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# Assessment of the Performance of Ethiopian Financial and Economic Environment

By Abebaw Kassie

*University of Gondar, Ethiopia*

*Abstract-* The financial system plays a pivotal role in economic activities in any country. Thus it is vital to determine the status and assess the financial health of the financial system and take corrective policy measures continuously. The objective of the paper is to evaluate the status of financial and banking system in Ethiopia. Descriptive statistical tools like percentages, growth rates, mean values and comparisons using ANOVA and Kruskal-Wallis tests have been used. Ethiopian financial sector in general and the Banking Sector in particular is performing well from year to year in terms of assets, deposits, loans and equities owned in the study period. Financial intermediation has increased during the study period as measured by Total Financial Assets to GDP, Financial System Deposits to GDP, Loans to GDP and Loans to Deposits. Ethiopia can be characterized as a least developed economy registering highest rate of economic growth. The financial sector is not that much developed in Ethiopia. Hence, the financial system needs to be developed to support the economy well.

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# Assessment of the Performance of Ethiopian Financial and Economic Environment

Abebew Kassie

**Abstract-** The financial system plays a pivotal role in economic activities in any country. Thus it is vital to determine the status and assess the financial health of the financial system and take corrective policy measures continuously. The objective of the paper is to evaluate the status of financial and banking system in Ethiopia. Descriptive statistical tools like percentages, growth rates, mean values and comparisons using ANOVA and Kruskal-Wallis tests have been used. Ethiopian financial sector in general and the Banking Sector in particular is performing well from year to year in terms of assets, deposits, loans and equities owned in the study period. Financial intermediation has increased during the study period as measured by Total Financial Assets to GDP, Financial System Deposits to GDP, Loans to GDP and Loans to Deposits. Ethiopia can be characterized as a least developed economy registering highest rate of economic growth. The financial sector is not that much developed in Ethiopia. Hence, the financial system needs to be developed to support the economy well.

## I. INTRODUCTION

The financial system plays a pivotal role in economic activities in any country. Thus it is vital to determine the status and assess the financial health of the financial system and take corrective policy measures continuously. This study aims at evaluating the status of financial and banking system in Ethiopia.

Ethiopia is the second most populous Sub-Saharan African country with estimated population of 91,730,000 (The World Bank, 2012). Ethiopia's economy is based on agriculture, which accounts for 46% of GDP and 85% of total employment (The Fact Book, 2012). Basically the financial system of Ethiopia constitutes banks, insurance companies and microfinance institutions. The financial system is growing in terms of number of banks, insurance companies and microfinance institutions and their branches during the study period dramatically especially with the private sector category.

The Ethiopian financial system is bank dominated which is reflected in terms of share of assets (around 95 percent), deposits (97 percent), loans and advances (94 percent) and equity (77 percent) of the financial sector on average. The absolute size of the banking sector is increasing dramatically from year to year in terms of assets, deposits, loans and equities owned. However, its relative dominance is getting

reduced marginally in the study period. On the other hand, the relative size of microfinance institutions (MFIs) on the above parameters was improving in the study period. Ethiopian financial system is undeveloped as it is significantly lesser as measured using financial system deposits to GDP, private credit by all banks to GDP, bank deposits to GDP, and bank loans to bank deposits taking the average world financial development measures as the benchmark.

The banking sector in Ethiopia is undeveloped as one bank branch serves around 148,992 persons in 2007 (the total population of the country is 73,750,932 as per 2007 census, Central Statistical Agency of Ethiopia, 2007 and total bank branches on June 30, 2007 was 495) and unfairly distributed as nearly 40 % of all the bank branches are located in the capital city and one branch serves around 14,419 persons in the capital city (the number of branches in the capital city was 190 on June 30, 2007), total population of 2,739,551 of the capital city as per 2007 census, Central Statistical Agency of Ethiopia, 2007) which constitute around 4 percent of the country's total population.

Generally, considering the annual average branches which are located in the capital city only constitutes 37.44 percent of all bank branches. This clearly shows that the banking sector in Ethiopia is not only undeveloped but also unfairly distributed.

The banking sector is performing well with respect to deposits, loans and advances, total assets and capital and reserves across the study period considered. The significant components of investments made by the banking sector comprises of treasury bills and government bonds. The amount of investment made in the form of treasury bills improved significantly across the time periods considered in the study. But the rate of growth of investment in the form of government bonds is moderate during the time period considered. The amount of resources mobilized in the form of demand, savings and fixed deposits is very much improved across the study period. This shows that one of the very purpose of banking business, financial intermediation, is increased significantly during the periods considered in absolute terms.

The Commercial Banking Sector in Ethiopia from 2001 to 2008 has made tremendous progress with respect of transferring the amounts of resources mobilized and in mobilizing the resources from different actors in the economy as the size has improved across

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the period. The commercial banking sector is performing well with respect to deposits, loans and advances, total assets and capital and reserves across the study period considered.

Ethiopian commercial sector is highly concentrated. Generally, public sector banks hold a majority of assets, deposits, loans and advances and equities. Though there is a declining trend in recent times because of the expansion of existing private banks and opening of new banks, the majority of the business of banking is controlled by Commercial Bank of Ethiopia, a state owned Commercial Bank in Ethiopia, even now.

The relative proportion of ownership of assets, deposits, and loans and advances granted by private sector is improved during the study period as compared to their public counterparts. There is a very good improvement in managing loans and advances by public sector commercial banks as they are able to reduce their nonperforming loan ratios at a dramatic low level though not up to the standard even in the recent year of study. The level of NPL of public banks revealed low performance as compared to their private counterparts.

As the banking sector is dominated by commercial banking, most of the resources are used to finance domestic and international trade. A majority of the loan is provided to the private sector followed by public enterprises. And significant amount of loan was provided by the Commercial Bank of Ethiopia, a state owned commercial bank although its relative share in the total balance of outstanding loan balance across the time period considered is reducing.

## II. NEED FOR THE STUDY

The financial system of a country plays a crucial role in the economic development of the country through the process of capital formation. The financial system through financial intermediation garners the scattered savings of the economy and avails them for investment in the economy. The capital formation depends upon the intensity and efficiency with which these activities are carried on. The effective mobilization of savings, the efficiency of financial intermediaries, channelization of these savings into most desirable and productive forms of investment are almost connected and have a great bearing on the contribution of capital formation to economic development. This is precisely what the financial systems do by acting as a link between the savers and the investors. In addition, financial system plays significant activities like providing entrepreneurial talent and stabilizing the economy. It also provides the means of payment and a variety of stores of value.

In this regard it is vital to appraise the financial soundness and performance of the financial sector so that ensuring proper support of the financial system to

the whole economic environment is possible, and realization of the set and aspired objectives, will be facilitated.

The present study is initiated by the following gaps: Review of literature shows that considerable work has been done on economic environment, financial sector and banking system conditions in other countries. However, no comprehensive work has been carried out in Ethiopian context.

Against this background, knowledge of the financial and banking sector situations is very important to achieve the objectives stability and growth of the banking sector, financial system and to the economy. As there were no extensive studies made on such issue, the present study is conducted to address it.

## III. RESEARCH OBJECTIVE

The financial system plays a pivotal role in economic activities in any country. Thus, it is vital to assess the status of the financial system and determine the health of the financial system and take corrective policy measures continuously. The main objective of the study is to gain a thorough understanding as to the financial environment and to evaluate the status of financial and banking system in Ethiopia

## IV. RESEARCH QUESTION

Given the objective of this study under consideration, the study will address the following main questions: Can the status of the financial structure and the banking system in Ethiopia be rated at its satisfactory level? What is its status in comparison with other countries in the world?

## V. DATA AND METHODOLOGY

### a) Data

The data used to analyze the status of macroeconomic environment, financial sector and banking systems are obtained from annual reports of National Bank of Ethiopia (the Central Bank in Ethiopia) and the financial development and structure database of the World Bank. The study period include from 2001 to 2011.

### b) Methodology

To evaluate the status of financial and banking system in Ethiopia, descriptive statistical tools like percentages, growth rates, mean values and comparisons using ANOVA and Kruskal-Wallis tests have been used. Comparisons of economic and financial systems are made between Ethiopia and some selected countries. The base of selection of countries for comparison is income groups and geographic regions of countries.

## VI. COMPARISON OF ECONOMIC AND FINANCIAL SYSTEMS ACROSS COUNTRIES

The base of selection of countries for comparison is income groups and geographic regions of countries. As per The World Bank Classification economies are divided among income groups taking in to account 2011 gross national income (GNI) per capita, calculated using the World Bank Atlas method. The groups are: low income, \$995 or less; lower middle income, \$ 995 to 3945; upper middle income, \$ 3,946 to 12,195; and high income, \$ 12,196 or more. Thus, Ethiopia, Kenya and Uganda are selected in low income, Sub Saharan Africa region; India and China are selected in middle income, Asia region; Japan is selected in high income, Asia region; The United Kingdom is selected in the high income, European region and The United States of America is selected in high income, North American region.

The economic development indicators used for the selected countries include: GDP per capita (current US\$), GDP growth (annual %), Gross savings (% of GDP), Gross capital formation (% of GDP) and Inflation, consumer prices (annual %). And financial sector indicators considered include: Bank capital to assets ratio (%), Bank nonperforming loans to total gross loans (%), Domestic credit provided by banking sector (% of GDP), Interest rate spread (lending rate minus deposit rate, %) and Real interest rate (%). Brief description of the variables used for the analysis is given below. The definitions are based on The World Bank: World Development Indicators.

## VII. ECONOMIC DEVELOPMENT INDICATORS

1. GDP per capita (current US\$): GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current U.S. dollars.
2. GDP growth (annual %): Annual percentage growth rate of GDP at market prices based on constant local currency.
3. Gross savings (% of GDP): Gross savings are calculated as gross national income less total consumption, plus net transfers.
4. Gross capital formation (% of GDP): Gross capital formation (formerly gross domestic investment) consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Fixed assets include land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the

construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. Inventories are stocks of goods held by firms to meet temporary or unexpected fluctuations in production or sales, and "work in progress." According to the 1993 SNA, net acquisitions of valuables are also considered capital formation.

5. Inflation, consumer prices (annual %): Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly.

## VIII. FINANCIAL SECTOR DEVELOPMENT INDICATORS

A financial sector in an economy is critical to its overall development. Banking systems and stock markets enhance growth, the main factor in poverty reduction. Strong financial systems provide reliable and accessible information that lowers transaction costs, which in turn bolsters resource allocation and economic growth. The following indicators are considered:

1. Bank capital to assets ratio (%): Bank capital to assets is the ratio of bank capital and reserves to total assets. Capital and reserves include funds contributed by owners, retained earnings, general and special reserves, provisions, and valuation adjustments. Capital includes tier 1 capital (paid-up shares and common stock), which is a common feature in all countries' banking systems, and total regulatory capital, which includes several specified types of subordinated debt instruments that need not be repaid if the funds are required to maintain minimum capital levels (these comprise tier 2 and tier 3 capital). Total assets include all nonfinancial and financial assets.
2. Bank nonperforming loans to total gross loans (%): Bank nonperforming loans to total gross loans are the value of nonperforming loans divided by the total value of the loan portfolio (including nonperforming loans before the deduction of specific loan-loss provisions). The loan amount recorded as nonperforming should be the gross value of the loan as recorded on the balance sheet, not just the amount that is overdue.
3. Domestic credit provided by banking sector (% of GDP): Domestic credit provided by the banking sector includes all credit to various sectors on a gross basis, with the exception of credit to the central government, which is net. The banking sector includes monetary authorities and deposit money banks, as well as other banking institutions where data are available (including institutions that do not accept transferable deposits but do incur



such liabilities as time and savings deposits). Examples of other banking institutions are savings and mortgage loan institutions and building and loan associations.

4. Interest rate spread (lending rate minus deposit rate, %): Interest rate spread is the interest rate charged by banks on loans to prime customers minus the interest rate paid by commercial or similar banks for demand, time, or savings deposits.
5. Real interest rate (%): Real interest rate is the lending interest rate adjusted for inflation as measured by the GDP deflator. Inflation, GDP deflator (annual %) is inflation as measured by the annual growth rate of the GDP implicit deflator shows the rate of price change in the economy as a whole. The GDP implicit deflator is the ratio of GDP in current local currency to GDP in constant local currency.

## IX. COMPARISON ACROSS COUNTRIES

The comparisons are made between Ethiopia and other countries. Differences among other countries for the parameters considered were not discussed for delimitation of the scope of the study. Comparisons are made using one way analysis of variance when parametric tests are met and a non-parametric test of Kruskal-Wallis of were used if the parametric assumptions are violated.

Test of normality using Kolmogorov-Smirnov is made and GDP per capita, LOGGDPG (GDP growth rate transformed using log transformation), Gross capital formation, inflation, bank capital to assets, Bank nonperforming loans to total loans, domestic credit provided by the banking sector to GDP and real interest rate are found to be normal.

Test of homogeneity of variances are made using Levene statistic and all of the variables are found to be heterogeneous. All variables are measured in terms of ratio scales and the values are independent.

Thus, GDP per capita, LOGGDPG (GDP growth rate transformed using log transformation), Gross capital formation, inflation, bank capital to assets, Bank nonperforming loans to total loans, domestic credit provided by the banking sector to GDP and real interest rate are found fit for parametric tests and one way analysis is used to test the equality of means among the countries considered. This is further confirmed using robust test equality of means using Welch and Brown-Forsythe statistic. And after the differences in means are tested, a post hoc multiple comparison of Games-Howell is used to identify in which categories those differences existed.

The Savings to GDP parameter is not fit for parametric test, a nonparametric counterpart of one way ANOVA which test of Kruskal-Wallis has been used and the post hoc analysis is made using Mann-Whitney test.

And the data available to analyse interest rate spread was not sufficient and it was not considered in the comparison.

### a) Economic Variables

#### i. GDP per capita (current US\$)

There is a significant difference of GDP per capita among countries considered,  $F(7, 56) = 280.74$ ,  $p < .05$ . And the GDP per capita of Ethiopia (USD178) is significantly lesser than even from low income countries. This shows that Ethiopia has a very big potential for growth. And the government should craft development strategies and open every possible opportunity for investment to further enhance economic growth.

#### ii. GDP growth (annual)

There is a significant difference of annual GDP growth rate among countries considered,  $F(7, 56) = 14.55$ ,  $p < .05$ . Ethiopia has significantly greater annual growth rate (9.18 percent) from high income countries (the United States, United Kingdom and Japan). And there was no significance difference in the growth rate of low and middle income countries taken for comparison. This shows that Ethiopia is growing at par with fast growing countries like India and China hence, Ethiopia's growth rate could be judged as satisfactory.

#### iii. Gross savings (% of GDP)

There is a significant difference of gross savings as compared to GDP growth rate among countries considered,  $F(7, 56) = 47.45$ ,  $p < .05$ . Ethiopia has significantly lesser gross savings to GDP from middle income countries (India and China); Japan from high income categories and significantly higher gross savings from United States. Thus, Ethiopia has low savings as compared to middle income countries. Savings are key for development by creating capital for investment, thus Ethiopia needs to improve its activity in this dimension to enhance further the economic growth.

#### iv. Gross capital formation (% of GDP)

There is a significant difference of gross capital formation as compared to GDP among countries considered,  $F(7, 54) = 90.59$ ,  $p < .05$ . Ethiopia has significantly higher capital formation from Kenya from low income countries; United States and United Kingdom from high income countries and significantly lesser capital formation from middle income countries (India and China). At early stage of development, capital formation is a key for development, thus Ethiopia needs to improve its activity in this dimension to enhance further the economic growth.

#### v. Inflation, consumer prices (annual %)

Although there is a significant difference of inflation among countries considered,  $F(7, 56) = 3.92$ ,  $p < .05$ , none of them were significant against Ethiopia. Hence there is no significant variation of the inflationary



environment on average during the study period with the countries taken in to account for comparison.

*b) Financial Development Variables*

*i. Domestic credit provided by banking sector (% of GDP)*

There is a significant difference on domestic credit provided by banking sector in relation to GDP in the economies considered,  $F(7, 56) = 792.65, p < .05$ . Ethiopia had significantly greater domestic credit percentage of GDP with 46.89 percent from Uganda in the low income countries and significantly lesser percentage from all middle and high income countries taken in to account for analysis. And there was no significant variation among Ethiopia and Kenya. Generally we can characterise the financial system of Ethiopia as undeveloped and the financial development could be highly related with the level of economic development of a country. That is, countries which have high financial development had high economic development and vice versa. Hence, countries should develop their financial system to enhance economic growth.

*ii. Bank capital to assets ratio (%)*

There was a significant difference of capital to assets ratios among countries considered,  $F(7, 52) = 44.47, p < .05$ . Ethiopia has significantly lesser capital asset ratios from low income countries with 5.67 percentage (Kenya and Uganda) and significantly higher capital assets ratio from United States from high income countries. There was no significant difference from middle income countries.

Though it is very difficult to compare the capital adequacy ratios of different countries as there is different treatment of bank capital in different economies, this is an important measure to evaluate the bank's ability to generate the cash flow necessary to make interest payments on outstanding debt. Thus, these ratios are used extensively by analysts outside the firm to made decisions concerning the provisions of new credit or the extension of existing credit arrangements. It is also important for management to monitor the firm's use of debt financing.

In the USA, leverage ratios are usually calculated as the ratios of tier-I capital to adjusted assets. Tier-I capital is the sum of equity and reserves less intangible assets and adjusted assets is calculated as the difference between total assets and intangible assets. Banks are needed to maintain a minimum leverage ratio of 5 percent in order to be considered well capitalized (International Finance Corporation, 2009).

Concerning the capital adequacy measure by bank capital to asset ratio, Ethiopia's position (5.67 percent) could be satisfactory as it is almost at par with middle income countries and significantly higher from United States. This could be resulted from differences in regulatory authority directives. Thus, harmonized capital

adequacy norms should have to be strengthened and implemented in all the countries to help banks to remain in business for long.

*iii. Bank nonperforming loans to total gross loans (%)*

There was a significant difference of nonperforming loan ratios of the banking sector among countries considered,  $F(7, 56) = 13, p < .05$ . Ethiopia had significantly higher NPL ratio from Uganda in the low income category and from all high income countries (United States, United Kingdom and Japan). There was no significant difference from middle income countries and Kenya from low income countries. This shows that the efficiency in managing loans and advances is significantly lesser in Ethiopia as compared with Uganda from low income countries and all high income countries. And there is no significant difference in loan management between Ethiopia and middle income countries.

This could result from proper management of loans and advances as evidenced by high income countries and restricting loans and advances granted by the financial system as evidenced by Uganda. Uganda has the lowest financial development level as measured by domestic credit provided by the banking sector to GDP with 8.84 percent of GDP whereas the grand average was 141 percent of GDP. Thus, low income and middle income countries should have sound credit granting policy so as to improve the quality of their assets maintained in their balance sheet. This further improves the amount of resources that should have to be tied up to protect the potential loss from uncollectability and hence can be used for other productive purposes.

*iv. Real interest rate (%)*

Although there was a significant difference in real interest rate in the economies considered,  $F(7, 56) = 7.14, p < .05$ , none of them were significant against Ethiopia. The real interest rate that is paid by the depository institutions is not significantly different in Ethiopia from other countries taken in to account.

In summary, in the context of the parameters of economic and financial indicators following main points are addressed. Ethiopia can be characterized as a least developed economy registering a highest rate of economic growth. The financial infrastructure needs to be developed so that deposit mobilization and capital formation will be improved. This, in turn, has an important effect to increase the economic growth. Hence, the financial system needs to be developed. The capital requirement of Ethiopian banks is satisfactory. Thus, there is no risk of inability to meet any potential loss that may be encountered by the banking sector. But the regulatory authority (The National Bank of Ethiopia) should strengthen the regulatory norms and update to the current practices that is implemented by countries which have sound banking sector. Though the

asset quality is improving in recent years, it needs to be improved further to meet the international and national standard or norm or practice. This will protect the financial sector from incurring operational losses and failing.

