-squared =	0.0073	
				Adj R-squared =	-0.0051	
Total	3.57192929	81	.044097893	Root MSE =	.21053	

rtoaccionesdeflactado	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
anualchangeinepsdeflactado	-.0078181	.0101991	-0.77	0.446	-.028115	.0124738
_cons	.1412931	.0234276	6.03	0.000	.0946706	.1879156

```
. hettest;
```

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
        Ho: Constant variance
        Variables: fitted values of rtoaccionesdeflactado

        chi2(1)   =   0.45
        Prob > chi2 =   0.5014

Correction test

```
. reg rtoaccionesdeflactado anualchangeinepsdeflactado, robust;
```

Linear regression

				Number of obs =	82
				F(1, 80) =	1.37
				Prob > F =	0.2444
				R-squared =	0.0073
				Root MSE =	.21053

rtoaccionesdeflactado	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
anualchangeinepsdeflactado	-.0078181	.0066673	-1.17	0.244	-.0210865	.0054503
_cons	.1412931	.0236257	5.98	0.000	.0942765	.1883097

```
. reg rtoaccionesdeflactado sumvar;
```

Source	SS	df	MS			
Model	.015983898	1	.015983898	Number of obs =	80	
Residual	3.48004697	78	.044615987	F(1, 78) =	0.36	
				Prob > F =	0.5512	
				R-squared =	0.0046	
				Adj R-squared =	-0.0082	
Total	3.49603887	79	.044253555	Root MSE =	.21122	

rtoaccione~o	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
sumvar	.0000463	.0000773	0.60	0.551	-.0001077	.0002003
_cons	.1399921	.024199	5.79	0.000	.0918156	.1881686

```
. hettest;
```

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
        Ho: Constant variance
        Variables: fitted values of rtoaccionesdeflactado

        chi2(1)   =   1.42
        Prob > chi2 =   0.2341

The results obtained for the year 2006 reveal that almost in all quarters analyzed the first estimation had no significance, due such condition additional tests had to be done in order to correct the model. After running the Breusch-Pagan test, the null hypothesis is that homogeneousness of the variance of the residuals exists, and so, in the first quarter the null hypothesis is accepted, second, third and fourth quarters do no present heteroskedasticity problems. Nevertheless, to precise the model, the robust error method was executed and the results obtained seem to work correctly and the models ran using this method showed far more significance levels and better confidence intervals except in the second and last quarter.

2007

Quarter 1

First regression model

```
reg  rtoaccionesdeflactado anualchangeinepsdeflactado;
```

Source	SS	df	MS		Number of obs =	83
					F(1, 81) =	0.21
Model	.016598851	1	.016598851		Prob > F =	0.6468
Residual	6.35757444	81	.078488573		R-squared =	0.0026
					Adj R-squared =	-0.0097
Total	6.37417329	82	.077733821		Root MSE =	.28016

rtoaccionesdeflactado	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
anualchangeinepsdeflactado	.0035518	.0077235	0.46	0.647	-.0118155	.0189191
_cons	-.1092058	.0314726	-3.47	0.001	-.1718265	-.0465851

```
. hettest;

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
        Ho: Constant variance
        Variables: fitted values of rtoaccionesdeflactado

        chi2(1)      =      0.30
        Prob > chi2  =    0.5808
```

Correction test

```
. reg rtoaccionesdeflactado anualchangeinepsdeflactado, robust;
```

Linear regression		Number of obs =	83
		F(1, 81) =	0.85
		Prob > F =	0.3583
		R-squared =	0.0026
		Root MSE =	.28016

rtoaccionesdeflactado	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
anualchangeinepsdeflactado	.0035518	.0038447	0.92	0.358	-.004098	.0112016
_cons	-.1092058	.0314974	-3.47	0.001	-.1718757	-.046536

Quarter 2

First regression model

```
reg  rtoaccionesdeflactado anualchangeinepsdeflactado;
```

Source	SS	df	MS
Model	.001929512	1	.001929512
Residual	8.39073119	82	.10232599
Total	8.39266071	83	.101116394