## X. CONCLUSIONS

Concerning the parameters of economic and financial indicators, the following main points are addressed. Ethiopia can be characterized as a least developed economy registering highest rate of economic growth. The financial infrastructure needs to be developed so that deposit mobilization and capital formation is improved. This, in turn, has an important effect to increase the economic growth. The financial sector is not that much developed in Ethiopia. Hence, the financial system needs to be developed to support the economy well. Though the asset quality is improving in recent years, it needs to be improved further to meet the international and national standard or norm. This will protect the financial sector from failing and losses. The capital requirement of Ethiopian banks is adequate. Thus, there is no risk of inability to meet any potential loss that may be encountered by the banking sector. But the regulatory authority (The National Bank of Ethiopia) should strengthen the regulatory norms and update to the current practices that is implemented by countries which have sound banking practices.

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## Assessment of Small Enterprise Financing, Case of Jordan

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**Abstract- Study Importance:** Small enterprises represent the most important pillars of economic development of the most countries of the world, these enterprises account for the highest percentage among all types of enterprises that contribute to the economic productivity. Small enterprises have been the focus and attention of most governments in developing countries due to the role they play in increasing production and employment in addition to their active contribution in increasing the rates of economic growth and national income and their support of the GNP of many countries. Research importance relies in identifying the most obstacles facing small businesses from small entrepreneurs perspective.

**Study Purpose:** That small enterprises form the backbone of the economy in all countries of the world, without exception. This research is an attempt to provide some solutions that may help in addressing the financing problem of small projects, especially in developing countries, identification of the main obstacles that small entrepreneurs face in financing their small projects.

**Keywords:** *small enterprises, funding institutions, microfinance.*

**GJMBR-C Classification :** *JEL Code: N20, B26*



*Strictly as per the compliance and regulations of:*



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# Assessment of Small Enterprise Financing, Case of Jordan

Abdul Aziz Farid Saymeh <sup>α</sup> & Dr. Sulieman Abu Sabha <sup>σ</sup>

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**Study Purpose:** That small enterprises form the backbone of the economy in all countries of the world, without exception. This research is an attempt to provide some solutions that may help in addressing the financing problem of small projects, especially in developing countries, identification of the main obstacles that small entrepreneurs face in financing their small projects.

**Study Results:** This study sought to identify the most important constraints faced by small entrepreneurs in Jordan as well as assessing present methods of financing these enterprises, through a field study by using a purposeful sample of the owners of these enterprises. The researcher has analyzed 345 questionnaires and through the analysis, a set of results have been reached and are summarized as follows:

- Insufficient amount of funding of these enterprises.
- Militancy in demanding guarantees in return for granting the loans.
- The high interest rates of these loans were the most important challenges faced by entrepreneurs of the study sample.

Based on the results of the study, the researcher recommends the need for the financial institutions to initiate a special policy to encourage entrepreneurs carry out their creative ideas and innovations via small enterprises and this encouragement will be through granting them the needed amounts of funds at low interest rates. This will help them ensure the success of their projects and enables them pay back loan installments. Also the government is urged to ensure loans through specialized foundations to encourage such enterprises as this will lead to growing national GDP and decreasing unemployment.

**Keywords:** *small enterprises, funding institutions, microfinance.*

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## I. INTRODUCTION

Small enterprises are businesses that maintain revenues and/or a number of employees below a certain standard. Every country has its own definition of what is considered a small and medium-sized enterprise. In the United States, there is no distinct way to identify small enterprises. The European Union, a small-sized enterprise is a company with fewer than 50 employees. Small enterprises are said to be responsible for driving innovation and competition in many economic sectors. Successful economic developments have demonstrated that small projects are the main focus in the expansion of the productive base, the increase of exports, and creation of new jobs, especially in rural areas and remote areas. Also it works to transform the rural areas to industrial areas and work to alleviate the imbalances between different regions in the one country and achieve equitable distribution of national income and wealth of the state. The terms of attention and causes to small enterprises differ in developed countries than in developing countries, Developed countries have realized the importance of small enterprises and their role in feeding the major projects of semi finished products and catalytic role in their production process, while the developing countries were interested in this kind of enterprises as a correcting catalyst for their economic reform measures, and a bid to reduce the role of the state in the investment process. (Latha & Murthy, 2009). The importance of small enterprises and their role is due to their spreading, as they form about 90% of the producing plants in the world and they employ between 50 % - 60 % of the workforce in the world (Al Mahrouq, and Magablah, 2006). They help to increase work opportunities and solve the unemployment problem and to increase exports and thus they tend to improve the balance of payments deficits. Also they contribute to the global GDP by about 46%, They represent 65% of the gross national product in Europe, compared with 45 % of U.S.A., while in It is worth to argued that small businesses are considered the backbone of the national economy (Afaneh, and Abu Eid, 2004). As well, small enterprises help to increase national gross product output and economic growth of nations. Most of the people in developing countries rely heavily on the job personal or small businesses as a source of income (Prasad & Tata, 2009), for these reasons, the issue of



small projects has great importance to the economic decision-makers in developed and developing countries, including Jordan both because of its pivotal role in economic development and social development.

## II. LITERATURE REVIEW

### a) *The concept of small enterprises*

Small enterprises are of great importance in all countries of the world, especially developing countries, taking into account the relative inequality between the small enterprises in developed countries compared to the project in the small developing countries, in terms of the amount of capital, productivity and labor used in the United States, Japan and European Union countries, the roof of capital for small projects exceeds 20 million dollars, while all small businesses in developing countries ranges from the size of capital for each of them between 20 thousand dollars and one hundred thousand dollars, and may be less than that.

The concept of small projects raises considerable controversy among those interested in the small enterprise concept, and this due that the term includes a number of projects that can fit underneath it, yet they may differ in their characteristics, as an example an enterprise that may be considered small in the United States may not be so in other developing countries. Also a small enterprise in one industry, steel, for example is not the case in the textile and apparel industry (Almberek, and al-Shammari, 2006).

Regarding the definition of small enterprises, there are several points of view and opinions. However, several criteria for the definition of small enterprises are used, such as labor, capital, added value, management properties, specialization, production methods, or market trends, as reported in a study of Gray and Gamser who prefer to use the number of employees criterion to determine the size of the organization, rather than relying on the size of assets and value-added criteria. Some studies have added technology used standard volume of sales, and the legal standards as the basic criteria for the classification of small enterprises (El-Beltagy 2005). The United Nations Industrial Development Organization (UNIDO) defines small enterprises as projects run by the same owners who take the full responsibility and the number of employees is estimated between 10-50 workers, the World Bank describes enterprises that employ between 10 and 50 employees as small. Standards to identify small enterprises vary from one country to another according to their potential, capabilities, economic circumstances, and stages of growth attained. European Commission identifies enterprises which employs not less than 10 workers on a permanent basis and between 10-99 as small enterprise, and which employs between 100-499 as medium. (Alattar, Kouly & Innes, 2009). Arab countries consider projects that

employ from 5-15 workers and invest less than \$ 15,000 as small enterprises. The GCC countries are use the capital standard to distinguish between projects, based on this, small enterprises are defined as those facilities that have capital invested less than 800,000 Bahraini dinars as small enterprises (Internet, Bahraini newspaper Al Wasat).

A study conducted by Georgia Institute of Technology has shown that there are about 75 different definition for small projects in 75 countries, these definitions have been classified into major groups - some of which depends on the size of the project (number of employees or capital), some of which depends on the economic characteristics of the enterprise such as small size, medium size and so on, other enterprises have been classified according to the nature of the administration of the project (by the owner or employees or both) and the other classifications are based on the problems faced by the project, such as the need for support or the level of technology used and the resources necessary to build the project. Some of which rely on the standard annual sales of the project small (Abu Alfahim, 2009).

Jaradat pointed that many countries have based the classification of small enterprises, according to the number of workers involved:

- In India, enterprises are classified as small when the number of workers does not exceed fifty for factories who use energy, and one hundred workers in the case of non-use of energy.
- In Japan and Korea, they specify small enterprises if the number of workers is thirty or less.
- In Sudan, they specify small enterprises if the number of employee is 25 workers or less.
- In Saudi Arabia, specifies small enterprises when the number of employees is less than 25 workers. ,
- Jordan specifies the number of workers between 5-20. Many studies have addressed the number of workers of small enterprises is less than 20 workers. (Jaradat, 2004).

### b) *Importance of Small Enterprises*

Importance of small enterprises has increased in the late seventies as it forms about 94.8% of the total world business. for example, Saudi market constitutes 90% of its economic establishments, 96 percent in the Arab Republic of Egypt, 97% in India, 90% in America, between 85-90% in Europe, and 71% in Japan (Green bank, 2000)) Jordan, constitutes 98% of its total installations as small enterprises. Small enterprises also were seen as vital for the economic growth in all of Latin America, Eastern Europe and Africa. Small projects in developing countries play an important role in reducing the problem of unemployment, especially in rural areas, on the grounds that the big companies and industrial companies, which rely on the urban areas has failed to play a distinct role in addressing the problem of

unemployment (Alam, 2006). Asian Tigers have realized the importance of small enterprises and has taken them a vehicle to achieve their development objectives. According to some statistics that Small Enterprises provided jobs for 50-60% of total work force in South Korea, it is worth to note that the state gives incentives and tax exemptions for the workers of small enterprises and set up a body to develop, especially in the sector of new technologies, services and tourism solidarity. Canada also has realized that this kind of enterprises represents the largest sector to create jobs in the country, i.e. about 80% of total employment opportunities (Beddaoui, Internet). Small projects are considered as the seed of economic activity that starts with small enterprises that grow and create conditions for larger projects to begin. Small enterprises form the lifeline out of the economic crisis; it is the main source which provides the needs of the citizens of needed goods and services. And is a major tributary which feeds the large industries with pre-requisites of mass production, in some industries more than 75% of the main components of the products are provided by the small enterprises. (El-Beltagy 0.2005).

### c) *Small enterprises in the Arab world*

The interest of the Arab world of small enterprises was the aim of reducing the problem of unemployment and its high levels in most Arab countries. Unemployment in the Arab countries concentrates mainly in the youth sector, where the average youth unemployment average rate about 53 % of the total volume of unemployment for all Arab countries. It ranges from 2 % in Kuwait, 3% in each of the UAE, Bahrain, Qatar, 7 % in Saudi Arabia and Oman, while it exceeded 11% in all of Egypt, Syria, Lebanon, and about 13 % in Jordan, 14 % in Tunisia and Morocco, 17 % in each of Sudan, Somalia and Yemen. However, unemployment rate exceeds 30% in each of Morocco, Palestine and Iraq (Alotthaim 0.2007). Here comes the importance of small enterprises that represent, on average, more than 90 % of the establishments in the developed and developing worlds. Statistics available describes that some Arab countries have a number of industrial establishments which occupy less than ten workers represent 95% in Egypt and 42% in Tunisia and 50% in Morocco (Galling 2001). The experience of the Arab world in the field of small enterprise sector is relatively new. In the early 90s. It started when Egyptian Government and Private sector have founded the business association in Alexandria Governorate by introducing lending enterprises is relatively recent, in Egypt began in the early nineties by the government and the pr programs for the poor, which later expanded to include suburbs and surrounding cities. As the central bank in Egypt to launch a package of incentives to encourage banks to expand the financing of small and medium enterprises. Amid

growing calls for the need to finance small enterprises which represented about 80% of the gross national product (*Al Masry Al Youm, 2008*). A company has been established in 1991 to ensure the risk of bank credit granted to small enterprises, this company was a joint venture and management of nine Egyptian banks and an insurance company (burned, and interview, 2006). Small and medium enterprises in the Arab countries acquire special importance due to several considerations relating to the characteristics of economic and social structures as well as availability rates of production factors, and the spatial distribution of population and activity. In Yemen, for example, small and medium enterprises contribute to about 96% of GDP in 2005, and about 77 %, 59 % and 25% in Algeria, Palestine, and Saudi Arabia, respectively, during the same year. It also represents this topic projects in Jordan, the proportion of 92.7 % of the total number of projects, and contributes 28.7% of Jordan's GDP, which is considered as low compared with other Arab countries. These projects represent 86.1 % of the total industrial projects in the United Arab Emirates, and about 76% of the total industrial enterprises operating in the Kingdom of Bahrain. And also represent more than 99% of non-agricultural enterprises. About 75% of private sector employment in the Arab Republic of Egypt is from small enterprise projects (Beddaoui, Internet). According to a study by Chen stated that the number of small and medium enterprises in China in 2001 amounted to 4.2 million projects, which represents 99% of the size of the projects registered in China, and equivalent to 75% of the gross industrial output as it has helped to create 79% of the total new jobs at the state level as a whole (Chen, 2006). The number of small and medium enterprises in the world has increased, in the Arab world the ratio has varied from one country to another. In the Arab Gulf states, small and medium industries form the backbone of the industrial sector by an estimated 85% of the total existing industrial installations. In a recent study conducted by the Gulf Organization for investments indicated that the proportion of small and medium factories have reached (94 %) of the size of the factories the United Arab Emirates and (92 %) of the factories Qatar, Oman, Bahrain and (75 %) of the factories Saudi Arabia, (78%) factories of Kuwait. Egypt and Syria constitute Small and Medium almost with the same percentage, but they vary in the nature of investment activity. In Jordan, the services sector occupies the bulk of the volume of small and medium enterprises, which constitutes 70% of the volume of projects in Jordan (Farajat 0.2009). The small and medium enterprises accounted for 97% of establishments registered as a private sector (*Al Rai newspaper, .2008*).



d) *Developing small enterprises in Jordan*

Small and medium enterprises in Jordan constitutes more than 90% of the total enterprises operating in various sectors of the economy, where they absorb about 60% of the workforce and contributes nearly 50% of GDP. This indicates the need to give these institutions a great deal of attention and assistance to overcome the obstacles that limit their growth to be a key driver of the national economy development in various fields. The estimated size of the total fund provided by these institutions is about half a billion Jordanian dinars, contributed to the finance the construction and development of (134) thousand projects. These enterprises have provided about eighty thousand permanent jobs (Alkhatib, 2009). Since the end of the last century. Jordan has started to implement the national economic reform and the liberalization of markets. The first achievements of this approach was the signing of a free trade agreement with the European Union in 1997, followed by the accession to the World Trade Organization in April of 2000, with the aim of improving the standard of living of Jordanian citizens through ambitious economic growth at an expected rate of 6.7 %annually, and to reduce unemployment by creating more job opportunities for Jordanians, and the opening of the Jordanian market for more industrial investments, commercial and various service. Also to promote competition in Jordanian market, which will lead to the reduction of high prices and to diversify its products in the local markets at prices that fit the Jordanian consumer (EJAB, 2007).The year 1959 was the beginning of the work to fund small enterprises in Jordan through the Agricultural Credit Corporation to grant loans to farmers. In 1965 was this sector was advocated through the establishment of the Industrial Development Bank (Al-Nabulsi, and Shalabi, 2009).

Jordan has begun its campaign to encourage small enterprises in the early seventies, through the Five-Year Economic Development Plan (1976-1980), which encouraged the social and economic development and the trend towards small projects that produce substitutes of imported products. In 1984, Jordan Loan Guarantee Corporation was established with a capital of 10 million dinars (Almahrouq and Magableh, 2006). In 1986 The Union of Charities was established to focus on the promotion of agro-industries and development of handicrafts. In 1989, an economic development program was established aiming to achieve economic and monetary stability, this program included economic and social plans aimed at providing employment opportunities for Jordanians in the field of small enterprises (Al-Nabulsi, and Shalabi, 2009), and in 1998 and in order to fight poverty and unemployment, the government through the Ministry of Planning and International Cooperation launched a program of social security package aimed at improving the living conditions of the poor and to increase their productivity.

In 2003 was the integration of development programs into one package called "productivity software socio-economic", which includes the development of small enterprises, where an equivalent of 17.14 million dinars were spent until 2005 on the development of small enterprises (Ministry of planning and International Cooperation 0.2005). However, the small enterprise sector in Jordan could not employ more than 35 % of the total Jordanian labor. The number of enterprises that occupy four workers or less (small projects) amounted to 87% of all small enterprises in 2005 (Eagles, 2008). According to the indicators available in the Ministry of Planning and International Cooperation, small and medium enterprises in Jordan form more than 98% of all the institutions involved, recruiting (60%) of the workforce with contribution of about (50 %) of the gross domestic product, compared with (80 %) for developed countries (guide microfinance institutions and micro-Jordan, 2006).The high population growth rate in Jordan and the slowdown in economic growth rates over the past years is one of the most important challenges facing the Jordanian economy which will have several implications, especially on the labor market (Eagles, 2008). There are many different financial institutions that provide support and funding for the development of small enterprises in Jordan, such as the Development and Employment Fund, which was established as a government institution in 1989 and began its lending in 1991, the Craftsmen Loan Fund, which is a subsidiary of the Industrial Development Bank was established in 1975, with the aim of microfinance and crafts. Among the leading institutions in the financing of small projects in Jordan is The Jordanian Company To Finance Small Projects (Tamweelcom), which was incorporated as a non-profit organization to support and develop small enterprises as a company owned by the Noor Al Hussein Foundation, the volume of bank loans until 31/12/2009 was 64958074 dinars and the number of loans were 139 286, 127 258 of these loans were for females and 12,028 loans for males, while the total number of clients since inception were 85 286 clients, female accounted for 91.14 %,and 8.86 % males (annual reports).There, in are many institutions that fund small enterprises directly and indirectly, such as fund lending to women, which was founded in 1999 as a private Jordanian non-profit organization to support the productive capacity of small-scale enterprises and works to empower women and strengthen its position as an individual producer in a society where the fund provided 114 thousand loans for about 40 thousand people, 99% of whom are women and in the year 2005.

The Arab uprisings and the global financial crisis and world economic slowdown have negatively impacted the Jordanian economy and highlighted demands for a more level economic playing field and equity in access to economic and social opportunities. Already challenged in providing jobs to the more than

60,000 youth who enter the labor market annually, Jordan has seen unemployment rising. Young men and women were the most affected, with unemployment, reaching 22.8 percent and 22.3 percent, respectively. Moreover, regional disparities continue to pose additional challenges. Limited private sector jobs are available in the outlying governorates, where employment relies largely on the civil service and other public sector jobs. At the same time, the private sector is hampered by difficulties in the business environment and inadequate access to finance. Job creation and economic inclusion are key priorities for Jordan today these goals will be advanced by improving access to finance, enhancing competitiveness, and fostering sustainable, private sector-led growth. Smaller firms in Jordan grow at faster rates than larger ones and create more new job opportunities; however, they are confronted with numerous hurdles. Inadequate access to finance is frequently cited as one of the main constraints. Financial intermediation, in general, is very low in Jordan compared to other developing economies. Access to finance is substantially more of a challenge for Small Enterprises than it is for large firms. The financial system is dominated by the banking sector, which is less competitive and plays a limited role in financial intermediation, compared to other Middle Income Countries .Small Enterprises often resort to the informal sector or family and friends for needed finance (Nasr, S and El Abd, Y, 2013).

*e) Constraints faced by small enterprises*

Many small enterprises faced several constraints stand as obstacles in achieving its goals of economic and social. These constraints vary pertaining the nature of the project activity exercised by the state in which they operate .Being a new concept, small enterprises faces difficulties, especially in Arab countries (Hawat 0.2007). Small enterprises face obstacles, with regard to access to capital and lack of appropriate distribution channels (Prasad & Tata, 2009). United Nations has declared that 2005 is the year of small enterprises financing in order to provide funds for more than 20 million households in developing countries (Prasad & Tata, 2009). A main obstacle for small enterprises is its need for funding from third parties where it is difficult to rely on self-financing, and the high cost of financing as compared with the rate of return of the project, which in most cases leads to the loss or suspension of the project (El-Beltagy, 2005). Small and medium enterprises paid higher interest rates than other competitors on the same type of loan and the amount ranges between 2 % -4 % (Qandah 0.2009).

Many studies show that owners of new projects suffer from inadequate funding and bad product and marketing is effective (O `Dwyer, & Ryan, 2000), consumers usually prefer foreign products over the domestic products similar foreign motivated by tradition,

and the lack of adequate incentives for local products to strengthen its competitiveness compared to the product of foreign and a policy of dumping by some foreign institutions and weaken significantly the ability of the product to the local competition .

We must not lose sight of inflation, which is considered a major cause of the high prices of raw materials and wages of workers and therefore higher operating costs for this type of projects, leading to higher prices for their products and that means not being able to cope with intense competition from large facilities (Qandah, 2009) as well, we should consider government higher tax rates on these projects among the main obstacles to the development of this sector.

These projects are suffering in general from its inability to provide financial statements, (Alzerra, and Rashdan 0.2005) In China, it was the lack of information of the main reasons that led to the failure of small enterprises (Alattar, Kouly & Innes, 2009), in a study for Gebru, he found that there is a positive relationship between the extent to which it is to use the information available and the performance of small projects. As well as information asymmetry existing between financial institutions and small enterprises, and to obtain the required financing is considered one of the main obstacles for small and micro enterprises, also he found that the lack of adequate safeguards that can cover the value of the requested loan, which is considered one of the main foundations for the banks to agree to grant the loan, creating a major problem for small businesses that they do not have fixed assets sufficient, especially in the beginning -of-life for these projects, the banks rely on capital facility and not on income established to take the credit decision to grant the loan or rejected(Gebru, 2009).

During the last fifty years the Arab Economic Planning was relying on the public sector to finance small enterprises, and they used to think of the quick profit small enterprises such as real estate and trade without thinking about what is provided in the project of job opportunities (Hawat 0.2007) .As well, there were lacks of clear legislation and government policies, and specific to support and organize small projects, and the lack of these projects to the plans, strategies and organizational structures that ensure proper growth and continuity. The adoption of these projects on traditional skills, and the low level of technology in the management of business. (AlKhaseeb, 2009). All of these obstacles are the major constraints facing small enterprises.

### III. PREVIOUS STUDIES

A Study by Dickinson, P., (2000), titled "The transformation of the economies of Eastern Europe: an assessment of the role and contribution of small enterprises in the private sector " Researcher conducted

this study to examine the role and the contribution of small enterprises of the private sector in the economic growth in Poland, referring to the importance of restructuring programs and the need to consolidate their role in economic growth through appropriate legislations and appropriate framework for their work. The researcher recommended the need to provide adequate managerial skills and tendency to take risks within the availability of appropriate economic environment in Poland compared with the other countries of Eastern Europe, however, the researcher confirmed the need for the government to encourage establishing more private small industrial enterprises. Study by Alwadi, (2004), titled "Small Projects: what are their reality and the challenges they faces with special reference to their role in development in Jordan,". The researcher suggested the need to distinguish between the growing and stable small enterprises, and that the main challenge for these projects due to lack of skills and management capabilities in order to develop these enterprises, in addition the researcher focused on the role of government in diminishing the challenges of funding. A study by Dawaba, A., (2006), titled "The problem of financing small and medium enterprises in the Arab countries," The researcher aimed to identify the importance and reality of small enterprises in the Arab countries and the problems of funding and methods by relying on the Islamic financing methods. It was one of the recommendations of the study is to implement the Islamic financing methods to fund small enterprises, and work on activating the role of the Arab Union for small enterprises and provide a regulatory environment to achieve and effecting collective efforts amongst the Arab countries.

A study by Abboud, K, (2007), titled "investment and finance strategies of small enterprises - a field study of small businesses in the city of Aleppo, Syria" The researcher highlighted the most important problems afflicting these projects and obstacles to their development and growth, the researcher found that the problems of lack of funding and weak management experience were the most important problems facing these enterprises, so the researcher recommended the need to find new funding formulas for dealing with these enterprises on non-traditional bases. The study of, Junjie,W., (2008), entitled "The empirical evidence to finance small projects in China," the researchers worked in providing evidence for a sufficient funds to finance small and medium enterprises with reference to the funding problems facing these enterprises in developing their businesses, and the end, the researchers found that financing options these projects vary according to the size and stage of the business cycle on the grounds that funding at the beginning of the project comes through private resources while in the advanced stages of the project, their much need for more funds of which the bulk relies on bank loans. A study by Slam, S.

(2009), entitled "impediments to the beginning and growth of small enterprises in Bangladesh", the researcher looked at the reasons for starting small enterprises and analyzed the obstacles facing these projects at the beginning and aftermath. Among the findings of the study was the fear of unemployment, family traditions and previous experience in the same field. The lack of Higher education was a prime reasons for the start of these projects. As for the obstacles facing these enterprises at their beginning and its sustainability was the lack of funds to start and working capital, the lack of training and skill, inadequate loans collateral, and the shortage of skilled manpower. At the end of the study, the researcher recommended the need for the Government to sensitize individuals about the economic opportunities available, and the need to provide corporate finance at low-interest to encourage workers in these projects through financial incentives, and the government to guarantee the loans of small enterprises. A Study by Singh, R., (2010), entitled "competitive small and medium enterprises in the globalized economy" .The study aimed to analyze the challenges faced by small and medium enterprises in both India and China after globalization. Researchers studied the development of these enterprises, the policies and strategies for governments concerned for the sake of developing a competitive edge. The study found that both India and China have developed several encouraging programs in this regard, however, the study recommended the need for more work on developing the managerial skills and their relationship to cut costs while working to improve the quality, which is strongly linked to improving competitiveness. Study of Mugava,M.et al, (2012), titled , Tax System Impact on the Growth of Small and Medium Enterprises (SMEs): With Reference to Shinyanga Municipality, Tanzania. Study was based on the survey of 120 managers/ Executive officers of the selected Small and Medium Enterprises in the Shinyanga Municipal region in Tanzania. Findings indicate that majority of the respondents perceive the adverse impact of existing tax policies on the growth of SMEs and suggest for reforming the tax policies in the Country.

#### IV. RESEARCH PROBLEM AND HYPOTHESES

##### a) *Research Problem*

Small enterprises play a vital role in the economic development of all countries. Today, small businesses are the heart of market economy with their buying and selling of products and services in most of developed and developing countries. Most small scale industries play an important role in the economic development of any country because of its productivity, employment provision for a given level of investment. Despite the significant role and vital role of small enterprises in the economy, which constitutes more than

90 % of the establishments in most countries of the world (Almahrouq and Maqableh, 2006), however, it is facing some obstacles that limit the development and progress of these countries. It is important to know that the success of small enterprises depends mainly on several factors, including the provision of adequate funding and to provide administrative efficiencies that can ensure the success of this kind of projects and support their official bodies. The problem in this research lies in how to identify the point view of small-scale entrepreneurs in relation to the financial and administrative problems and try to find some solutions that can help increase the support for these enterprises and to provide the necessary funding and work to develop and increase the spread of these enterprises due to their vital role to the economic development and solving the unemployment problem. However, this research is intended to answer the following questions:

1. Do High interest on loans and the lack of collaterals represent the most important obstacles facing small enterprises?.
2. Do financing institutions provide required funds for small enterprises?.
3. Are repayment period and inadequacy of funding amounts represent major constraints of small enterprises
4. Are administrative procedures and the lack of advisory services constraints to finance small enterprises?
5. Do government and commercial banks provide support to finance small enterprises?

#### *b) Hypotheses of the study*

Based on problems of the study, the researcher has developed the following study hypotheses:

$(H_{o1})$  high interest on loans and the lack of guarantees are the most important obstacles facing small enterprises.

$(H_{o2})$  financing institutions provide the required funds to small enterprises.

$(H_{o3})$  repayment period and the inadequacy of funding are among the major constraints of small enterprises.

$(H_{o4})$  administrative procedures and the lack of advisory services are among the major constraints to finance small enterprises.

$(H_{o5})$  Both government and commercial banks provide enough support to finance small enterprises.

#### *c) Research Methodology*

This a field study, the researcher had prepared a questionnaire and distributed copies to a represent able purposeful sample.

430 questionnaires were distributed to a sample of intended micro-entrepreneurs in Jordan, who have already succeeded in obtaining a loan by microfinance institutions operating in Jordan. Researcher obtained

420 questionnaire out of which 415of were valid, exception 5 in response to a lack of suitability for the purposes of analysis, and after unloading the data obtained and processed statistically using the Statistical Package for Social Science (SPSS).

## V. RESEARCH RESULTS

### *a) Distribution of the study sample by sample characteristics*

Through table (1) we note that the study sample were concentrated among 78 % of males and 22 % females , and for the age group was highest in the first category between 20-25 years and 28% , followed by the age group the last 41 years and above , while the lowest age group was 16% for the class the second and fourth.

With regard to educational level was the highest participation rate for bachelor holders and 34% and the least was to drive a master's degree and doctorate and 2% and 0 % , respectively. For the general form of ownership of the project was the individual property for the project and 44% is the highest among other forms of ownership (family and share with others), and the percentage of the commercial sector 74% the highest among the various economic sectors of the study sample and the least of the artisanal sector and 2% . With regard to the way the acquisition of the project site, the percentage of rental 85 % compared to other methods, i.e acquisitions and investment.

### *b) Problems and the reasons for rejection of microfinance*

As can be seen from Table 2 that 62% of the sample had experienced a problem in getting adequate funding at the beginning of the enterprise life, and that 44% of the sample had been refused funding request them by microfinance institutions. The study also found that the main reason for the rejection of the loan application was due to the lack of adequate collaterals. This result is the same as the findings of Assmeerat study (Assmeerat, 2009).

### *c) The most important impediments to finance small enterprises*

We notice from the results contained in the table (3) that the most important constraints that guide the borrower is the strictness in collateral demands up to 44% of the study sample, followed by high interest rates of loans in some cases to more than 26%, this means accepting the first hypothesis (H1), which states that "the high interest on loans and the lack of guarantees form the most important obstacles facing small enterprises. In addition, the ratio of only 6% of the respondents who responded that the most important obstacle for them is the lack of a sufficient grace period ,however, this may be justified by the micro financing institutions due to the small size of the loan.



#### d) Testing of hypotheses

By considering table, (4) We note that the mean and standard deviation for all the answers were close and within the normal distribution of the sample, and this shows a lack of significant differences in the answers of the study sample, and also if we compare this value with the overall average for all the answers we find it also close, as the value of significance values for all the results of the study were 0.000, which means that the results of the statistical analysis shows significance for all the questions that have been addressed to the study sample.

Through the question No. (1), We note that 44% of the sample approved that microfinance institutions should provide full funding, and that 32% of the sample were not approving it which means that the second hypothesis ( $H_{0_2}$ ) has been accepted, which states that "financing institutions provide the required funds to small enterprises". As for the stresses in the request for collaterals 84% of the sample has approved it, as for the rise in interest rates, 76% of the of the sample supported it and here comes the emphasis on the acceptance of the first hypothesis, ( $H_{0_1}$ ). For the inadequacy of the repayment period and the amount of funding, the results of the study demonstrated that 60% of respondents confirmed that the repayment period is not enough and 70% said that the amount of funding is not sufficient, and that means accepting the third hypothesis ( $H_{0_3}$ ), which states that: ", repayment period and the inadequacy of funding are among the major constraints of small enterprises". With regard to administrative procedures and procedures for the approval of the loans' approvals, the rate has ranged between 50% - 80% of the study sample and therefore accepted the fourth ( $H_{0_4}$ ) hypothesis, which stipulates that "administrative procedures and the lack of advisory services are among the major constraints to finance small enterprises".

As for the government and commercial banks roles in directing financing small enterprises, the role of the government has been supported by 48% of the study sample, in turn, 28 % of the sample did not support the government's role, as for commercial banks and their role in providing the necessary funding was approved by 60 % of the sample ( $H_{0_5}$ ), which states that: "Both government and commercial banks provide enough support to finance small enterprises". It is to be concluded from this study that small enterprise finance in Jordan suffers from a variety of obstacles, the most important obstacle is the non sufficient funds and the high lending rates, in addition the enterprise financing institutions have high rigidity in demanding guarantees faced by limited guarantees owned by small enterprise owners, the last obstacle is the absence of the active role of the government and routines administrative procedures which are considered as fatal funding constraints.

## VI. CONCLUSIONS

1. Small enterprises face a militancy problem in the request for collaterals by donors, (approval of 84% on Q.-2), and that the interest rates on granted loans to small enterprises are high (approval of 76% on Q.- 3).
2. 76 % of the sample of the study confirmed that the repayment period is not considered enough (question - 4), and the loan amount is not enough to finance the needs of the enterprise (approval reached 70% on Q.- 5).
3. Approval of the loan application includes long administrative and routine procedures (80% approval on Q (6) and 50 % On Q. (7).
4. 60 % of the study sample approved the establishment of commercial banks to provide funding for small enterprises (Q.9), but 48% feel the absence of the government's role in providing the required support for small enterprises (question - (10).
5. 50% of the study sample faced the problem of loan repayments in a timely manner, and that 47 % of the sample suffered from the rejection of their loan applications in advance.

## VII. RECOMMENDATION

1. There is a deem need for commercial banks and microfinance institutions to grant adequate loans for small enterprises in order to achieve economic development and work on solving the problems of unemployment.
2. It is deeply important to urge microfinance institutions to ease the required collaterals for their loans and to accept the project itself as the collateral without the need for other guarantees or collaterals.
3. In a bid to broaden the base of beneficiaries of loans, it is necessary that the Micro Financing Institutions(MFI) to reduce their interest rates, which is considered one of the most important funding constraints faced by the owners of these small enterprises. So MFI can take advantage of increasing the number of borrowers in this situation and achieve better profit.
4. A deem important issue is that the government establishes an institution to guarantee loans granted to finance small enterprises.

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## APPENDIX

*Table 1* : The characteristics of the study sample

Statement	Percentage
Gender	
Male	78%
Female	22%
Age Group	
20-25	28%
25-30	16%
30-35	18%
35-40	16%
41-above	22%
Education Level	
Less than High School	%14
High School	%24
Deploma	%26
Bachelor	%34
Masters	%2
P.hd.	0
Project Type	
Individual	%44
Family	%34
Partnership	%22
Distribution of projects among the various sectors	
Commercial	%74
Industrial	%8
Crafting	%2
Services	%16
Way acquisition project site:	
Investment - ensuring	%1
Rental	%14
Ownership	%85

*Table 2* : illustrates the problems and the reasons for rejection of micro-finance

QUESTION	PERCENTAGE
Have you encountered financing problems when you start the project?	
YES	78%
NO	22%
Have you ever refused a loan application by the Foundation funded?	
YES	44%
NO	56%
What are the reasons for rejection?	
Nature of the enterprise	4.5%
Lack of adequate safeguards	86.5%
The size of the loan is high	4.5%
Term of Loan	4.5%

*Table 3 :* shows more obstacles facing small enterprises

Question	Percentage
What are the most obstacles facing micro-finance?	
Term of the loan is not sufficient	8%
The loan amount is not enough	16%
Militancy in collateral demand	44%
Lack of sufficient grace period	6%
Loan interest high	26%

*Table 4 :* shows the results of the field study of impediments to finance small projects

Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Std. Dev.	Mean	Sig.
1- Microfinance institutions working to provide full funding required for the project	22%	22%	24%	28%	4%	1.171	3.227	0.0
2- Stringent microfinance institutions to request guarantees.	26%	58%	14%	2%	0%	0.667	4.111	0.0
3- The benefits of micro-finance loans are considered very high.	30%	46%	20%	4%	0%	0.815	3.974	0.0
4- The period of repayment of loans of small projects is insufficient.	14%	46%	28%	8%	4%	0.849	4.026	0.0
5- The proportion of the requested loan is considered low compared to the size of the loan required (margin rate)	20%	50%	20%	8%	2%	0.825	3.412	0.0
6- There are a lot of routine administrative procedures when applying for the loan	28%	52%	12%	8%	0%	1.096	1.096	0.0
7- The approval of the loan application needs to be a long period of time by the management.	12%	38%	30%	16%	4%	1.014	3.326	0.0
8- The microfinance institutions to provide advisory services to borrowers.	12%	30%	16%	34%	8%	0.877	3.512	0.0
9- Commercial banks are considered the best of microfinance institutions specialized in the provision of funding for the project.	12%	48%	22%	14%	4%	0.922	3.521	
10- The government, in turn, is required to provide support and encouragement to finance small projects	16%	32%	24%	20%	8%	0.954	3.643	0.0
11- Loan application was rejected in advance prior to obtaining the required financing	23%	24%	20%	30%	3%	1.15	3.12	0.0
12- Facing difficulties and persistent problems in the payment of installments due in a timely manner.	6%	44%	44%	2%	4%	1.156	3.162	
General Average						0.958	3.484	

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## The Lead-Lag Effect on the Predictability of Returns: The Case of Taiwan Market

By Latifa Fatnassi Chaibi

*Abstract-* The aim of this paper is to investigate the lead-lag effect on the predictability of returns. This analysis is applied to daily and one-minute interval data on the TAIWAN stock market. The results indicate evidence of predictability between indices with different degrees of liquidity and when considering one-minute interval data.

*Keywords:* return predictability, lead-lag effect, impulse-response function.

*GJMBR-C Classification :* JEL Code: D53



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# The Lead-Lag Effect on the Predictability of Returns: The Case of Taiwan Market

Latifa Fatnassi Chaibi

**Abstract-** The aim of this paper is to investigate the lead-lag effect on the predictability of returns. This analysis is applied to daily and one-minute interval data on the TAIWAN stock market. The results indicate evidence of predictability between indices with different degrees of liquidity and when considering one-minute interval data.

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## I. INTRODUCTION

The lead lag effect according to Tonin et al. (2013) is perceived when there is a relationship between the price movements of two distinct markets, when one of them leads and the other follows with some lag time when this effect is identified, there is a rupture of the Efficient Market Hypothesis (EMH) in consequent the predictability of returns.

Several studies have investigated the lead-lag effect on the predictability i.e. Lo and Mackinlay (1990), Camillerie and Green (2004). All the studies conclude that the predictability is attributed to the lead-lag effect. Thus, study aims to examine the lead-lag effect and its impact on predictability of returns of Taiwan stock market. To this end, this paper is organized as follow: in the first section, we go through a literature review of the lead-lag effect. In the second section, we presented the data and methodologies. The empirical results are summarized in the third section.

## II. LITERATURE REVIEW

Camilleri and Green (2004) examined the lead-lag effect on the Indian market using three approaches: Test Pesaran Timmermann, VAR model, Granger-Causality and Impulse-response function on daily and high frequency data. The results imply that lead-lag effect appears to be the main source of the predictability of returns.

Oliveira et al. (2009) examined the existence of lead-lag effects between U.S stock market (NYSE) and the Brazilian stock market (Bovespa). They concluded that the price movement in the NYSE is followed by similar movements in Bovespa which would enable predicting stock prices in the Brazilian market, thus providing arbitrage opportunities.

The aim study of Tonin et al. (2013) is to examine the lead lag effect between the stock market of

the BRIC member countries from March 2009 until to March 2013. The result emphasizes that the Brazilian market leading others stock exchange analyzed in periods before and after the financial crises.

TSE (1995) examined the lead-lag relationship between the Nikkei spot and futures contract about Nikkei index and found that lagged changes in futures prices cause adjustments in the spot price, in the short run, but the reserve is not true.

Meric et al. (2008), study the co movement and causality to markets in the United States, United Kingdom and six asian markets. The authors used the technique of Principal Analysis to determine if the standards of co movement of the markets of USA, UK, AUSTRALIA, CHINA, RUSSIA, INDIA, JAPAN and SOUTH KOREA have changed with periods before and after September 11<sup>th</sup>, 2001.

Pena, Guelman and Rabelo (2010) analysed the relationship of Dow Jones index and the Nikkei-225 index with the Bovespa index with daily data of the variation of three indexes in the period of January 2006 to May 2008. The results identified contemporary relations between Dow Jones and Bovespa indexes. The authors also indicate the possibility of lag in the relationship between Bovespa and Nikkei 225 indexes.

Nakamura (2009) shows the existence of lead-lag effect between the equity markets and the integration of the Brazilian stock market and their deposits in the American depository receipt (ADR s).