Number of obs =	84
F(1, 82) =	0.02
Prob > F =	8.8911
R-squared =	8.0002
Adj R-squared =	-8.0120
Root MSE =	.31980

rtoaccionesdeflactado	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
anualchangeinepsdeflactado	-.0011156	.0081242	-0.14	0.891	-.0172772	.015046
_cons	-.0623834	.0350193	-1.78	0.079	-.132048	.0072813

```
. hettest;

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
        Ho: Constant variance
        Variables: fitted values of rtoaccionesdeflactado

        chi2(1)     =     9.19
        Prob > chi2 =   0.0024
```

Correction test

```
. reg rtoaccionesdeflactado anualchangeinepsdeflactado, robust;
```

Linear regression		
Number of obs =	84
F(1, 82) =	0.04
Prob > F =	0.8387
R-squared =	0.0002
Root MSE =	.31980

rtoaccionesdeflactado	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
anualchangeinepsdeflactado	-.0011156	.0054642	-0.20	0.839	-.0119856	.0097543
_cons	-.0623834	.0362669	-1.72	0.089	-.1345297	.009763

Quarter 3

First regression model

```
reg  rtoaccionesdeflactado anualchangeinepsdeflactado;
```

Source	SS	df	MS
Model	.003097306	1	.003097306
Residual	7.39058728	80	.092382341
Total	7.39368459	81	.091280057

```
Number of obs =      82
F( 1,    80) =    0.03
Prob > F      = 0.8552
R-squared     = 0.0004
Adj R-squared = -0.0121
Root MSE      = .30394
```

rtoaccionesdeflactado	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]
anualchangeinepsdeflactado	.0011813	.0064513	0.18	0.855	-.0116572	.0140197
_cons	-.0605961	.0336258	-1.80	0.075	-.1275136	.0063214

```
. hettest;

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
        Ho: Constant variance
        Variables: fitted values of rtoaccionesdeflactado

        chi2(1)       =     0.04
        Prob > chi2   =   0.8451
```

Correction test

```
. reg rtoaccionesdeflactado anualchangeinepsdeflactado, robust;
```

```
Linear regression                        Number of obs =      82
                                         F( 1,    80) =    0.54
                                         Prob > F      = 0.4632
                                         R-squared     = 0.0004
                                         Root MSE      = .30394
```

rtoaccionesdeflactado	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]
anualchangeinepsdeflactado	.0011813	.0016025	0.74	0.463	-.0020077	.0043732
_cons	-.0605961	.0336304	-1.80	0.075	-.1275227	.0063335

Quarter 4

First regression model

```
reg  rtoaccionesdeflactado  anualchangeinepsdeflactado;
```

Source	SS	df	MS
Model	.572982894	1	.572982894
Residual	5.44617271	82	.06641674
Total	6.0191556	83	.072519947

```
Number of obs =      84
F(  1,     82) =    8.63
Prob > F      =  0.0043
R-squared     =  0.0952
Adj R-squared =  0.0842
Root MSE      =  .25771
```

rtoaccionesdeflactado	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]
anualchangeinepsdeflactado	.0204422	.0069598	2.94	0.004	.006597	.0342874
_cons	-.0075746	.0281214	-0.27	0.788	-.063517	.0483678

```
. hettest;

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of rtoaccionesdeflactado

         chi2(1)       =     8.51
         Prob > chi2   =   0.0035
```

Correction test

```
. reg rtoaccionesdeflactado anualchangeinepsdeflactado, robust;
```

```
Linear regression                          Number of obs =      84
                                           F(  1,     82) =    2.55
                                           Prob > F      =  0.1145
                                           R-squared     =  0.0952
                                           Root MSE      =  .25771
```

rtoaccionesdeflactado	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]
anualchangeinepsdeflactado	.0204422	.0128125	1.60	0.114	-.005046	.0459303
_cons	-.0075746	.0279602	-0.27	0.787	-.0631964	.0480472

For 2007 in the first three quarters of the model, change in earnings per share started to fall in its capacity to explain stocks returns, only the last quarter could explain them. In the first quarter the sign of the coefficient is negative, indicating that it does not explain stock returns, but its coefficient and t statistic are also not significant.

Second and third semesters, had positively coefficients as expected but are not relevant due to its statistics. Finally, the last semester when the crisis started is the only one that contributes.

2008

The world experienced the height of the financial crisis during 2008; the data gathered for this period along with the proposed models fail to explain the returns per share of the firms studied. The results for this period, using the changes in earnings per share fail to give statistically relevant results and lose relevance in this period; this shows the interaction between the financial information and the economic environment more clearly.