Mulliaris and Urratia (1992) shows that the lead-lag effect for six major stock market indexes, comaparing these indices between the periods before and after the crises of 1987 submitted significant changes between those periods.

## III. DATA AND METHODOLOGY

The analysis of the lead-lag effect on the predictability of returns is applied on the daily and high frequency data of Taiwan stock exchange. The daily set constitutes of the closing observations of the TSEC (Taiwan stock exchange corporate) and the TSEC Midcap. The main and the less liquid index respectively. The daily data period ranges from 30/04/2002 to 05/04/2012.the high frequency data included the value of both indices and the study period lasts between 03/03/2012 to 07/03/2012. We begin first by the unit root test (ADF). Subsequently, we will analyze the lead-lag effect on the predictability of return using three

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methodologies VAR, Granger Causality test and Impulse-Response function. In what follows we present these different methodologies.

#### a) Granger-Causality Test

The Granger-causality methodology is based on the estimated VAR. Granger [1969] showed that a shock affects a given time series, generates a shock to other time series and then the first series is due to Granger in the second. In this case, the VAR model of a time series appears to be an AR adjusted under other delayed time series and an error term. The VAR model is a means of modeling causal and feedback effects (feedback effect) when two or more time series according to Granger cause the other. The term does not imply causality; it may be the case of inter-relationships between time series caused by an exogenous variable. A bivariate VAR model may be formulated as follows:

$$x_t = \sum_{i=1}^n \alpha_{1i} x_{t-i} + \sum_{i=1}^n \beta_{1i} y_{t-i} + \mu_{1t} \quad (1)$$

$$y_t = \sum_{i=1}^n \alpha_{2i} x_{t-i} + \sum_{i=1}^n \beta_{2i} y_{t-i} + \mu_{2t} \quad (2)$$

Where  $x_t$  and  $y_t$  are two variables assuming to Granger-cause each other, whilst  $\mu_t$  is an error term. The system of two equations (1) and (2) is formulated by the following vector:

$$\begin{bmatrix} x_t \\ y_t \end{bmatrix} = \begin{bmatrix} \alpha_{1i} & \beta_{1i} \\ \beta_{2i} & \alpha_{2i} \end{bmatrix} \begin{bmatrix} x_{t-i} \\ y_{t-i} \end{bmatrix} + \begin{bmatrix} \mu_{1t} \\ \mu_{2t} \end{bmatrix}$$

$$IRF_y(n, \delta, \omega_{t-1}) = E[y_{t+n} / \varepsilon_t = \delta, \varepsilon_{t+1} = \dots = \varepsilon_{t+n} = 0, \omega_{t-1}] - E[y_{t+n} / \varepsilon_t = 0, \varepsilon_{t+1} = \dots = \varepsilon_{t+n} = 0, \omega_{t-1}] \quad (3)$$

Where:

$\delta_t$  is a shock at time t;

$\omega_{t-1}$  is the historical time series

$\varepsilon$  is an innovation

IRF is generated from t to t + n.

## IV. EMPIRICAL RESULTS

This section reports the results of the analysis of a lead-lag effect on the predictability of returns of Taiwan stock market. In both cases daily data and high frequency, the ADF test results show that the two indices are no stationary in level (ADF values are higher than their critical values for different significance levels). However, in first differences, the logarithmic price indices are stationary I (1). To clarify this idea of stationarity of the series, we turn to study the

The Granger causality implies market inefficiency in the sense that fluctuations generate an index fluctuation leads to a fluctuation in another index. This means that if the first fluctuation was justified by new information, the latter fluctuation should have occurred at the same time, ruling out lead-lag effects. Therefore when testing for Granger-Causality using daily data, one should expect contemporaneous relationships if the markets are efficient and if there are not non-synchronous trading effects.

#### a) Impulse-Response Function

One of the main uses of the VAR process is the analysis of impulse response. The latter represents the effect of a shock on the current and future values of endogenous variables. VAR models can generate the Impulse-Response Functions. The response of each variable in the VAR system to a shock affecting a given

variable: either a shock on a variable  $x_t$ , can directly affect the following achievements of the same variable, but it is also transmitted to all other variables through dynamic structure of the VAR. The impulse response

function (IRF) of the variable  $y_t$  to a shock on the variable  $x_t$ , occurring in time t, can be viewed as the difference between the two time series:

- ♣ The realisations of the time series  $y_t$  after the shock in  $x_t$  has occurred; and
- ♣ The realisations of the series  $y_t$  during the same period but in absence of the shock in  $x_t$ .

This can be formulated in mathematical notation as follows:

autocorrelation of TSEC (LT) and TSEC Midcap (LTM) series at different delays. The autocorrelation coefficients are high and decline slowly indicating the existence of a unit root. What is the evidence that the logarithmic series of two indices are I (1). In what follows, we analyze the lead-lag effect on the predictability of returns using three methodologies, namely the VAR, Granger causality and impulse response function.

According to both AIC and SC criteria we obtain a VAR (1) for the logarithmic daily and high frequency series of indices LT and LTM. Estimation of individual equations of the VAR systems are reproduced in table 1 (in APPENDIX)

The lead-lag effect between the two indices can be derived from a significance of the coefficients of two equations. From Table1, we can see that there is no lead-lag effect, since the coefficients of LKM (-1) and LK



(-1) are not significant at the 5% and therefore it no relationship between the two indices. But in the the case of the high frequency data, we find that the coefficient that are significant indicating a led-lag effect and delayed returns of LTM can explain returns of the dependant variable LT.

In order to investigate further the Granger causality tests are applied to the system of two equations. The results obtained for a number of delay equal to one for daily and high frequency data are given in Table 2.

Table 2 : Granger-Causlity Test

Daily data

Null Hypothesis	F-Statistic	Probability	
LTM does not Granger Cause LT	0.42530	0.51441	
LT does not Granger Cause LTM	1.32350	0.25015	
VAR Pairwise Granger Causality			
Dependent variable: LT			
Exclude	Chi-sq	Degrees of Freedom	Prob.
LTM	0.425301	1	0.5143
All	0.425301	1	0.5143
Dependent variable: LTM			
Exclude	Chi-sq	Degrees of Freedom	Prob.
LT	1.323501	1	0.2500
All	1.323501	1	0.2500

High frequency data

Null Hypothesis	F-Statistic	Probability	
LTM does not Granger Cause LT	1.07610	0.29976	
LT does not Granger Cause LTM	0.49364	0.48243	
VAR Pairwise Granger Causality			
Dependent variable: LT			
Exclude	Chi-sq	Degrees of Freedom	Prob.
LTM	1.076101	1	0.29971
All	1.076101	1	0.29971
Dependent variable: LTM			
Exclude	Chi-sq	Degrees of Freedom	Prob.
LT	0.493649	1	0.48248
All	0.493649	1	0.48248

The null hypothesis hypothesis that LTM does not cause LT is accepted when the probability associated is greater than the usual statistical threshold of 5%. Similarly, the null hypothesis that LT does not cause LTM is accepted threshold of 5%. These different VAR performed in this section confirm the evidence of a relationship and the TSEC index generate TSEC Midcap in case of high frequency data.

The analysis of the Impulse-Response function of each indices and for both daily and high frequency data, reveals the following results:

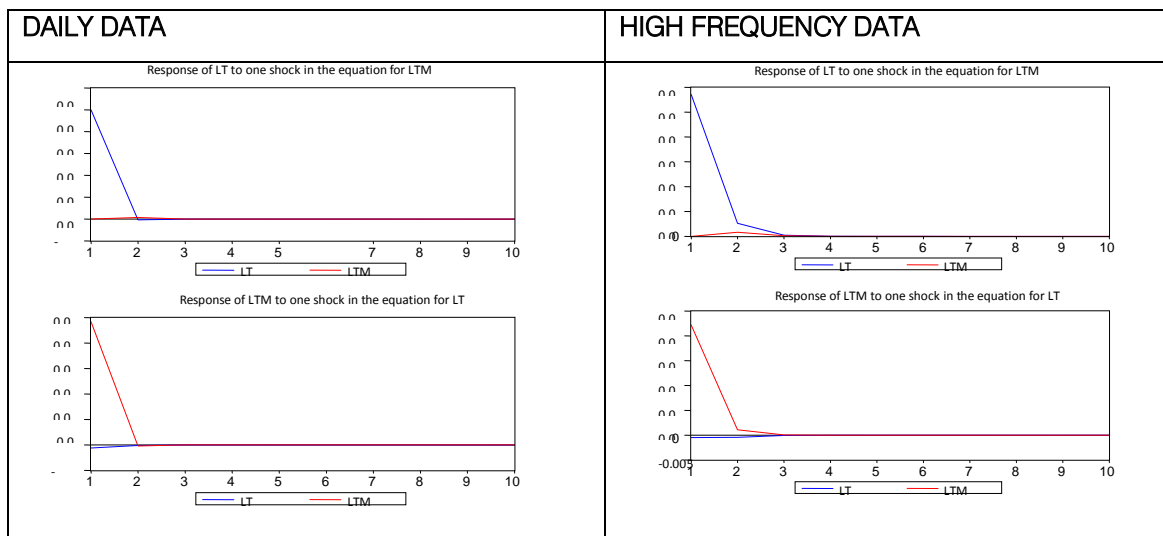


Figure 1 : Impulse-Response Function

If data is daily, a TSEC shock had a higher impact on the TSEC Midcap index. For the case of one-minute frequency, a TSEC shock generates a higher impact on the TSEC Midcap index. This is attributed to a lead-lag relationship.

This study, based on impulse response functions, can be supplemented by an analysis of variance decomposition of forecast error. The objective is to calculate the contribution of each of the innovations

in the variance of the error. The results for the study of the variance decomposition are reported in a Table 3. The variance of the forecast error is due to LT for about 99.97% to its own innovations and to 0.02% with those of LTM. The variance of the forecast error is due to LTM 0.067% to the innovations of LT and 99.93% to its own innovations. We can deduce that the impact of a LT shock on LTM is important but there is almost lower than the impact of a LTM shock on LT. For the case of high

frequency data: The variance of the forecast error of LT is due to 8% of LTM innovations while that of LKM 75.09% is due to innovations LT. So the impact of a LT shock on LTM is more important than the impact of a LTM shock on LT:

*Table 3* : Decomposition of the variance of the LK and LKM series

*Données journalières*

Variance Decomposition of LT:			
Period	S.E.	LT	LTM
1	2.50E-09	100.0000	0.000000
2	2.50E-09	99.97866	0.021340
3	2.50E-09	99.97865	0.021345
4	2.50E-09	99.97865	0.021345
5	2.50E-09	99.97865	0.021345
6	2.50E-09	99.97865	0.021345
7	2.50E-09	99.97865	0.021345
8	2.50E-09	99.97865	0.021345
9	2.50E-09	99.97865	0.021345
10	2.50E-09	99.97865	0.021345
Variance Decomposition of LTM:			
Period	S.E.	LT	LTM
1	2.42E-09	0.065231	99.93477
2	2.42E-09	0.067311	99.93269
3	2.42E-09	0.067312	99.93269
4	2.42E-09	0.067312	99.93269
5	2.42E-09	0.067312	99.93269
6	2.42E-09	0.067312	99.93269
7	2.42E-09	0.067312	99.93269
8	2.42E-09	0.067312	99.93269
9	2.42E-09	0.067312	99.93269
10	2.42E-09	0.067312	99.93269
Ordering: LT LTM			

*Intervalle d'une minute*

Variance Decomposition of LT:			
Period	S.E.	LT	LTM
1	0.054759	100.0000	0.000000
2	0.067947	99.92130	0.078704
3	0.068060	99.91973	0.080267
4	0.068061	99.91972	0.080284
5	0.068061	99.91972	0.080284
6	0.068061	99.91972	0.080284
7	0.068061	99.91972	0.080284
8	0.068061	99.91972	0.080284
9	0.068061	99.91972	0.080284
10	0.068061	99.91972	0.080284
Variance Decomposition of LTM:			
Period	S.E.	LT	LTM

1	0.016367	24.50274	75.04973
2	0.019423	24.90636	75.05936
3	0.019435	24.91379	75.07862
4	0.019435	24.91387	75.08861
5	0.019435	24.91387	75.08861
6	0.019435	24.91387	75.08861
7	0.019435	24.91387	75.08861
8	0.019435	24.91387	75.08861
9	0.019435	24.91387	75.08861
10	0.019435	24.91387	75.08861
Ordering: LT LTM			

These results concluded that the predictability of LTM index by LT returns. These results are consistent with those shown by the impulse response function. In these studies, we can conclude that the lead-lag effect can generate a predictability of returns of the two indices of Taiwan stock exchange in the case of frequency data.

## V. CONCLUSION

The purpose of this chapter is to study the impact of the lead-lag on the predictability of returns Taiwan stock exchange via the examination of effect. Three methodologies were adopted on daily and high frequency data of two indices. These are different levels of liquidity based on bid-ask spread. Specifically, in the high-frequency data, the results show that the more liquid index leads the less liquid. In the conclusion the lead-lag effect cause the predictability returns on the Taiwan stock exchange.

## APPENDIX

Table 1 : OLS estimation of VAR equations (daily data and high frequency data)

OLS estimation of a single equation in the unrestricted VAR				
Dependent Variable: LOG TSEC(LT)				
Method: Least Squares				
Sample(adjusted): 30/04/2002 12/03/2008				
Included observations: 1452 after adjusting endpoints				
Regressor	Coefficient	Std. Error	t-Statistic	Prob.
Constante	0.00746	0.00304	24.5594	0.0000
LT (-1)	0.0151	0.0271	0.5561	0.5782
LTM(-1)	-0.00692	0.0263	-0.2630	0.7926
R-squared	0.000266	Mean dependent var		7.9200
Adjusted R-squared	-0.001114	S.D. dependent var		2.50E+09
S.E. of regression	2.50E+09	Akaike info criterion		46.12207
Sum squared resid	9.08E+21	Schwarz criterion		46.13298
Log likelihood	3348.162	Durbin-Watson stat		1.997158
Fstas	0.192[0.0245]	System LogLikelihood		6691.312
Diagnostic tests				
Test Statistics	LM version		F version	
A : Serial Corrélation	6..1997 [0.0450]		F(1, 1451)=3.1024 [0.0452]	
B : Normality	6.40340[ 0.0000]		Not applicable	
C : Heteroscedasticity	77.30856[0.12045]		F(1, 1451)=51.8300 [0.1205]	
A : Lagrange Multiplicateur Test of residual serial correlation				
B : Based on a test of skewness and kurtosis of fitted values				
C : Based on the regression of squared residuals on squared fitted values.				

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# The Impact of Leasing Decisions on the Financial Performance of Industrial Companies

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*Introduction-* a) *Preamble:* The contractual agreement represents the lease between the two Parties, the lessee and the lessor, and gives the contract to the lessee the right to use certain assets for a specific time period owned by the lessor in return for periodic payments paid by the tenant for the owner. the use of leases have largely spread because of the advantages offered by the leases as an alternative to owning originally included leases many magazines including ships, aircraft , land , and buildings..

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# The Impact of Leasing Decisions on the Financial Performance of Industrial Companies

(Analytical Study of Industrial Companies Listed on the Amman Stock Exchange Stock Exchange in the Period from 2002 to 2011)

Marwan Mohammad Abu Orabi

## I. INTRODUCTION

### a) Preamble

The contractual agreement represents the lease between the two Parties, the lessee and the lessor, and gives the contract to the lessee the right to use certain assets for a specific time period owned by the lessor in return for periodic payments paid by the tenant for the owner. The use of leases have largely spread because of the advantages offered by the leases as an alternative to owning originally included leases many magazines including ships, aircraft, land, and buildings.

The leasing historically runs from the date of the Pharaohs and in Iraq, thousands of years ago people were working in the lease, such as rental of agricultural land and agricultural equipment. Leasing was well known in Islamic economics. In fact leasing exists in Islamic economics and is named *Ijara*; *Ijara* leads to acquisition. Leasing currently is based on Western experience, as with regard to leasing in the modern era, after the industrial revolution and after the Second World War, there was a need for the use of industrial machinery and equipment to keep pace with developments in those countries were not allowed at the time to own land were established leasing companies to help secure the land as well to finance industrial machinery and equipment, which was to keep pace with the industrial revolution. Aftermath World War II, leasing companies were specifically established in U.S.A. and Europe, where banks were not permitted to do this job, and at the time when banks noticed that the leasing companies are working well and contribute to the growth of the economies of their countries, the banks asked to be allowed to exercise the lease and were allowed to do so. The banks at the moment were the biggest beneficiaries of the system of leasing. In this study, the researcher will analyze the data of industrial sector companies in Jordan for a number of years in an attempt to see the impact the leasing decisions on the performance of these companies.

## II. RESEARCH COMPONENTS

### a) The research problem

The political changes at the end of the eighties of the twentieth century have led to unprecedented economic transformations represented by moving trend towards market economy, and the adoption of the privatization policy which gave the private sector the largest relative weight in the economic activity, and entailed the search for methods of financing new and more flexibility to suit the conditions of the market economy to finance large capital equipment in the infrastructure sectors, and the implementation of programs of structural reforms to replace the declining traditional funding sources.

The research problem lies in the absence of the use of non-traditional methods of financing, such as leasing, which can be used by the Jordanian industrial companies, as industrial companies need to finance some of their projects due to lack of financial liquidity for these establishment, which helps to them improve their financial performance.

Despite the importance of lease in the work of industrial companies, but most companies do not rely on leasing in their operations, so the problem of this research is set to answer the following questions:

1. Does leasing enhance the financial performance of the Jordanian industrial companies?
2. Does Leasing intend to achieve profits for Jordan's industrial companies?
3. Does leasing affect the risks of Jordan's industrial companies?
4. Does leasing have an effect on the liquidity of the Jordanian industrial companies?
5. What are the factors and variables affecting the leasing decision of Jordan's industrial companies?

### b) The importance of the research

The investment funding is the cornerstone of infrastructure projects in general and industrial companies in particular, and because of the high capital costs as well as the continued need for working capital in the operational phases of the maintenance, replacement, and renewal of the productive assets to maintain levels of productivity and to improve it if



possible, and in this context the lease is one of the methods of funding that has been introduced as a significant funding method in the recent times as a suitable tool to face the global challenges related to funding sources. In addition to being a system of financing designed to attract savings necessary new capital market, it also achieves a lot of advantages through the modernization of equipment and selection of advanced technology necessary to raise production efficiency and increase competitiveness.

The leasing is the perfect solution in many circumstances where there are no sources of funding necessary or rising costs as the cost of other funding sources, and the importance of research is also came through the international attention through the issuance of several accounting standards, which describes the accounting treatment for leases and how it is disclosed, such as the International Accounting Standards (IAS 17) and the American Accounting Standards (FASB13) The Canadian Accounting Standards (section 23065).

#### c) *Research objectives*

This research aims to assess the effect of leasing decisions on the financial performance of industrial companies listed on the Amman Stock Exchange for Securities through the following objectives:

1. Identify the impact of leasing on the financial performance of industrial companies in Jordan.
2. Identify the impact of leasing on the profits of industrial companies in Jordan.
3. Identify the impact of financial leasing on the financial risk in the Jordanian industrial companies.
4. Identify the impact of leasing on the liquidity in the Jordanian industrial companies.

#### d) *Research hypotheses*

After reviewing the research problem and in order to achieve the goals of research, researcher will test the following hypotheses:

##### i. *The main hypothesis*

leasing decisions have significant effects on the financial performance of the Jordanian industrial companies.

The ramifications for this hypothesis is the following null-hypotheses:

$H_{0_1}$ : There is no statistically significant effect of leasing decisions on the profitability of the Jordanian industrial companies.

$H_{0_2}$ : There is no statistically significant effect of leasing decisions on the liquidity of the Jordanian industrial companies.

$H_{0_3}$ : There is no statistically significant effect of leasing decisions on the degree of risk in the Jordanian industrial companies.