Quarter 1

First regression model

. reg rtoaccionesdeflactado anualchangeinepsdeflactado;

Source	SS	df	MS		Number of obs =	84
					F(1, 82) =	3.17
Model	.584152566	1	.584152566		Prob > F =	0.0789
Residual	15.1281947	82	.184490179		R-squared =	0.0372
					Adj R-squared =	0.0254
Total	15.7123473	83	.189305389		Root MSE =	.42952

rtoaccionesdeflactado	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
anualchangeinepsdeflactado	-.0194905	.0109533	-1.78	0.079	-.0412802	.0022992
_cons	-.0440828	.0470692	-0.94	0.352	-.1377184	.0495529

. hettest;

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
        Ho: Constant variance
        Variables: fitted values of rtoaccionesdeflactado

        chi2(1)   =   3.19
        Prob > chi2 =   0.0741

Correction test

. reg rtoaccionesdeflactado anualchangeinepsdeflactado, robust;

Linear regression				Number of obs =	84
				F(1, 82) =	3.79
				Prob > F =	0.0551
				R-squared =	0.0372
				Root MSE =	.42952

rtoaccionesdeflactado	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
anualchangeinepsdeflactado	-.0194905	.0100152	-1.95	0.055	-.0394139	.0004329
_cons	-.0440828	.0458168	-0.96	0.339	-.135227	.0470615

Quarter 2

First regression model

```
reg  rtoaccionesdeflactado anualchangeinepsdeflactado;
```

Source	SS	df	MS		Number of obs =	84
					F(1, 82) =	1.04
Model	.13399918	1	.13399918		Prob > F =	0.3115
Residual	10.5950555	82	.129207994		R-squared =	0.0125
					Adj R-squared =	0.0004
Total	10.7290547	83	.129265719		Root MSE =	.35946

rtoaccionesdeflactado	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
anualchangeinepsdeflactado	.0089773	.0088153	1.02	0.311	-.0085592	.0265238
_cons	.0217825	.0395195	0.55	0.583	-.0568344	.1003995

```
. hettest;

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
        Ho: Constant variance
        Variables: fitted values of rtoaccionesdeflactado

        chi2(1)      =     1.08
        Prob > chi2  =   0.2994
```

Correction test

```
. reg rtoaccionesdeflactado anualchangeinepsdeflactado, robust;
```

Linear regression		Number of obs =	84
		F(1, 82) =	2.72
		Prob > F =	0.1030
		R-squared =	0.0125
		Root MSE =	.35946

rtoaccionesdeflactado	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
anualchangeinepsdeflactado	.0089773	.0054445	1.65	0.103	-.0018535	.0198081
_cons	.0217825	.038551	0.57	0.574	-.0549076	.0984727

Quarter 3

First regression model

```
reg  rtoaccionesdeflactado anualchangeinepsdeflactado;
```

Source	SS	df	MS			
				Number of obs =	84	
				F(1, 82) =	0.49	
Model	.089925042	1	.089925042	Prob > F =	0.4881	
Residual	15.1984514	82	.185346968	R-squared =	0.0059	
				Adj R-squared =	-0.0062	
Total	15.2883764	83	.184197307	Root MSE =	.43052	

rtoaccionesdeflactado	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
anualchangeinepsdeflactado	.0059572	.0085526	0.70	0.488	-.0110566	.022971
_cons	-.1810723	.0480164	-3.77	0.000	-.2765923	-.0855523

```
. hettest;

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
        Ho: Constant variance
        Variables: fitted values of rtoaccionesdeflactado

        chi2(1)      =      0.37
        Prob > chi2  =    0.5417
```

Correction test

```
. reg rtoaccionesdeflactado anualchangeinepsdeflactado, robust;
```

Linear regression						
				Number of obs =	84	
				F(1, 82) =	2.25	
				Prob > F =	0.1377	
				R-squared =	0.0059	
				Root MSE =	.43052	

rtoaccionesdeflactado	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
anualchangeinepsdeflactado	.0059572	.0039737	1.50	0.138	-.0019478	.0138623
_cons	-.1810723	.0481244	-3.76	0.000	-.276807	-.0853376

Quarter 4

First regression model

```
reg  rtoaccionesdeflactado anualchangeinepsdeflactado;
```

Source	SS	df	MS
Model	.023644128	1	.023644128
Residual	11.6047333	81	.143268312
Total	11.6283774	82	.141809481

```
Number of obs =      83
F(  1,    81) =    0.17
Prob > F      =  0.6856
R-squared     =  0.0020
Adj R-squared = -0.0103
Root MSE      =  .37851
```

rtoaccionesdeflactado	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
anualchangeinepsdeflactado	.0000155	.0000383	0.41	0.686	-.0000606	.0000916
_cons	-.0474935	.0417882	-1.14	0.259	-.1306388	.0356519

```
. hettest;

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
        Ho: Constant variance
        Variables: fitted values of rtoaccionesdeflactado

        chi2(1)      =      0.49
        Prob > chi2  =    0.4826
```

Correction test

```
. reg rtoaccionesdeflactado anualchangeinepsdeflactado, robust;

Linear regression                          Number of obs =      83
                                           F(  1,    81) =   13.48
                                           Prob > F      =  0.0004
                                           R-squared     =  0.0020
                                           Root MSE      =  .37851
```

rtoaccionesdeflactado	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
anualchangeinepsdeflactado	.0000155	4.23e-06	3.67	0.000	7.12e-06	.000024
_cons	-.0474935	.0420357	-1.13	0.262	-.1311314	.0361445

2009

For the 2009 period, the results remain mixed; the effects of the crisis could still be felt after 2008. Except for a recover observed in the first quarter, the rest of the periods are not significant, so, annual change in earnings per share cannot be representatives or do not have impact in the stocks returns.

Quarter 1

First regression model

```
reg  rtoaccionesdeflactado anualchangeinepsdeflactado;
```

Source	SS	df	MS		
Model	.640256066	1	.640256066		
Residual	14.6679659	81	.181085999		
Total	15.308222	82	.186685634		

```
                                    Number of obs =      83
                                    F( 1,    81) =    3.54
                                    Prob > F      =  0.0637
                                    R-squared     =  0.0418
                                    Adj R-squared =  0.0300
                                    Root MSE      =  .42554
```

rtoaccionesdeflactado	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
anualchangeinepsdeflactado	.0020459	.0010881	1.88	0.064	-.000119	.0042109
_cons	.0938974	.0468230	2.01	0.048	.0007327	.1870622

```
. hettest;

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of rtoaccionesdeflactado

         chi2(1)      =    12.87
         Prob > chi2  =   0.0003
```

Correction test

```
. reg rtoaccionesdeflactado anualchangeinepsdeflactado, robust;

Linear regression                       Number of obs =      83
                                        F( 1,    81) =    0.60
                                        Prob > F      =  0.4396
                                        R-squared     =  0.0418
                                        Root MSE      =  .42554
```

rtoaccionesdeflactado	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
anualchangeinepsdeflactado	.0020459	.0026342	0.78	0.440	-.0031953	.0072871
_cons	.0938974	.0491409	1.91	0.060	-.0038775	.1916723

Quarter 2

First regression model

```
.  reg  rtoaccionesdeflactado anualchangeinepsdeflactado;
```

Source	SS	df	MS			
Model	.060845587	1	.060845587	Number of obs =		81
Residual	12.6610638	79	.16026663	F(1, 79) =		0.38
				Prob > F	=	0.5396
				R-squared	=	0.0048
				Adj R-squared =		-0.0078
Total	12.7219094	80	.159023867	Root MSE	=	.40033

rtoaccionesdeflactado	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
anualchangeinepsdeflactado	.0025238	.004096	0.62	0.540	-.0056291	.0106766
_cons	.2853834	.0449673	6.35	0.000	.1958782	.3748886

```
. hettest;
```

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
        Ho: Constant variance
        Variables: fitted values of rtoaccionesdeflactado

        chi2(1)     =      0.53
        Prob > chi2 =    0.4682
```

Correction test

```
. reg rtoaccionesdeflactado anualchangeinepsdeflactado, robust;
```

Linear regression

```
Number of obs =      81
F( 1,    79) =    1.17
Prob > F     = 0.2833
R-squared    = 0.0048
Root MSE     = .40033
```

rtoaccionesdeflactado	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
anualchangeinepsdeflactado	.0025238	.0023363	1.08	0.283	-.0021265	.007174
_cons	.2853834	.0453827	6.29	0.000	.1950515	.3757154

Quarter 3

First regression model