$H_{0_4}$ : There is no statistically significant effect of the decisions of leasing on financial performance of the Jordanian industrial companies.

#### e) *Methodology*

This research consists of two aspects: theoretical and practical sides:

1. The theoretical side will depend on the researcher's descriptive approach, content analysis, and comparative studies, as has been described in the scientific literature of Arab and foreign periodicals pertaining the literature of this research in order to cover the key topics for the research variables.
2. The practical side consists of the research community, which includes all Jordanian public shareholding companies within the industrial sector listed at Amman Stock Exchange (ASE) during the period (2001 - 2011), in order to ensure measurement research variables, researcher will exclude companies that meet any of the following conditions:
  - A. Non- trading the company shares during the study period, or part of it for more than 6 months.
  - B. the companies that were registered at ASE after 2011.
  - C. the companies that have been merged during the study period.
  - D. companies that have been suspended from trading its shares during the study period , or part of it.
  - E. companies that do not have enough information regarding the search variables.
  - F. companies that split their shares during the study period.

Research will be based on the annual reports and final accounts and the guide of Jordanian public shareholding companies for the research sample. Collected data of the study shall be compiled and be subjected to the appropriate statistical analysis and testing programs.

#### f) *Research Statistical Design and Data Analysis Methods*

This study is based on studying of the time series with several variables and using special methods of analysis such as time series aided by Parametric Test and Non Parametric Tests, after making sure that the data collected follows the normal distribution track or not by using Colomgrov Smirnov test (KS. test) Klomorov - Smirnov Fit Test. As has been used in previous studies, the measures of central tendency and dispersion were often used to measure the stability financial ratios. However, researcher will depend on these standards also to test the present research variables.

### III. RESEARCH STRUCTURE

In order to achieve the objectives of the research and testing of hypotheses; this research has been divided into the following chapters:

#### *Chapter I: Leasing*

##### *The first topic:*

##### *The second topic:*

*Chapter II: Financial Performance**The first topic:**The second topic:**Chapter III: Applied Study**The first topic:* definition Amman Stock Market and industrial companies listed in it*The second topic:* data analysis and hypothesis testing.

#### IV. PREVIOUS STUDIES

##### a) Study: Wael Qirtam year (1991)

The research problem was in trying to figure out the impact of the decision of purchasing capital assets as well as the impact of rental capital assets on the degree of financial risk in order to compare between them and then to choose the suitable alternative.

This study aimed to develop a balanced approach in making a purchase or lease, so that it is applicable in practice so as the facility, under certain conditions, will reach to a suitable alternative in each situation individually, as well as to measure the impact of this decision on the degree of financial risk faced by the facility.

The study also aimed to identify the extent of the difference between the theoretical models and the actual practice of the process of making a purchase or lease.

A number of hypotheses have emerged from this study, perhaps the most important are:

- There is no effect on the degree of financial risk between the original decision to buy the asset rather than to lease pertaining the transport sector.
- There is no effect of cash flows between the decision to buy the assets rather than leasing them.

The study found the following results:

The transport sector encloses a high degree of freedom in the choice of buying or leasing, so the decision to purchase or lease is completely a financing decision of the first class, where the company compares between the lease or purchase. There are many considerations that the company does not take into account when making a purchase and lease, such as the nature of the cash inflows and outflows for the decision, where the company assumes that all cash flows concerning the purchase or lease are the same.

The process of evaluating the financial implications of the purchase or leasing policy suffers from serious shortcomings in terms of being based mainly on some financial indicators that may be misleading in some cases, such as the ratio of trading and that cannot be relied upon because they are based on historical cost.

##### b) Study: Muayad Al Fadhl, (1991).

The problem of the study was to find out the extent of the use of lease financing to raise the rate of

return on investment as well as the importance of using the present value of the unity of cash instead of the nominal value.

This study aimed to develop a set of proposals and recommendations from the reality of the application in the Arab region about the role leases assets in the financing of investment projects as well as to draw the attention of the departments of economic establishments in the Arab countries, especially those that suffer from a shortage of capital in hard currency, to the importance of using such contracts in their financing of projects and get what they need from fixed assets necessary to start or continue to exercise their economic activity.

This study was purely theoretical the researcher followed the descriptive approach in addition to the use of postulated digital data to illustrate the impact of the default entry of such contracts in the profitability of both the lessor and lessee alike.

The most important findings of this study are:

1. use of lease contracts and the financial ones in particular, will raise the rate of return of investment and equity for both the lessor and the lessee and that is due to emerging leverage.
2. the accounting measurement function for leases uses the present value of cash instead of its nominal value.
3. Adoption of the economic life of the asset, for purposes of determining premium of annual depreciation, if the contract refers to the transfer of ownership at the end of the contract period to the tenant or enclosing a preferential price, but if terms of the contract do not confirm the transfer of ownership of the asset to the lessee it includes a preferential purchase price. Depreciation must be in accordance with the duration of the contract, and for whatever duration to be used in measuring depreciation the benefits and services are apportioned according to the way in which the tenant if it differs from the method used by the lessor.

##### c) Study of Fouad Melegy year (1993)

The problem of the study lies in the possibility of the accounting measurements for financing leases on its profitability for both the lessor and the lessee in the shipbuilding industry.

This study aimed to draw attention to the role played by the leases in the field of maritime transport, which contribute to the financing of investment projects in order to intensify efforts to reach out to suggestions and recommendations that can be guided by them in the field of maritime transport industry in the Arab world and especially for a country that suffers from a lack of capital in foreign currencies.

The researcher in this study has followed the descriptive analytical style and the field study (Applied),

where this study was conducted in the field of Maritime Transport.

The results of this study showed that long-term leases have a positive impact in increasing the rate of return on the lease and equity of both tenants and landlords, this is in light of the availability of financial, administrative and regulatory potential for each of them , and in addition it is to take into account the time value of money , as the investment in the shipping industry is characterized by a length of time and its impact cannot be ignored; therefore it is much better for the tenant to lease the means of transport instead of buying them.

*d) Study of Samir Ramahi year (1995)*

This study deals with a problem over the application of accounting rental contracts in industrial corporations Jordan.

The goal of the researcher of this study is to clarify the aspects related to leasing contracts through clarifying the concept of leasing contracts and knowing the accounting rules laid down in order to stipulate the accounting lay outs of leasing contracts , as well as highlighting the importance of leasing contracts and their accountability in helping the Jordanian industrial public shareholding companies to achieve their missions and to qualify the nature of the contracts used in these companies.

The study also aimed to identify the financing alternatives available to the director and how to compare between these alternatives upon taking a funding decision. This study was conducted on a sample of 46 industrial companies, the study concluded that there was no use of the leasing contracts in the Jordanian industrial corporations and this is due to the lack of awareness among the decision makers to the advantages of rental contracts.

*e) Study of Saeed Lebda year (1995)*

The problem presented in this study is to see the manifestations of non-completion of the Egyptian capital market and the presence of the catalyst on leasing. This study aimed to test and study the effect of the attributes on the Egypt ion market is full of motivation for Leasing, especially as the theoretical justifications for resorting to leasing, which reflect the presence of the manifestations of the imperfection of the Egyptian capital market which are:

- Rapid technological development.
- High rate of interest on loans and credit facilities.
- Exposure to changes in industry prices.
- Non-availability of sufficient cash flow to buy the asset.
- Depreciation of assets in a short time.
- Take advantage of tax benefits.
- Blaming some of the project risk to the lessor.
- Inability to increase the capital of the project.

The most important outcomes of this study include:

1. The companies facing high costs for regular loans have more incentive to use the leasing in accordance with the standard value of the organization.
2. The small-sized companies considered to be more motivated to use financial leasing as compared with the large-sized ones in accordance with the standard value of the company.

*f) Study of Ammar Shaheen year (1997)*

The problem presented in this study is to find out the extent of reliance on the lease as a way of funding the construction sector in Jordan.

Objective of this study was to highlight the advantages of capital leasing and clarify its concept properly, and the definition of lease as a method of financing fixed assets ,elaborating its types and characteristics ,the development of the foundations to take the right decision in financing through leasing in Jordan through leasing and by comparing it with other funding alternatives , and to identify the reasons why the decision-makers in the construction sector in Jordan do accept (or reluctant) to use leasing as a method of financing.

The researcher followed in this study the descriptive analytical method by distributing the questionnaire to each of lessee companies represented by construction companies of buildings, roads and leasing organizations represented by commercial banks and machinery leasing companies.

The most important findings of this study were:

- The decision-makers in the construction companies in Jordan incline in application of the leasing system in their companies.
- Leasing helps companies to update their leased assets with ease they wish to do so , which will enable them to keep pace with the latest technological developments to always lease the latest edition which will lower operating costs due to the update.
- The Jordanian laws and regulations related to the classification of contractors constitute a real obstacle to the application of the leasing system and they need to do some modifications in these laws to enable them make advantage of borrowing via the leasing system.
- The study has shown from the viewpoint of banks and leasing companies that lease mechanisms lacks some aspects regarding the collaterals provided by the lessor companies compared with regular credit collaterals.

*g) Study of Mrs Hiam Al Sayered (1997)*

This study was concerned the problem of the possibility of the application of lease financing

practically to achieve the lowest possible cost at an acceptable degree of financial risk and the application was on Egypt Air. The objective of this study is to take a balanced decision for lease financing so that it is applicable in practice and under certain conditions so as to reach to better financing alternatives and to have an optimally financing portfolio through the least possible cost in an acceptable degree of financial risk.

The researcher in this study followed the descriptive analytical approach by conducting financial analysis and statistical data of Egypt Air in order to identify the impact of the company decisions on the determinants of financial value of the organization.

The most important findings of this study were:

- There is significant inverse relationship between the degree of significant business risk into practice facility and the decision to lease financing.
- There is significant inverse relationship between the degree of risk a moral entity's financial position between the application and the decision to lease financing.

It is found during this study that the researcher presented a general idea of the factors affecting the decision to lease financing, in addition to the statement of the importance of financial leasing as a modern financing method.

#### *h) Study of Mohammed Jalal Al Sayyed (1998)*

The problem concerned in this study is the possibility of rationalizing the accounting treatments for Leasing for both the lessor and the lessee in the light of the different accounting standards and disclosures.

The aim of this study was to examine the types and patterns of different leasing operations, with a focus on financing, and the rationalization of accounting treatments for the leasing operations of both the lessor and the lessee, in the light of the rules and accounting standards of various international, American, Canadian and Egyptian systems, and the importance of and how to disclose in this regard, in addition to evaluating law No. 95 of 1995 regarding the leasing and to clarify the accounting requirements necessary for the application, and the adoption of controls substantive tax exemptions.

The most important findings of this study were:

- The modern economic units need leasing as a way to acquire assets of high-tech and high cost and to overcome the difficulties that might accompany the traditional sources of financing.
- There are multi advantages of leasing for lessors, lessee and the national economy which sustains the state's efforts in the areas of economic and social development.
- The accounting treatments for financial leasing operations and disclosure of rationalization are of deem necessity in order to achieve an integrated

treatment of both the lessors and the lessees in the light of the rules and different accounting standards.

#### *i) Study of Mahmoud Subuh (1999)*

The problem treated via this study was to know the views of academics and accountants in the practical issues of leasing and whether there were agreements or disagreements between the theorists, academics and practitioners regarding the use of leasing as a financing tool.

The aim of this study was to know the views of academic theorists in cases of the use of lease financing of assets, and to know the views of accountant's practical issues in using lease financing of assets, in addition to clarify whether there is agreement or disagreement between the theorists, academics and practitioners pertaining the issues of using asset lease financing.

In this study, the researcher used the descriptive analytical method by distributing a questionnaire to a sample of 100 companies used lease financing.

The most important findings of this study were:

- A small proportion of assets were acquired through financial leasing operations.
- 62% of practitioners consider debt and lease as financing alternatives, while 32% of them believe that are complements.
- 54% of the practitioners see that the most important practical reason to lease a financial asset is to avoid the risk of obsolescence, while 44% of them believe that the reason why the next in importance to the use of this source of funding because it offers off budgetary funding.

#### *j) Study of Nidal Al Arbeed (2000)*

The problem considered in this study was to find out the extent of the leasing application of Syrian commercial banks as a way of investment on the one hand and as a way of funding method for companies.

The main objective of this study was to study the new method of attracting and investing of funds in Syrian commercial banks which is leasing, and to shed light on the accounting problems associated with this type of contracts through the presentation and analysis of the accounting study that was issued by the (FASB) No. / 13 / and the possibility of taking advantage of them to make a proposal of the accounting treatment related to this activity to the Syrian commercial banks.

The most important results of this study is to present of the importance of the leasing activity for Syrian commercial banks, also the study demonstrated the weakness of the policy of Syrian commercial banks to employ their money which led to an imbalance between liquidity and profitability which has led to a decline in the rates of profitability of these banks, this is



decline in the rates of profitability of these banks, this is due to the lack of laws and regulations that govern the employment policies of funds.

k) *Study by Bashar Jamal Nimr (2000)*

The problem concerned in this study is the nature of the legal relationship between the parties in the process of leasing (the supplier, the lessee and the lessor)

The objective of this study is to present the importance of financial leasing contracts in supporting the national economy, and in particular to developing countries for their limited financial resources to gain access to technical development and the advancement of the industry by acquiring the necessary equipment to run projects for the production of goods, and remove them from the process of economic recession to prosperity and integration into the circle of producing countries.

The researcher pointed to the existence of two legal relationships: the first is the relationship between the supplier and the lessee, this a selling one. The second relationship is between the lessee and the lessor, and it is a leasing relationship, and the researcher concluded that these two relationships are integrated to form a leasing contract.

The most important results of this study were:

- The leasing contracts are the most important financial contracts, which play an important roles and essential to the national economy, especially in developing countries.
- The leasing contract is made up of three parties which are: the lessor who is buying the assets, and the supplier who sells the assets, and the lessee who rents these assets.
- The leasing contract is distinguished from other financial contracts as it is composed of three contracts: the sale, the agency and the lease.

l) *Study by Mohammed Khalifa (2001)*

The problem tackled by this study is how the tax for long-term contracts have been treated in accordance with international accounting standards , as well as to study the validity of the general sales tax on leases in accordance with the concept of incoming international standards.

The most important findings of this study is that the leases in accordance with International Accounting Standard proposes is to be subjected to the general sales tax at the conclusion of the lease as long as the leased asset is an industrial commodity subjected to tax, and the lessee of the non- exempted entities are, according to the sales tax law.

m) *Study by Ali Abul Fateh Shata (2001)*

The problem treated in this study is the legality of the lease in terms of legitimacy and the legal verdict on this type of contracts.

The aim of this study was to identify the legality of contracts for purchased leases and ends in ownership along with brief analysis of the overall opinions and jurisprudence of the groups and legal opinions of jurists. Devising measurement bases and Evidence of accounting processes associated with contract administration ended with ownership which are carried out by Islamic banks, whether the bank is a lessor or lessee, in addition to the problems of accounting procedures for those contracts and the ways to address them from Islamic accounting perspective.

The researcher followed the descriptive analytical methods, by conducting an analytical study of accounting problems related to these operations:

- Many of the contemporary scholars see the ability of holding leasing contracts that end by ownership.
- The U.S. standard has more targeted attempts than others by laying the foundations for the accounting for leases financing which end with ownership. This rests upon a comprehensive theoretical integrated framework.

n) *Study by Ramzi Yousef Al-Hajji (2002)*

The problem addressed in this study is associated with the accounting of leasing contracts and the position of the auditor and what are the most important procedures for checking the validity of these contracts.

The purpose of this study indicate the variety of leasing contracts and recommendations of the financial accounting standards laid by the accounting foundations that govern the classification and evaluation of the leasing contracts. The researcher has addressed the accounting problems associated with the long-term leases and the of the auditors' view points of these contracts and the procedures used to examine these contracts. The main results are the following:

- The financial leasing activity is important and must be publicized especially after the release of the decision to allow its exercise.
- There is a need to make some adjustments in the tax and accounting systems and laws in order to fit with the nature of this new activity.
- There are specific procedures that the auditor's have to follow in reviewing financial leasing contracts.

o) *Study by Mohammed Yasin Al Subuu (2003)*

The problem addressed in this study is an attempt to explore the risks to which banks are facing in their capital assets leasing process to companies and the most important accounting practices they follow by in recording and documenting these leasing operations.

The main objective of this study to address the basic accounting practices used to record these leasing operations and the treatment of these contracts and consider them as a kind of investment, and to estimate

the magnitude of risks to banks as a result of dealing in such contracts.

Study main results were:

- There is an upward trend for the use of leasing to help businesses expand and develop their activities.
- The leasing process has a significant contribution to all businesses as it enabled them to use advanced technology which cannot be bought and constantly updated.
- This study highlighted the phenomenon of the tendency of many businesses in Jordan for the use of lease financing to fund their operational expenses instead of resorting to borrowing.
- Leasing has helped to create more profitable outlets and new activities to banks where profits have become increasingly grown.

p) *Study by Sakhr Ahmad Al-Khasawneh, 2004.*

The problem addressed by this study is the importance of the leasing from the legal point of view. The researcher elaborated the importance of the leasing from the law standpoint. Jordanian legislator has developed the Law No. (16) in 2002, which contributed to solving many of the issues that govern the leasing contracts, where a special legislation has been issued which deals with risks taken by the lessee, it is the same legislation developed by international accounting standards

Study main results were:

- The leasing contract is relatively recent, and has sought by the Jordanian legislator by selecting and appointing its own terms as a kind of investment funding to promote and revive the national economy.
- The lease payment is a key element in the financial leasing contract.
- The standard leasing principle in Jordan is that risk is always taken by the lessee.
- The leasing contract is a bilateral contract in terms of the conclusion of in both the lessor and the lessee and the tripartite in terms of implementation which are: the lessor, the lessee, and supplier or contractor.
- The major Character of the lease contract is that the lessee is the only negotiating party with a supplier or contractor, he identifies his needs and agrees with the supplier on the price of the leased asset and the lessor receives the funds from the lessee upon the receipt of the acknowledgment .
- This type of contract is known and accepted by Islamic banks within the certain conditions and regulations consistent with the provisions of Islamic law.

q) *Study of Holmes, (1991)*

The problem addressed in this study is the trade-off between contracts for the purchase of capital versus its lease.

The objective of this study to point out the advantages of asset lease financing as an alternative to the purchase of a capital asset. The study also tackled the case of taking the decision of lease financing, it is often done with a discount rate equals the opportunity cost of the interest rate on loans in order to discount the cash flows associated with the alternative. The study also shows that when evaluating the decision that the asset is leased or purchased through borrowing, cash flows often appear in negative value in the early years and therefore the optimal decision is one that reduces costs as it is often used method of net present value and internal rate of return to make a suitable alternative.

The study pointed out the advantages of leasing as compared to buying in addition to the identifying the aspects of lease financing such as the net present value and internal rate of return which are used upon analyzing the lease funding decision compared to buying .

r) *Study by Branson, (1995)*

The problem addressed in this study is to attempt to answer the question of whether leasing is complementary to borrow or an alternative.

The objective of this study was to find out whether leasing as a is an alternative funding source to borrowing or a complementary, this study was an update of a study Ang and Peterson titled The Lease Ganglion in 1984. The researcher found that the leasing is a complement to borrow but not a substitute for it also researcher noted that there is a significant trend by companies towards the use of leasing during the study period.

s) *Study by Baker (2003)*

The problem tackled by this study is how the financial manager decides on owning the asset or lease it, and was applied on the school and car plants sectors in New Zealand.

This study demonstrated the importance of leasing as a means of funding the acquisition of services asset, in addition to highlighting the role of leases in the field of road transport, which contributes to the financing of investment projects in New Zealand, where as leasing industry is so new. The study focused on how the decisions are to choose between the lease or acquisition using other funding sources. The choice is with reference to the interest rate competition and to choose the alternative that achieves the lowest interest rate possible.

This study was conducted on many businesses, schools, and all those who use the transportation business, where the researcher noted through interviews conducted with specialists in this area that there is a growing demand towards the use of leasing within the financial structure of these companies and institutions. Another study was conducted on one of the largest car factories in New Zealand, where the researcher noted



that this plant has sold 80,000 cars, of which 35% - 40% of these cars were sold through leasing.

## V. LITERATURE REVIEW

### a) Leasing

#### i. *First: the concept of leasing and nature*

Lease is a contractual agreement between two Parties, the lessee and the lessor, this contract gives the lessee the right to use certain assets for a specific time period owned by the lessor in return for periodic payments paid by the lessee to the lessor. This kind of funding has spread largely due to the advantages offered by the leases as an alternative to owning the original assets. Leases include many assets such as: ships, aircraft, land, buildings, etc., Accounting Accord No. (17) Has been introduced as a treatment of leases for all concerned such as lessors and lessees, and the appropriate accounting disclosures for these agreements. The leasing accord covers all kinds of leases except those pertaining natural resources such as oil and mining, also it does not cover contracts relating the use of films, video tapes, manuscripts, patents, copyrights, and the like. The importance of Lease Contracts has increased in our present time because of the numerous advantages they offer to both lessor and Lessee sides. Multiple companies are specialized in dealing with this type of contract due to the growing size of its activities, after special legal legislations have been put to organize its work and to determine the rights and responsibilities of the parties concerned.

The lease is an agreement between the lessor and lessee whereby the lessor gives the lessee the right to use certain asset owned by the lessor - during a specified period versus an amount of cash paid periodically and is called lease. The risk faced by lessors are less than the risk faced by lenders who accept to take an asset as a collateral for the granted loan.

From the perspective of banks, Lease financing is not intended or designed that the lessor will own the assets for itself. it is the process of leasing the asset to be made available for the customer to use the finance against the performance of the value of the lease to be agreed upon, and by the end of the lease period this asset may be sold in public auction, or sold to the lessee or returned to the lessor to re-lease it again.

In general, the lease contract includes the following components:

- characteristics of the asset that determines its type and state.
- Contract Duration: How long the lessee leases out the asset and this may be part of the asset life time, or may cover all the economic valid life of the leased asset.
- The leasing value of the asset: It is a periodic payments paid by the lessee to the lessor and the

nature of these payments: are they equal or decreasing or increasing installments.

- The fair value of the asset: It is the appraised value of the asset upon leasing which usually similar to the market value of the asset that the lessor determines the leasing value of the asset.
- Residual Value: represents the fair market value of the asset or the leased asset at the end of the contract period.
- Contract validity: the ability or inability of contract cancellation: it describes the terms of the contract whether to allow the termination of the lease contract before it ends, and in this case it should illustrate the value of the fine that have to be paid to the lessor.
- Responsibility for the expenses of the asset during the period of the leasing contract: the expenses related to the implementation of the contract, such as the asset maintenance expenses, taxes and insurance on the leased asset.
- The option to purchase the leased asset at a discounted price Bargain Purchase Option: this enable the lessee to buy the leased asset at a discounted price at the end of the leasing contract.
- The requirement to renew the contract if the economic life of the asset exceeds the duration of the contract.
- Any other protection conditions as agreed by the lessor and lessee.

Jordanian law No. (16) for the year 2002 has defined Leasing as "the contract under which the lessee is entitled to use the asset in exchange for the lease, paid to the lessor. The lessee has to bear any risks related to the leased asset.

#### ii. *Secondly, the main characteristics of the process of leasing*

The main characteristics of the process of leasing as has been identified by the Union of equipment leasing within the definition of Leasing context as "a contract between the lessor and the lessee in order to lease a specific asset from a distributor or an industrial company specialized in such assets at which the lessor retains the asset ownership. And the lessee retains the possession of the asset and use it against specific leasing payment for a certain period of time, "and these characteristics lies in the following points:

1. Selected assets that are leased from either from its supplier, from the facility that manufactures those assets, from a bank, or from a specialized company or individual.
2. The lessor retains ownership of the asset, and this asset is one of the things the concept of tenancy where it should not be for the lessee the right to acquire the asset at the moment or at a future date , otherwise this will be considered as a purchase in installments

3. As long as the lessee is committed to pay the leasing payment and meets all the other conditions of the lease, he has the full right to use the asset throughout the period of the lease.
4. There is a certain time period where the lease is binding and irrevocable and called period of primary or mandatory which could be lengthened or shortened depending on the type of the lease, and during that period the lessee tries to recover at least what has been invested, or at least part of it with adequate profit to be realized from the leasing process.
5. The burden of technical obsolescence of the asset during the term of the lease is located entirely on the lessee, where he cannot cancel the lease at any time under the pretext that the leased asset has become technologically obsolete.
6. The responsibility of maintenance and insurance relies upon the type of leasing contract. Usually, the burden is on the lessor in the case of operating lease and on the lessee in the case of financial leasing. Or as may be agreed upon.

#### iii. *Third, the parties to the process of leasing*

1. Lessor: the party who finances the purchase of the asset of his own and leased it to the lessee with the condition of retaining his ownership of the asset during the lease period.
2. lessee: the party who determines the standards of leased asset, deadline and place of receipt, the lessee shall bear the costs of maintenance, repair and insurance of the asset with its pledge to maintain it during the term of the lease and authorize the lessor for any claims for third-parties pertaining the asset. Against the use of the asset, lessee pays periodic payments to the Lessor cover part of the cost of the asset, benefits, and profit margin.
3. Supplier or producer who is supplying the asset to the lessee upon the orders of the lessor in the light of the specifications that may put by the lessee.

#### iv. *Fourth: Leasing as an activity*

The mechanism of leasing is clarified as follows:

1. The lessor - which is usually a financial institution - funded purchase specific assets and the required knowledge of a company or institution (lessee) and lease it long-term contract is irrevocable to cover payments rental - during the period of the contract - money paid originally, benefits and profit margin, and so close to the the so-called full coverage of the value of assets.
2. Expresses this type of leasing activity financing for the purchase of equipment or capital assets for leasing.
3. Borne by the tenant - without the lessor - all maintenance and repair costs, taxes and other, but

may be required to enter into a maintenance contract with a tenant or product supplier to ensure the continued validity and efficiency of the operation of the equipment.

4. Enable the lessee the opportunity to buy the equipment at the end of the lease duration, either against the residual value of the purchase cost as well as benefits and profit margin, or at prices determined at the beginning of the lease contract.
5. Allow the lessee an opportunity to renew the contract for a period or periods at a symbolic leasing price.

#### v. *Fifth: the advantages of leasing*

##### a. *The advantages of leasing for the national economy*

1. The productivity of capital assets adds great additions to the national GDP. , and as the leasing does not require full funding (100%) so the leasing contracts contribute to the progress of the economic development programs.
2. Leasing contracts are considered as stability factors for the sustainability of investments during crises and economic changes.
3. Finance of capital assets through leasing requires potentially qualified working hands to provides speed in the implementation of the projects.
4. Leasing contracts help in Keeping pace with technological developments, raises the production quality, reduces cost, and increase the level of investment opportunities by opening new markets at home and abroad.
5. Since the right of ownership to the lessor remains when using the method of leasing, and as the profit made by the lessee may exceed his profit by buying, this brings us to the profit realized for ways to lease assets but not purchase them.

##### b. *The advantages of leasing for the lessee*

Lessees usually evaluate investments on the basis of expected cash flow but not on the basis of expected profits. The lessee will differentiate between r purchase and lease by cash outflows related to any of these resolutions, where limited cash outflows in the case of lease installments, while maintenance expenses are usually borne by the lessor.

One of the main advantages for the tenant:

1. the tax savings achieved as a result of downloading all operating expense payments decade leading to the reduction of the value of taxable profit ( ) .
2. to achieve the advantages of financing through savings in cash instead of using it to buy the leased asset , and use this liquidity to finance the working capital needed for operations rather than directed to capital funding .
3. improves the financial position of the lessee, which saves him from borrowing to buy assets and thus reducing his commitments which improves the

image of the financial indicators in the balance sheet. And thus financial will be lowered. At the same time this will raise the rate of return on assets and Leads to improves the image of the financial position.

4. reduce the asset risk as a result of becoming obsolete and transfer this risk to the lessor at the end of the contract and give him the right to change the original leased asset by another which will be more efficient.
5. low of interest cost as the lease regarded as an operating expense, thereby reducing the proportion of credit and resulting to a better credit rating.

*c. The advantages of leasing for the supplier*

Most important advantages are: -

1. It provides an opportunity to take advantage of excess of idle assets and get excess returns on these assets.
2. It provides him with an opportunity to market the commodity of goods produced by the lease and provided a refund for the leased asset with payoff.
3. The opportunity of selling the leased asset to the lessee at the end of the life term of the lease.

*d. The advantages of leasing for the lessor*

The lessor assesses the investment decision of the commodity on the basis of evaluation of the lease, where this decision is based on cash outflows and inflows together and the difference any on a net basis between the two (the difference between cash inflows and outflows) inflows represented premium lease in addition to the sale value of the asset at the end of the lease period, and cash outflows represented in all expenses that represent the actual use of money (such as maintenance expenses and taxes on profits from asset leasing. We can say that the advantages enjoyed by the lessor are the same advantages enjoyed by the supplier, but the lessor has the additional advantage in reducing the cost of bankruptcy:

- In case exposed the charter company to the risk of bankruptcy, the lessor position will be better than the lender position, as the lessor in this case can get on the original lease, while for the lender on the original guarantor of the loan is not easy as well to its attendant costs.

*vi. Sixth : Types of leasing*

There are two main types of leasing: Operating Lease and Finance Lease.

The lease is apparent in the form of rent, but it is not, in essence, it is a finance, because the lease is a financing process.

*a. Operating lease*

It is a contract whereby the customer gets fixed asset and used it for a certain period and to return at the

end of the leasing period and has no choice to own the asset at the end of the period.

Advantage of this type of leasing a set of characteristics Perhaps the most important are:

1. This type of lease is not intended to own the asset, and thus the asset is owned by the service provider, the entity provided this service bears the expenses of maintenance, insurance and other expenses.
2. The leasing period should be less than the lifetime of the asset usually a short leasing period basis enables the lessor to lease the asset again.
3. according to the accounting principles, the lease shall not enter into the assets nor the liabilities of the balance sheet which helps to improve the financial status of this client.
4. For tax purposes for this type of lease, each installment is considered an expense eligible for the client deducts the lease expense from taxable income, but as for the sales tax, the full premium is viable and the full sales tax will be added.
5. This a revocable contract, the customer can rescind it at any time.
6. This type of lease is globally used due to its numerous advantages because it is considered a running cost for the lesse organization.

*b. Lease Financing*

1. It is a contract between the lessee and the lessor and fee is required, there is an option for the customer to own the asset or return it back at the end of the lease period according to the agreement signed. If the customer wants to return the asset there must be a text gives the right to return.
2. according to international accounting principles, the lessee enjoys all the benefits and bears all the risks associated with this asset.

*c. Types of financial leasing*

Financial leasing has many forms:

A. leased asset form:

The type of leasing contract which considers the forms of leased asset as it may be transferred item, property, or nonmaterialistic assets.

B. leasing facilities forms:

Financial Leasing is divided into two types:

1. direct financing lease: a direct contractual relationship between the lessor and the lessee.
2. Indirect financing Lease:

The lease funding will be indirect and is transacted through the factory or distributor of the asset, it is intended to introduce the client to the lessor, or what is so-called sales facilities.

C. Asset ownership at the end of the lease contract:

Financial Leasing can be divided into two main sections, according to whether the lessee has

the right to buy the asset at the end of the lease term, financial leasing sections are:

1. keep the residual value of the leased asset.
2. Participation of benefits.

Census parties relationship: It is divided into two sections:

1. direct financing lease:

Transaction is stuck between the lessor and the lessee without the intervention of third parties, or center.

2. multi-parties financial lease:

It is a form of financial leasing, which requires the intervention of several parties to accomplish the process of leasing.

vii. *Seventh: Importance of financial leasing*

importance of leasing of equipment and tools for productive purposes has increased in the developed world within a short period of time and derives its importance for companies, they can be leasing equipment and devices needed in much easier to buy, leasing companies also benefit as it ensures them to get the cash flow in constant pace throughout the productive life of the equipment or the economic life agreed with the charter company, also ensures that they also have to get the cost of these machines, as well as to achieve an adequate return. As for lessees it ensures that the marketing and disposal of large equipment with a high cost for the producers, leasing cost seems much reasonable for them, as it can on the way to get the equipment they need, without having to carry a huge financial burden. The importance of leasing as follows:

1. Provides a means of appropriate funding in light of the need to create projects and renovation of existing ones.
2. to find new areas for investment.
3. contribute effectively to the development and transfer of technology and innovation for the different sectors.
4. to contribute to the alleviation of the rising trend of the prices of products as the cost of this method is less than the traditional ways of funding.
5. activation and development of certain sectors characterized by high value capital equipments.

viii. *Eighth : Leasing experience in Jordan*

In 1984 there was a company in Jordan called " Jordan Leasing" and the International Finance Corporation (IFC) was contributing to the Jordanian company, the main function was in leasing machinery and equipment. However, for more than one reason this company did not continue its activities and was turned into a bank, known as Amman Bank. And thus the leasing service stopped in Jordan for more than one reason, but the most important reason that there was no legal accords and regulations to govern the leasing transactions between the parties, in addition to some of

the difficulties faced by the company where the market was not configured to accommodate such a. and as a result it stopped leasing. since that time and up to 1998 there were no leasing services listed in Jordan at all, until 1998, where authorities concerned have prepared a law draft for Leasing and through it some companies began to work even before the issuance of the Financial Leasing Law, and in 2002 the provisional Law for Leasing was released, where some basic principles were included by this law to cover the legal framework of the related parties, but it did not cover all aspects of the needs of this sector and it is hoped the growth in this area, today there are more than 20 hand holds a license leasing business. Some of these companies are owned by banks and part of the banks involved in this type of financing and there are real estate companies and placed are involved in the leasing business. practice.

Later, the Ministry of Industry and Trade, has issued a number of executive instructions concerning the registration of leasing companies, as well as the Income Tax Department has issued instructions on how to accounting for leasing operations for tax purposes.

ix. *Ninth : The volume of leasing in Jordan*

The volume of leasing in Jordan in 2001, about 35 million dinars accounted for 0.6 % of the total credit facilities with banks, but more importantly, it was followed by a growth in this size until it reached an average during the last five years to 50 Million dinar is a matter of great optimism for Leasing . If we look at the portfolio of leasing note that 48 % of them for the purposes of the property such as residential and commercial complexes, and not all for the purpose of business, even though if the factory leases a land is classified within the business sector, if the Hospital leases land is classified as investment, the basic principle is the same but not for the purposes of financing real estate. Industrial Development Bank has funded property leases for the purposes of industry and tourism are classified as investment property. The transport sector constituted 27 % of the leasing portfolio which is positive because this sector needs development and modernization. The industrial sector amounts to its share of 20%, even if we talked about banking facilities for the industrial sector, according to figures from the central bank does not exceed 15% of the size of the facilities. Which means that the leasing organizations contributed to the industrial sector, more than banks, while the other sectors such as the medical sector had a limited share of leasing.

x. *Tenth: The difference between the regular funding and leasing / Case of Jordan*

Bank usually grants overdraft or loans given in the form of cash, the Bank usually examines the purpose of granting this facility, while in the leasing the funding is very specific and is conducted in advance where the leasing company will not pay the lessee the



value of the asset until the receipt of the asset, which is determined by the end of lease so they are not up to the other, and when the lessee is selected. This end draw this money out to the particular end and make sure to exploit the funding for this purpose is deem important to the success of the funding process.

For Leasing in general, more than 99% of the leases, which was held in Jordan were originally to ensure the same and there is no other collateral versus the asset, while in regular funding there is usually subject to an additional purpose. For the repayment of public funding in the normal loan is repayable in constant installments, while in the lease, there is flexibility to suit the client's ability and these characteristics are present in leasing such flexibility in the process and the fit with a straight income is the basis of the lease and put the program on the client's needs .

The return for financial leasing is intended to be constant, while in the regular funding does not have a steady income, but variable, also leasing is irrevocable and neither party is able to cancel the contract under any circumstances.

In Jordan, as is the case in many countries, leasing activity is primarily practiced by banks and through specialized departments, and through leasing companies owned by banks, or through suppliers or manufacturers, now in Jordan, there are suppliers exercised leasing activity such automobile companies, machinery factories.

The leasing company gets its money from its capital. As for bank subsidiaries, Central Bank requires that the bank can not lend its subsidiary more than 20% of its capital, and it should resort leasing money for other sources of funding such as mutual funds, pension funds, specialized funds or to issue bonds to the market.

xi. *Ninth: leasing " of the current law and the new law*

Among the obstacles faced by financial leasing in Jordan that there is no clarity regarding the mechanisms and procedures for re- ownership, I am lessor owner of the asset, as there is no court cases in respect of Financial Leasing, either because it is the selection of the customer or that the nature of the service is different from the nature of the service regular funding in the bank, so let no obvious issues for this type of financing.

Related parties as lessor and lessee and the supplier and the duties and rights of each party is defined in the current law , the registration procedures must go to the lessor and the lessee and the Ministry of Industry and Trade and the sign in front of the Registrar and this procedure is counterproductive and has no meaning .

At present there is no tax incentives in the current law, although there should be incentives in some cases. The law of leasing deals with several parties such

as the Ministry of Industry and Trade with the Ministry of Tourism with circles territory and with some ministerial departments such as Transport Regulatory Commission and with the Jordan Investment Board, all of these parties are ignorant about the current law. These form part of the existing defects in the law and in its application.

The "International Finance Corporation" IFC had a significant positive role, where it had made all the preparation of the draft of the new leasing law. , and this project is supposed to address many of the gaps in the current law, when prepared;

The accounting treatment for the leasing company: These companies consider the leasing return is an increase in their revenue, and thus it appears in the income statement, it is treated like a usual revenue for the budget if the lease has been financed through its fund, then net effect becomes on the assets side becomes zero. However, if the leasing company had borrowed to finance this lease, this will increase its value on the asset side, while the liabilities side will be increased by the value of the loan versus leasing.

## VI. DATA ANALYSIS AND HYPOTHESIS TESTING

### a) *Study Variables*

This study examines the (lease financing) as an independent variable and will be expressed in the financing lease and this includes three quantitative indicators:

1. leasing Index,
2. Fixed Assets Turnover index
3. Total Assets Turnover index

Dependant Variable: it is the financial performance which will be expressed in three key indicators are: (liquidity, profitability, risk).

### b) *Collection and data compilation*

The aim of collecting and preparing the data for the purposes of testing study hypotheses:

*Study sample:* all industrial companies listed on the Amman Stock Exchange and engaged in the lease financing as a society for the study, during the period between 2007 -2011.

### c) *Normality Test: Researcher used [Kolmogorov - Smirnov Fit test (K-S test)]*

The results of this test showed that most of the variables of the study data follow a normal distribution, and that, as shown in the following table:



Testing normal distribution : (K-S) test to study variables

Variable	Mean	Stand. Dev.	K - S	Significance Lev.
Leasing Index	0.4274	0.3505	0.043	0.05
Total Assets Turnover index	0.6352	0.3008	* 0.217	0.05
Fixed Assets Turnover index	3.924	5.372	0.000	0.05
Current Ratio Index	3.713	3.027	0.0229	0.05
Quick Ratio	1.972	3.744	0.000	0.05
Net Working Capital Turnover	1.699	11.140	0.000	0.05
Gross Profit	5374851.13	12527688.63	0.000	0.05
Net operating profit	451055.32	7371810.50	0.000	0.05
Net Profit	2755.688	8279765.95	0.020	0.05
Return on assets	0.308	0.115	0.022	0.05
Return on Equity	0.073	1.066	0.000	0.05
Percentage of Gross Profit Margin	0.224	0.184	0.050	0.05
Percentage of operating profit margin	0.503	0.127	0.000	0.05
Percentage of net profit margin	0.009	0.337	0.011	0.05
Earnings / JD	0.185	0.355	*0.213	0.05
Dividend per share / JD	0.143	0.211	0.000	0.05
The standard deviation of sales	3409368.74	7874661.15	0.007	0.05
The degree of financial leverage	1.881	2.260	0.000	0.05
Degree of Operational Leverage	0.725	1.592	0.000	0.05

\* Greater than the significance level of 5% do not follow a normal distribution.