```
.  reg  rtoaccionesdeflactado anualchangeinepsdeflactado;
```

Source	SS	df	MS		
Model	.022944741	1	.022944741		
Residual	7.011825	80	.087647813		
Total	7.03476974	81	.086849009		

```
Number of obs =      82
F(  1,     80) =    0.26
Prob > F       =  0.6103
R-squared      =  0.0033
Adj R-squared  = -0.0092
Root MSE       =  .29605
```

rtoaccionesdeflactado	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]
anualchangeinepsdeflactado	.0011081	.0021658	0.51	0.610	-.003202 .0054183
_cons	-.0559996	.0327671	-1.71	0.091	-.1212082 .009209

```
. hettest;

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
        Ho: Constant variance
        Variables: fitted values of rtoaccionesdeflactado

        chi2(1)      =      7.05
        Prob > chi2  =    0.0079
```

Correction test

```
. reg rtoaccionesdeflactado anualchangeinepsdeflactado, robust;

Linear regression
```

```
Number of obs =      82
F(  1,     80) =    0.27
Prob > F       =  0.6080
R-squared      =  0.0033
Root MSE       =  .29605
```

rtoaccionesdeflactado	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]
anualchangeinepsdeflactado	.0011081	.0021522	0.51	0.608	-.0031740 .0053911
_cons	-.0559996	.0336613	-1.66	0.100	-.1229877 .0109884

Quarter 4

First regression model

```
reg  rtoaccionesdeflactado anualchangeinepsdeflactado;
```

Source	SS	df	MS		
Model	.023474270	1	.023474270		
Residual	4.29017771	80	.053627221		
Total	4.31365199	81	.053254963		

Number of obs =	82
F(1, 80) =	0.44
Prob > F =	0.5101
R-squared =	0.0054
Adj R-squared =	-0.0070
Root MSE =	.23150

rtoaccionesdeflactado	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
anualchangeinepsdeflactado	.0019958	.0030166	0.66	0.510	-.0040074	.007999
_cons	-.011583	.0257777	-0.45	0.654	-.0628822	.0397162

```
. hettest;
```

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
        Ho: Constant variance
        Variables: fitted values of rtoaccionesdeflactado

        chi2(1)   =   0.64
        Prob > chi2 =   0.4229

Correction test