Source: prepared by the researcher in 2014.

#### d) Data analysis

1 - using software (SPSS), the researcher calculates the Pearson correlation coefficient and that, as shown in the table below:

Dependant Variable	Leasing Index -R	R <sup>2</sup>	Total Asset Turnover-R	R <sup>2</sup>	Fixed Asset Turnover-R	R <sup>2</sup>
Current Ratio	% 79.1	0.626	% 42.5	0.181	% 78.6	0.618
Quick Ratio	% 75.1	0.565	% 40.7	0.166	% 74.4	0.554
Net Working Capital Turnover	% 28.4	0.081	% 14.1	0.020	% 8.3	0.007
Gross Profit	% 34.2	0.117	% 28.6	0.082	% 21.6	0.047
Net Operating Profit	% 35.6	0.127	% 23.4	0.055	% 21.2	0.046
Net Profit	% 34.7	0.121	% 23.2	0.054	% 21.2	0.046
Assets Turnover	% 67.8	0.461	% 53.8	0.290	% 74.1	0.550
Equity Turnover	% 40.3	0.163	% 75.6	0.572	% 51.5	0.266
Percentage of gross profit margin	% 59.5	0.345	% 38.7	0.150	% 62.5	0.391
Percentage of operating profit margin	% 58.8	0.346	% 41.8	0.175	% 66.5	0.442
Percentage of net profit margin	% 58.4	0.341	% 51.7	0.325	% 65.9	0.435
Earnings Per Share	% 66.3	0.440	% 42.7	0.183	% 66.4	0.442
Dividend per share	% 57.4	0.330	% 64.8	0.420	% 76.1	0.578
The standard deviation of sales	% 32.7	0.107	% 27.3	0.075	% 18.9	0.036
The degree of financial leverage	% 23.4	0.055	% 48.6	0.237	% 24.5	0.062
The degree of operating leverage	% 47.2	0.223	% 24.3	0.0	% 34.2	0.117

SPSS Test : Using software (SPSS), the researcher developed 3 sets of regression models :

Regression coefficient shows that a low coefficient of interpretation and therefore can be interpreted that the relationship between the variables of the study through the equations of the third degree (Cubic) and Table above shows the coefficient of determination R<sup>2</sup> between the variables of the study.

## VII. TEST OF HYPOTHESES

This study is based on the prime hypothesis that leasing affects the financial performance of industrial companies engaged in the leasing, this main

premise has been subdivided into three sub hypotheses because of the different ways of expressing the financial performance as the dependent variable.

#### a) The FIRST hypothesis test.

i. In conducting the test the impact of the decision of leasing representative, we use the following formula:

$$Y = a + b_1x_1 + b_2x_1^2 + b_3x_1^3$$

$$Y = 5,0016 + 2,2402x_1 + 12,775x_1^2 + 10,475x_1^3$$

Where:

Y = dependent variable = Current Ratio  
 X1 = independent variable = lease index  
 R2 = 0.626  
 R = 0.791

The model indicates that the relationship between the dependent variable (Current Ratio) and the independent variable (the rental index) is not a linear relationship in the sense that the relationship curve takes an upward trend downward trend.

- ii. when testing the effect of the decision of leasing representative] index lease [and liquidity of the company represented] by the quick [, show that this effect can be described through a regression model of the third degree (exponential), according to the following equation:

$$Y = a + b_1x_1 + b_2x_1^2 + b_3x_1^3$$

$$Y = 2,6202 + 7,2327x_1 + 28.046x_1^2 + 16.936x_1^3$$

Where:

Y = Dependent Variable = quick ratio  
 X1 = independent variable = lease index  
 R2 = 0.565  
 R = 0.752

The model indicates that the relationship between the dependent variable (quick ratio) and the independent variable (the rental index) is not a linear relationship in the sense that the relationship curve takes an upward trend downward trend and sometimes at other times.

- iii. In conducting the test the impact of the decision of leasing representative] index lease [and liquidity of the company as measured by] Turnover net working capital], show that this effect can be described through a regression model of the third degree (exponential), according to the following equation:

$$Y = a + b_1x_1 + b_2x_1^2 + b_3x_1^3$$

$$Y = -1,592 + 40,833x_1 + 91,741x_1^2 + 48,682x_1^3$$

Whereas

Y = the dependent variable = Net Working Capital turnover  
 X1 = independent variable = lease index  
 R2 = 0.081  
 R = 0.285

The model indicates that the relationship between the dependent variable (turnover net working capital) and the independent variable (the rental index) is not a linear relationship in the sense that the relationship curve takes an upward trend downward trend and sometimes at other times.

- iv. In conducting the test the impact of the decision of leasing representative] index of fixed asset turnover [and liquidity companies represented] by trading [, show that this effect can be described through a regression model of the third degree (exponential), according to the following equation:

$$Y = a + b_1x_1 + b_2x_1^2 + b_3x_1^3$$

$$Y = 0,4216 + 1,573x_1 + 0,161x_1^2 + 0,005x_1^3$$

Whereas:

Y = dependent variable = Current Ratio  
 X1 = independent variable = turnover of fixed assets  
 R2 = 0.618  
 R = 0.786

The model indicates that the relationship between the dependent variable (Current Ratio) and the independent variable (fixed asset turnover) is not a linear relationship in the sense that the relationship curve takes an upward trend downward trend and sometimes at other times.

With regard to the correlation coefficient R between the dependent variable (Current Ratio) and the independent variable (turnover rate of fixed assets), we find that the link 78.6 % which means that there is a correlation is positive and strong and statistically significant as the value of (sig. t) 0.001 which is smaller than the significance level 0.05 Based on the foregoing, we reject the hypothesis nihilism and accept the alternative hypothesis, which requires the presence of statistically significant effect of the fixed asset turnover ratio and trading of industrial companies listed on the ASE, which engaged in lease financing.

- v. With a decision to test the impact of leasing representative] turnover rate of fixed assets [and the company's liquidity, measured through] quick ratio [show that this effect can be described through a regression model of the third degree (exponential), according to the following equation:

$$Y = a + b_1x_1 + b_2x_1^2 + b_3x_1^3$$

$$Y = 0,387 + 1,592x_1^2 + 0,179x_1^2 + 0,005x_1^3$$

Whereas

Y = dependent variable = quick ratio  
 X = independent variable = turnover of fixed assets  
 R2 = 0.554  
 R = 0.744

The model indicates that the relationship between the dependent variable (quick ratio) and the independent variable (fixed asset turnover) is not a linear relationship, in the sense that the relationship curve takes an upward trend downward trend and sometimes at other times.

With regard to the correlation coefficient R between the dependent variable (quick ratio) and the independent variable (turnover rate of fixed assets), we find that there is a relationship strong and positive 74.4% and statistically significant as the value of (sig. t) 0.001 which is smaller than the significance level 0.05 based on what progress we reject the hypothesis nihilism and accept the alternative hypothesis, which requires the presence of statistically significant effect of the fixed asset turnover and quick ratio.

b) *The second hypothesis test.*

This study will be limited to (the rate of return on assets (RoA) Net Income ratio, AND earnings per share (EPs) dividends Dps).

- i. In conducting the test the impact of the decision of leasing representative] index [and profitability of the company represented by] the rate of return on assets ROA [show that this effect can be described through a regression model of the third degree (exponential), according to the following equation:

$$Y = a + b_1x_1 + b_2x_1^2 + b_3x_1^3$$

$$Y = 0,099 + 0,523x_1 + 2,094x_1^2 + 1,301x_1^3$$

Whereas

Y = dependent variable = rate of return on assets ROA  
 X1 = independent variable = lease index  
 R2 = 0.461  
 R = 0.679

The model indicates that the relationship between the dependent variable (the rate of return on assets ROA) and the independent variable (the rental index) is not a linear in the sense that the relationship takes an upward trend downward trend. With regard to the correlation coefficient R between the dependent variable (the rate of return on assets) and the independent variable (leasing index), the correlation coefficient R = 67.9%, which is a positive correlation and the forces to some extent are statistically significant as the t value is 0.035 which is smaller than 0.05 significance level, so we reject the nil hypothesis And accept the alternative hypothesis, which requires the presence of a statistically significant effect of the lease index on the rate of return on assets of industrial companies engaged in lease financing.

- ii. In carrying out the effect of the decision of leasing representative] index [and profitability of the company represented] by net profit margin [show that this effect can be described through a regression model of the third degree (exponential), according to the following equation:

$$Y = a + b_1x_1 + b_2x_1^2 + b_3x_1^3$$

$$Y = 0, 2261 + 0,529x_1 + -3615x_1^2 + 2,456x_1^3$$

Where:

Y = dependent variable = net profit margin  
 X = independent variable = index hire  
 = R2 0.341  
 R = 0.584

The model indicates that the relationship between the dependent variable (net profit margin) and the independent variable (leasing index) is not a linear relationship in the sense that the relationship takes an upward and downward trends.

In conducting the F-test to measure the validity of the model to represent the relationship between the

dependent variable (net profit margin) and the independent variable (leasing index). Test shows that this model is fit to represent the relationship at the level of significance 0.022 and a confidence degree 97.8 %; this indicates that the model is valid to represent the relationship in question. The value of the coefficient of determination (R2) has reached 34.1 %, which is relatively low, yet it is statistically significant.

With regard to the correlation coefficient R between the dependent variable (net profit margin) and the independent variable (lease index), correlation coefficient has reached 58.4 %, which is a good and statistically significant. The t value is 0.05 which is equal to the minimum significance level 0.05. Accordingly, we reject null hypothesis and accept the alternative hypothesis, which confirms the presence of statistically significant effect for the lease index on the net profit margin of industrial companies engaged in the lease financing.

- iii. In conducting test on the impact of the leasing decision represented by leasing index and the profitability of the company represented by the stock a yield of EPS show that this effect can be described through the third degree (exponential) regression model according the following equation:

$$Y = a + b_1x_1 + b_2x_1^2 + b_3x_1^3$$

$$Y = 1,101 + -4,778x_1 + 1,836x_1^2 + 2,109x_1^3$$

Whereas

Y = dependent variable = Earnings Per Share EPS  
 X1 = independent variable = index hire  
 R2 = 0.440  
 R = 0.663

The model indicates that the relationship between the dependent variable (earnings per share EPS) and the independent variable (leasing index) is not a linear relationship in the sense that the relationship takes an upward trend downward trend.

In conducting the F-test to measure the validity of the model to represent the relationship between the dependent variable (earnings per share EPS) and the independent variable (leasing index) show that this model is fit to represent the relationship at the level of significance 0.019 any degree of confidence of 98.1, this shows that the model is valid the representation of the relationship in question.

Coefficient of determination R2 value has reached 44%, this means that rental index explains 44% of the changes in the dependent variable.

With regard to the correlation coefficient R between the dependent variable (earnings per share) and the independent variable (lease index), researcher found that the correlation percent is 66.3 %, which is positive, fairly strong and statistically significant as the value of t value is 0.030, and therefore the null hypothesis is rejected and alternative hypothesis is accepted.

- iv. In conducting the test of the impact of the leasing financing decision represented by leasing index and company profitability represented by dividends per share (DPS) show that this effect can be described through a degree regression model (exponential), according to the following equation:

$$Y = a + b_1x_1 + b_2x_1^2 + b_3x_1^3$$

$$Y = 2,31 + 0,024x_1 + 4,23x_1^2 + 5,631x_1^3$$

Where:

financing decision represented by leasing index and  
Y = dependent variable = Dividend per share DPS

X1 = independent variable = index hire

$$R^2 = 0.330$$

$$R = 0.574$$

The model indicates that the relationship between the dependent variable (dividend per share) and the independent variable (leasing index) is not a linear relationship in the sense that the relationship takes an upward downward trend.

In conducting the F-test to measure the validity of the model to represent the relationship between the dependent variable (dividend per share) and the independent variable (leasing index) show that this model is fit to represent the relationship at the significance level of 0.024 and 97.7% degree of confidence, this indicates that the model is valid for the representation of the relationship in question.

The coefficient of determination value (R<sup>2</sup>) has reached 33% which means that the independent variable (leasing index) has interpreted 33% of the changes taking place in the dependent variable (dividend per share) and the remaining 67% is due to other factors not included in the model.

With regard to the correlation coefficient, it has reached 57.4% at t value of 0.045 which is smaller than the significance level of 0.05. Accordingly, we reject the null hypothesis and accept the alternative hypothesis, which reflects a statistically significant effect of the leasing index on dividends per share DPS for industrial companies involved in the leasing finance.

- v. In conducting the test the impact of the of lease financing represented by (fixed assets rotation) and profitability of the company represented by (average ROE) shows that this effect can be described through a regression model of the third degree (exponential), according to the following equation:

$$Y = a + b_1x_1 + b_2x_1^2 + b_3x_1^3$$

$$Y = 0,2897 + 1,055x_1 + 0,976x_1^2 + 0,31x_1^3$$

Where:

Y = dependent variable = rate of return on equity

X1 = independent variable = asset turnover

$$R^2 = 0.572$$

$$R = 0.756$$

The model indicates that the relationship between the dependent variable (rate of return on

equity, ROE) and the independent variable (fixed asset turnover) is not a linear relationship, in the sense that this relationship takes an upward and downward trend.

In conducting the F-test to measure the validity of the model to represent the relationship between the dependent variable (the rate of return on equity) and the independent variable (turnover of fixed assets) showed that this model is fit to represent this relationship at 0.021 significance level and 97.9 % confidence degree and this indicates that the model is valid for mentioned representation.

The value of the determination coefficient (R<sup>2</sup>) is 57.2 % which means that the turnover rate of fixed assets explains 57.2 % of the changes in the dependent variable (equity rate of return), while the remaining 42.8 %, are factors other than the turnover index of fixed assets.

With regard to the correlation coefficient (R) between the dependent variable (equity rate of return) and the independent variable (fixed assets turnover rate), we find that the correlation is 75.6 %, which a positive, strong and statistically significant correlation, also (t) value is 0.022 which is smaller than the standard significance (0.05) level; based on the aforementioned, we reject the null hypothesis and accept the alternative one which states that there is a statistically significant effect of the rate of rotation of the fixed assets on the rate of return on equity for public industrial companies listed on the Amman Stock Exchange and are engaged in lease financing.

- vi. In deciding to test the impact of leasing representative (rate of rotation of fixed assets) and profitability of the company represented by (Dividends per share) show that this effect can be described through a regression model of the third degree (exponential), according to the following equation:

$$Y = a + b_1x_1 + b_2x_1^2 + b_3x_1^3$$

$$Y = 0,0969 + 0,093x_1 + 0,029x_1^2 + 0,0016x_1^3$$

Where:

Y = dependent variable = Dividend per share DPS

X1 = independent variable = turnover of fixed assets

$$R^2 = 0.578$$

$$R = 0.761$$

The model indicates that the relationship between the dependent variable (dividend per share) and the independent variable (fixed asset turnover) is not a linear relationship, in the sense that this relationship takes an upward trend downward trend and sometimes at other times.

Upon conducting the F-test to measure the validity of the model which represents the relationship between the dependent variable (dividend per share, DPS) and the independent variable (turnover of fixed



assets), the test showed that this model is fit to represent the relationship at 0.020 significant level, or a 98% confidence degree. This indicates that the model is valid in representing mentioned relationship.

Determination coefficient (R<sup>2</sup>) has reached 57.8 % which means that fixed asset turnover explains 58 % of the changes in dividend per share and the remaining 42.2 % is due to other factors not included in the model. Correlation coefficient (R) between the dependent variable (dividend per share) and the independent variable (fixed assets turnover rate), the correlation is 67.1 %, a positive correlation and strong to some extent and is statistically significant as the (t) value is 0.022 which is smaller than the standard (0.05) significance level, therefore it can reject the null hypothesis and accept the alternative one, which reveals that there is a statistically significant effect of the fixed asset turnover on the dividends of industrial companies listed at Amman Stock Exchange and are engaged in lease financing.

*c) Testing third hypothesis testing.*

HO<sub>3</sub>: There is no statistical significant effect of the decision between leasing and the risk encountered by industrial corporations listed on ASE and engaged in lease financing. There are several risk measures in companies to measure systemic or unsystematic risks these measures include dispersion measures (range, standard deviation, variance, and coefficient of variation) which are suitable for measuring the overall risks (systemic + unsystematic), while financial and operating leverage are two barometers to measure business and financial risks of companies. In this study, the researcher will use three risk measures: sales standard deviation, financial leverage, and operational Leverage:

- i. when testing the effect of the leasing decision represented by the leasing index and companies risk represented by the standard deviation of sales. This effect can be described through a regression model of the third degree (exponential), according to the following equation:

$$Y = a + b_1x_1 + b_2x_1^2 + b_3x_1^3$$

$$Y = -4 \times 10^6 + 7,7 \times 10^7 x_1 + 2 \times 10^8 x_1^2 + 7,7 \times 10^7 x_1^3$$

Where:

Y = dependent variable = standard deviation of sales

X<sub>1</sub> = independent variable = index hire

R<sup>2</sup> = 0.107

R = 0.327

The model indicates that the relationship between the dependent variable (standard deviation of sales) and the independent variable (the leasing index) is not a linear relationship in the sense that the relationship takes a downward trend, and sometimes an upward trend.

When an F-test is used to gauge the validity of the model to represent the relationship between the

dependent variable (standard deviation) and the independent variable (leasing index) show that this model is not fit to represent this relationship as the value of (F) is 0.756 which is greater than the significance level of 5% and the value of the coefficient of determination R<sup>2</sup> has reached 10.7% ,which means that the leasing index explains 10.7% of the dependent variable data (standard deviation of sales) and the remaining 89.3% belonging to factors other than the leasing index and were not included in the model.

Based on the foregoing, we accept the null hypothesis, which means that there is no statistically significant effect of the leasing index on companies risk represented by the standard deviation of sales.

- ii. when testing the effect of lease financing decision represented by leasing index on corporate risk represented by the degree of financial leverage [DFL]. This effect can be described through a regression model of the third degree (exponential), according to the following equation:

$$Y = a + b_1x_1 + b_2x_1^2 + b_3x_1^3$$

$$Y = -1,134 + 28,194x_1 + .73,243x_1^2 + 41,465x_1^3$$

Where:

Y = dependent variable = degree of leverage DFL

X<sub>1</sub> = independent variable = index hire

R<sup>2</sup> = 0.223

R = 0.472

The model indicates that the relationship between the dependent variable (degree of leverage DFL) and the independent variable (leasing I index) is not a linear relationship in the sense that the relationship takes a downward trend, and sometimes an upward trend at other times.

In conducting the F-test to measure the validity of the model to represent the relationship between the dependent variable (financial leverage) and the independent variable (leasing index) show that this model is not fit to represent this relationship as the value of (F) is 0.45 which is greater than the significance level of 5%.

The value of the coefficient of determination R<sup>2</sup> has reached 0.223, which means that leasing index explains 22.3 % of the changes in the data of the dependent variable (financial leverage) and the remaining 77.7 % belonging to factors other than the leasing index and were not included in the model in question.

Based on the foregoing, we accept the null hypothesis, which means that there is no statistically significant effect of leasing index on companies risks represented by financial leverage.

- iii. when testing the effect of the decision of leasing representative] index lease on corporate risk represented] degree of operational leverage [DOL]. This effect can be described through a regression



model of the third degree (exponential), according to the following equation:

$$Y = a + b_1x_1 + b_2x_1^2 + b_3x_1^3$$

$$Y = 1,165 + 1,423x_1 + 2,555x_1^2 + 1,546x_1^3$$

Whereas

Y = dependent variable = degree Lifting operational DOL

x1 = independent variable = index hire

R<sup>2</sup> = 0.055

R = 0.235

The model indicates that the relationship between the dependent variable (degree of operating leverage, DOL) and the independent variable (the leasing index) is not a linear relationship in the sense that the relationship takes a downward trend, and sometimes an upward trend at other times.