```
. reg rtoaccionesdeflactado anualchangeinepsdeflactado, robust;
```

Linear regression

Number of obs =	82
F(1, 80) =	0.59
Prob > F =	0.4453
R-squared =	0.0054
Root MSE =	.23150

rtoaccionesdeflactado	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
anualchangeinepsdeflactado	.0019958	.0026019	0.77	0.445	-.0031821	.0071738
_cons	-.011583	.0253192	-0.46	0.649	-.0619697	.0388037

Second regression model

The second estimated regression considered the whole database as a panel. This analysis explained the effects or impact that all the defined ratios must have in the stock returns and observe if this information could be more representative that only using earnings per share as the first model. As in the first one, normality test were performed, and after getting the results, heteroskedasticity and multicollinearity test were also executed, and the outcomes were no presence of any of them.

Profitability, liquidity, capital structure, debt service coverage and turnover are the categories in which the ratios are classified. Three different models were estimated.

The first one (TOTAL), considered the eleven selected ratios. As it can be observed in Table 2, only six of this ratios: Cash Flow From Operation/Total Assets (CFFOTA[18]), Cost of Goods/Inventory (COFGINV), Earnings Before Taxes/Interests (EBTI), Earnings Before Taxes/Total Worth (EBTTOTALWORTH), Sales/Total Assets (SALESTA) and Sales/Accounts Receivables (SALEACREC) are significant according to statistic t. Different from model one, annual change in earnings per share is not significant when more variables are added to the model. In general, the R^2 shows low values. As expected, the signals of Current Assets/Current Liabilities (CACL), Cost of Goods/Inventory (COFGINV) and Long Term Liabilities/Stockholder's Equity (LTLSE) are negative. In addition, Earnings per Share (EPS), EBTTOTALWORTH and Net Income/Sales (NETINCSAL) are positive. Finally, the rest of the ratios by its nature could have positive or negative coefficients.

Model 2 was restricted by considering only seven ratios. The interesting point of this is that CFFOTA, COFGIVN, EBTI, EBTTOTOTALWORTH, SALEACREC and SALESTA are still significant, consistent with M1 and the coefficients behave in the same way.

---

[18] Own abbreviations for simplicity to work in econometric programs

In models M3 and M4 same results are observed, with the specified variables the conclusions are consistent, they are statistical significant and the coefficients have the proper sign to explain the model.

These selected variables in the four models, act the same to explain how they have a positive or a negative impact in stock returns.

In addition, an extra factor was added, an exogenous variable was introduced to the econometric model estimation in order to help to explain the effects of changing economic conditions and its impact on the financial information and if this lose its relevance during a crisis period. Again, the eleven ratios were used to make the estimation and we could observe in the results that the exogenous shocks (dummy variable) are statistically significant and they influence in a negative form to stock returns.

The t statistic values achieved in this period show a better performance for the use of more robust financial information for crucial decision-making processes, since they remain relevant longer and with less problems of specificity. Mainly because fundamentals are proportions that summarize financial information of the firm and are less prone to be affected by changes in the size of the firms and their specific sectors.

Table 2

Estimation Output Results from Panel Data Regressions

	M1-TOTAL	M2	M3	M4	M5
C	0.019403 (0.777706)	0.016253 (0.936814)	0.016591 (0.974148)	-0.006345 (-0.343541)	0.041442 (1.61448)
ANCHEPS	0.00000249 (0.021114)				0.0000179 (0.152178)
CACL	-0.000393 (-0.070822)				-0.000586 (-0.106183)
CFFOTA	0.211684 (1.007912)	0.222738 (1.068196)			1.061137 (0.221922)
COFGINV	-0.000103 (-1.034003)	-0.000105 (-1.076856)		-0.00011 (-1.102327)	-0.000111 (-1.108877)
EBTI	0.000311 (3.593096)	0.000311 (3.611672)	0.00031 (3.603943)	0.000292 (3.392108)	0.000303 (3.524858)
EBTTOTALWORTH	0.192214 (2.743993)	0.187307 (2.777403)	0.18936 (2.819434)		0.17648 (2.524617)
EPS	0.000116 (0.086015)				-0.0000102 (-0.007629)
LTLSE	-0.00342 (-0.20903)				-0.002171 (-0.133258)
NETINCSAL	-0.000000144 (-0.001559)				0.00000591 (0.064218)
SALEACREC	0.000714 (1.099651)	0.000736 (1.153294)			0.000647 (0.999722)
SALESTA	-0.133126 (-1.950153)	-0.130682 (-1.982501)	-0.094981 (-1.555547)		-0.129206 (-1.900839)
EXSH	-	-	-	-	-0.07009 (-3.36476)
R-squared	0.018315	0.01823	0.015443	0.009872	0.026758

Source: Own

Conclusions

After this analysis, we can conclude that more complex financial data seems to react better to macroeconomic downturns and recoveries, this giving a superior advantage over more simplified methods of analysis with little marginal costs in computation time, power, and data manipulation.

Financial ratios represent a better way to explain any change in stock returns that only the use of earnings, the main reason is because they summarize the daily operation of the enterprise and thus if an external eventuality like an exogenous shock appears in the economy, this ratios can advertise quickly than earnings about this variations. For example, a rise in the interest rates will affect the company directly on its long-term debts, if there is a recession sales and accounts receivables may have variations because people have less money to buy or cannot pay their loans. If a company is an importer a rise in the exchange rate will influence and it cost of goods will increase.

Therefore, considering this variables contribute more to the objective of this research. Even with the loss of confidence for both models, the proposed panel of financial ratios reacts earlier to the effects of the crisis; this gives this an advantage for the use of the more complex data to make better decisions during difficult financial scenarios.

A proposed refinement for this model can be found using the test that Chow (1960) proposed in order to determine the possibility of pooling similar data, the Chow test is an statistical and econometric test of whether the coefficients in two linear regressions on different data sets are equal. This method requires testing a series of statistical parameters to assess whether or not data is structurally stable across periods or sections.

Further research could be conducted; it can be compared with other countries in the same or a different period, between sectors, firms, etc.

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