In conducting the F-test to measure the validity of the model to represent the relationship between the dependent variable (degree of operational leverage) and the independent variable (index hire) show that this model is not fit to represent the relationship reaching (sig. F) 0.899 which is, of course, is greater than the significance level of 5% .

The value of the coefficient of determination R<sup>2</sup> has reached 5.5 %, which is a low interpretation rate and means that the lease index has explained 5.5 % of the changes in the data of the dependent variable (degree operational leverage) and the remaining 94.5 % belongs to other factors than the leasing index and were not included in the model in question.

Based on the foregoing, we accept the null hypothesis, which means that there is no statistically significant effect of the leasing index on companies risk measured by the degree of operational leverage.

## VIII. THE THIRD TOPIC

### a) First- results

Through statistical analysis, we could extract the following results:

1. The lease financing measured by lease index has statistically significant effect on the liquidity of companies measured by trading ratio. 62.6 % of the changes in the financial performance of the (liquidity) are attributable to the lease financing.
2. The lease financing measured by lease index has statistically significant effect on the liquidity of companies measured by quick ratio. 56.6 % of the changes in the financial performance (quick ratio) are attributable to lease financing.
3. The lease financing measured by lease index has statistically significant effect on the liquidity of companies measured by the rate of rotation of net working capital. Hence the rate of rotation of the net working capital can not be relied upon as an indicator of liquidity. The reason behind this is the

fluctuation in the volume of companies sales and its impact upon the turnover of net working capital, thus it could be argued that the net working capital turnover is not a substitute for companies' liquidity.

4. The lease financing measured by the fixed assets rotation rate has a statistically significant effect on the liquidity of companies, measured by trading rate. 61.8 % of the changes in the financial performance (liquidity) is attributed to the turnover rate of fixed assets and it could be argued that the turnover rate of fixed assets can be a substitute and an indicator of lease financing.
5. The lease financing as measured by the rate of rotation of the fixed assets has a statistically significant effect on the liquidity of companies, measured by the quick ratio. 55.4 % of the changes in the financial performance (quick ratio) are attributable to lease financing.
6. The lease financing measured by lease index has a statistically significant effect on the profitability of companies measured by return on assets (ROA), 46.1 % of the changes in corporate profitability is attributable to the lease financing.
7. The lease financing measured by lease index has a statistically significant effect on the profitability of companies measured by net profit margin. 34.1 % of the changes in profitability are attributable to the lease financing.
8. The lease financing measured by lease index has a statistically significant effect on the profitability of companies measured by EPS. 44% of the changes in EPS are attributable to the lease financing.
9. The lease financing measured by lease index has a statistically significant effect on the profitability of companies measured by profits distributed per share (DPS). 33% of the changes in corporate DPS are attributable to lease financing.
10. The lease financing measured by the rate of rotation of fixed assets has a statistically significant effect on the profitability of companies measured either by return on equity (ROE) or dividends per share (DPS).
11. It is found that 57.2 % , 57.8 % of the changes in the financial performance (profitability)[ROE, DPS] are attributed to lease financing .So it is worth to conclude that the lease index and turnover of fixed assets index can be used as agents to lease financing .
12. The lease financing measured by the lease index (turnover of fixed assets) does not have a statistically significant effect on the risk of companies measured financial leverage, operational leverage, and the standard deviation of sales).

Where the interpretation rate is low (10.7%, 22.3%, 5. 5%); this may be due to the dialectical proportional relationship between risk and return. It is found that lease financing increases the profitability of companies, but rises the corporate risk accordingly.

## IX. SECOND: RECOMMENDATIONS

Based on the results of this study, the researcher recommends the following:

1. Researcher proposed three indicators to measure financial leasing is (leasing index, total assets ,turnover index, fixed assets turnover index) , based on the theoretical framework and previous studies , researcher thinks that other indicators could be used as replacements for lease financing such as rent installments.
2. researcher recommends using other measures to reflect the companies' risk such as beta coefficient which measures systemic risk, covariance, or standard deviation of earnings instead of the standard deviation of sales.
3. The study was conducted on industrial companies listed on the Amman Stock Exchange for the period (2007-2011); however, the researcher recommends that other researches to be conduct this on other companies or other sectors and different periods.
4. companies that use lease financing are urged to compare between the lease expense and amortization rate before embarking on a rental asset.
5. companies that use high leverage levels are urged to develop plans and programs for high productivity rates and get rid of idle equipment in order to achieve profitability for the company and reduce financial risks .
6. Researcher recommends that corporations to expand the use of lease financing as an activity rather than buying the asset.

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# Assessing the Role of Electronic Payment Systems in Financial Institutions. A Case of a Savings Bank in Zimbabwe

By Robert Nzaro & Norest Magidi

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**Abstract-** This research sought to evaluate the role of electronic payment systems in financial institutions using a case of a Savings Bank in Zimbabwe. The research objectives were; to find the types of electronic payment systems used by the savings bank, to assess the role of electronic payment systems on operations of the savings bank and to find the merits and demerits of using electronic payment systems in savins banking. This research used a descriptive survey design. The findings were based on data obtained from 20 savings bank employees, 40 savings bank customers and five savings bank top managers from Causeway and Bindura branches. Questionnaires and face to face interviews were used to obtain primary data and secondary data was obtained through studying information from internet online publications, textbooks as well as latest newspaper articles.

**Keywords:** *electronic payment system, ecocash, western union, telegraphic transfers.*

**GJMBR-C Classification :** *JEL Code: N20*



ASSESSING THE ROLE OF ELECTRONIC PAYMENT SYSTEMS IN FINANCIAL INSTITUTIONS A CASE OF A SAVINGS BANK IN ZIMBABWE

*Strictly as per the compliance and regulations of:*



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**Keywords:** *electronic payment system, ecocash, western union, telegraphic transfers.*

## I. INTRODUCTION

Zimbabwe is a developing country trying to cope with the ever changing nature of conducting business in the twenty first century. One way that business is being affected the world over today involves the use of modern electronic payment systems. The

intense competition for funds on the financial market place and the need to survive such high levels of competition leaves financial institutions with no option but adopt the use of modern electronic payment systems. This is believed to go a long way in ensuring that the financial institution delivers a quality service to its clients at the lowest cost possible. An electronic payment system refers to cash and associated transactions that are implemented using electronic means (Humprey et. al, 2001). The use of the internet and digital stored value systems are typical in this regard, thereby allowing bill payments or debit transfers done directly from the bank. It can be argued that Zimbabwe is lagging behind when it comes to adoption and use of modern electronic payments systems when the country is compared with developed nations, but when the same comparison is done with its sub-Saharan counterparts the adoption and use of modern electronic systems in the country is not far off from the country's regional counterparts.

## II. LITERATURE REVIEW

### a) *Electronic Payment System*

Agimo (2004) define an electronic payment system as that payment by direct credit, electronic transfer of credit card details, or some other electronic means as opposed to payment by check and cash. Accordingly, an electronic payment system is any means used to make payment using an electronic network such as internet. Many new payment services have come into existence in recent years, most of which are based on technological innovations such as card, telephone and the internet (Abor 2004).

### b) *Types of Electronic Payment Systems*

#### i. *Real Time Gross Settlement (RTGS)*

RTGS refers to funds transfer systems where transfer of money or securities takes place from one bank to another on a real time and on a gross basis. 'Real time' means payment transaction is not subjected to any waiting period and 'gross settlement' means the transaction is settled on one on one bunching or netting with any other transaction. Once processed, the payments are final and irrevocable. RTGS is controlled by the central bank of the country and is most suitable for low volume but high value transactions.

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ii. *Automated Teller Machines (ATMs)*

This is a combination of a computer terminal, with cash vault that allows a bank customer to access their funds by punching in a PIN (Humphrey et al (2001). Most ATMs are located outside the bank and on public places that are far away from home bank offices offering retail banking services to customers. In the banking halls, there are Point of Sale (POS) machines where the ATM cards are swiped and a customer can access their funds after punching the pin. The customers make deposits, view mini statements and pay their bills over the POS machines (Abor 2004).

iii. *Credit Cards*

These is defined by Pierce (2001) as a plastic card that assures a seller that a person using it has a satisfactory credit rating and that the issuer will see to it that the seller receives payment for the goods delivered. In Zimbabwe, the card holder can go to retail outlets that have Zimswitch to buy their groceries and demand cash backs provided that the account of the card holder has sufficient funds.

iv. *Western Union*

This is defined as money transfer systems were the funds are transferred electronically between countries from the sender to the receiver. The agents are paid a commission for transferring the funds on behalf of Western Union. In Zimbabwe, the western union's agents can only receive but not send money from abroad. They are only allowed to send money from one city to another around Zimbabwe.

v. *Ecocash*

This is a mobile cash transfer facility that was launched by Econet Wireless a mobile cell phone service provider on 30 September 2011 in Zimbabwe. This service allows users of the system to send and receive money, buy airtime and make other payments using their mobile phones. Money can be transferred across different Zimbabwean networks throughout the country using the assistants of agents who include POSB.

vi. *Telegraphic Transfers*

These refer to an electronic means of transferring funds overseas or from one country to another (Annon 2003). It also known as TT which means a cable message from one bank to another in order to effect the transfer of money. The use of telegraphic transfers is believed to reduce cost of transaction considerably and this reduction in cost easily can be transferred to the banks' customers. In the end, the concerned bank will be able to create a competitive edge over its rivals.

c) *Impact of Electronic Payment System on Income Streams and Profitability*

Electronic payment system affects the profitability of a financial institution in a number of ways.

These include issues to do with; convenience, offering variety of services, cost reduction, speed payments, security and accessibility [Birch and Young 1997; Sokolov 2007; Tan and Teo 2000; Aliaskari et al, 2011; Sana et al, 2011; Whitman and Mattord 2005; O' Connell 1996]. In addition, the increase in the use of ATM and POS has a positive impact on economic development, consumption, and trade. Increased presence and adoption of new technologies facilitate payment transactions and in turn has positive impact both on consumption, in particular leisure goods, and trade (AL-Adwan et al. 2013).

### III. RESEARCH DESIGN

A descriptive survey design was used because the study required the collection of data that were descriptive in nature. Questionnaires and face to face interviews were used to obtain primary data and secondary data was obtained by studying information from internet online publications, textbooks as well as newspaper articles. Data was obtained from five top managers of a savings bank, 20 employees drawn from finance and accounting departments from the same company as well as 40 customers belonging to the same company. To ensure data validity and reliability, the researcher carried out a pre-test of the questionnaire first before engaging into a fully fledged data gathering exercise. This was done to ensure that the required data would be collected.

### IV. RESULTS AND DISCUSSION

a) *Commitment towards the Use of Electronic Payment Systems.*

From the surveyed sample, 75% of the surveyed clients reflected little commitment and showed a negative attitude towards the adoption of electronic payment systems on transaction processing. Some clearly pointed out that the use of electronic payment systems such as credit cards would make their funds unsecure. This was so despite the fact that, in Zimbabwe cases of card fraud are not as rampant as those of other countries. Birch and Young (1997) once stated that if the web site holding the customers money does not follow strict security recommendations including strong passwords, the online transaction would become unsecure and the people's funds may be stolen. The surveyed management and staff did not share the same sentiments to those raised by the clients in as far as commitment to electronic systems use and adoption was concerned. The majority of the sampled employees (65%) argued that intensive employment of electronic payment systems would lead to reduced demand for labour hence, would likely lead them losing their jobs as a result. The whole 100% of the surveyed managers supported the use of extensive electronic

systems arguing that it would enhance the profitability of the financial institution.

*b) Types of Electronic Payment Systems used by the savings bank.*

The surveyed sample reflected the following electronic payment systems;

*Table 4.1 : Electronic Payment Systems used by the Savings Bank from all interviewees*

System Type	Often Used (%)	Not sure (%)	Not used (%)
Credit Cards	55	25	20
RTGS	70	10	20
Western Union	35	40	25
Telegraphic Transfers	10	85	5
Cellphone Banking	90	10	-

Source: Survey Data 2013

From the data on table 4.1 above, it is clear that the popular electronic payment systems were cellphone banking which had 90%, RTGS which had 70% and credit card which had 55% responses. Western Union and Telegraphic Transfers were not popular as they had 35% and 10% usage respectively. Abor (2004) stated

*Table 4.2 : Impact of Electronic Payment System on Convenience, Choices Variety, Cost Reduction, Speed Payment, Security and Accessibility to clients*

Response	SA		A		N		SDA		D		Total
Convenience	22	55%	17	42.5%	3	7.5%	0	0	0	0	100%
Choices Variety	22	55%	17	42.5%	3	7.5%	0	0	0	0	100%
Cost Reduction	22	55%	17	42.5%	3	7.5%	0	0	0	0	100%
Speed Payment	22	55%	17	42.5%	3	7.5%	0	0	0	0	100%
Security	22	55%	17	42.5%	3	7.5%	0	0	0	0	100%
Accessibility	22	55%	17	42.5%	3	7.5%	0	0	0	0	100%

Source: Survey Data 2013 Key: SA-Strongly Agree, A-Agree, N-Neutral, SDA-Strongly Disagree, D-Disagree

From the table above, it can be deduced that the majority of the respondents were in agreement that the six pillars of electronic payment systems affected the income streams of a financial institution. Sixty five percent of management and employees strongly agreed that the electronic payment systems had a great impact on the income streams of POSB. AL-Adwan et al, (2013) asserted that electronic funds transfer reduced cost, saved time, improved accuracy, improved reliability and quality of service and this eventually improved the profitability of banks. This was in line with findings of AL-Adwan et al, (2013) who highlighted that countries with more developed retail payment services had better performing banks in terms of both accounting ratios and their profit and cost efficiency. Nader (2011) in a study of Saudi Arabian commercial banks however concluded that the availability of electronic payment systems such as POS terminals did not improve the profit efficiency of the banks in that particular country for the period 1998 to 2007.

that telephone/ cellphone banking, the RTGS and the credit cards were the main types of electronic payment systems that had a significant impact on the income streams of financial institutions. ATMs were singularly pointed out as having the greatest influence on the income streams of financial institutions. A large number of respondents (60%) revealed that cellphone banking had the greatest impact on the income stream of a financial institution. These findings concur to those found by Annon (2003) who postulated that there were different types of electronic payment systems that affect the income streams of a bank but, the most common one being cellphone banking. The findings also discovered that the least expensive type of electronic payment system was electronic banking.

The responses concerning whether or not the six positive impacts of electronic payment system namely; convenience, offering choices/ variety, cost reduction, speedy payment, security and accessibility had an impact on POSB profitability varied though they were in consistent with previous findings. The table below highlights the findings concerning these positive impacts. Clients were asked on whether or not they felt that above factors affected service delivery and the responses are shown in table 4.2 below;

*c) Other Factors Affecting Income Streams of Financial Institutions*

Respondents were asked to show how other factors affected the operations of the savings bank and the responses were as follows;

Factor	Response	Percentage (%)
Internal Control	8	32
Corporate Governance	15	60
Adherence to RBZ Guidelines	2	8
<b>Total</b>	<b>25</b>	<b>100</b>

Source: Survey Data 2013

The majority of the respondents (60%) comprising management and staff indicated the importance of corporate governance on income flows. The issue of corporate governance is strongly supported by the Zimbabwean Banking Act [Chapter 24:20] and the RBZ Banking Regulations Guideline No.1-2004/BSD

on Corporate Governance. Proper internal controls were also cited as having an impact on income flows by 32% of the respondents. Failure to observe central bank guidelines was also cited by 8% of the respondents as causing a fall in profitability. Other issues raised by one of the managers included the political situation as well as the quality of assets owned by the bank. These were heightened as having a great impact on the income streams of the institution.

d) *Challenges of adopting Electronic Payment systems*

The respondents comprising employees and management noted five major shortcomings of adopting electronic payment systems namely; high set up costs, web thievery, and long query solving time as well as auditing challenges. On these issues, the respondents were asked to show whether or not they believed that these factors affected the adoption of electronic payment systems. Table 4.4 below shows the results;

Table 4.4 : Challenges of Adopting Electronic Payments Systems.

Alternative	Respondents	Percentage (%)
Strongly Agree	21	35
Agree	25	42
Neutral	14	23
Disagree	0	0
Strongly Disagree	0	0
TOTAL	60	100

Source: Survey Data 2013.

The above findings concurs with the findings of Birch and Young (1997) who highlighted that if banks failed to use up to date anti viruses or firewalls, personal accounts could be hacked resulting the accessing of confidential customer account information and the making of unauthorized transactions in the customers accounts. According to Mc Andrews (1997) if an error is made when making a payment or if there is a fraudulent transaction made in a certain account, it may become tedious and time consuming to reconcile that because of different laws and legislations of different countries. These findings were also in line assertions raised by Vartanian (2000) that auditing of the system is quite difficult and complicated as compared to auditing of paper which could have been done over years.

V. CONCLUSION

The major types of electronic payment systems used by the savings bank were the RTGS, ATMs, credit cards, cell phone banking, Western Union, ecocash and Telegraphic Transfers. The adoption of electronic payment systems by the savings bank resulted the following benefits; convenience, offering of a variety of services, cost reduction, speed payment, security and accessibility. From the study, it is recommended that the savings bank and other banks in Zimbabwe shift their focus to electronic payment systems to enhance

profitability. Banks were also encouraged to continue investing in more modern electronic payment systems and new technologies as these would result in improved income streams and enhance their profitability. Banks were also encouraged to engage in training and manpower development so as to ensure that staffs become aware of all the electronic payment systems as well as to ensure the growth of e-commerce in the country. The government on the other is advised to constantly review policies that are related to the promotion and adoption of electronic payment systems that affect financial institutions. In this way, it is believed that scarce resources (money) can be efficiently allocated and utilized thereby positively affecting the gross Domestic Product (GDP).

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# Greek Crisis, Stock Market Volatility and Exchange Rates in the European Monetary Union: A Var-Garch-Copula Model

By Adel Boubaker & Jaghoubbi Salma

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**Abstract-** The main objectives of this study are twofold. The first objective is to examine the volatility spillover between seventeen European stock market returns and exchange rate, over the period 2007-2011, in a multivariate setting, using the VAR (1)-GARCH (1,1) model which allows for transmission in returns and volatility. The second is to investigate the dependence structure and to test the degree of the dependence between financial returns using two measures of dependence: correlations and copula functions. Five candidates, the Gaussian, the Student's t, the Frank, the Clayton and the Gumbel copulas, are compared. Our empirical results for the first objective suggest that past own volatilities matter more than past shocks (news) and there are moderate cross market volatility transmission and shocks between the markets. Moreover, the result on the second objective implies that, considering all the financial returns together, the Student-t copula seems the best fitting model, followed by the Normal copula, both for the two sub-period. The dependence structure is symmetric and has non-zero tail dependence.

**Keywords:** *greek financial crisis, return spillover, volatility spillover; foreign exchange rate, var-garch (1, 1)-copula model.*

**GJMBR-C Classification :** *JEL Code: G15; C32; F30*



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**Keywords:** greek financial crisis, return spillover, volatility spillover; foreign exchange rate, var-garch (1, 1)-copula model.

## 1. INTRODUCTION

Understanding the dependence structure across international financial markets remains a crucial issue for risk management and portfolio management. Several studies have focused on the co-movement of world exchange indices during a worldwide financial crisis. Moreover, many researchers have investigated the relationship among worldwide financial markets. There is a great deal of research focusing on the co-movements of international equity markets. Following the stock market crash of October 1987 in the United States, King and Wadhvani (1990) tried to explain why, in October 1987, almost all financial markets collapsed together despite different economic contexts. In 1996, Calvo and Reinhart estimated that the

co-movements of weekly equities returns and Brady bonds, in Asia and Latin America, were higher after the crisis. Baig and Goldfajn (1999) investigated the links between five financial markets which are Thailand, Malaysia, Indonesia, Korea and the Philippines. They tested the statistical significance of the increase in correlation coefficients of exchange markets equity, interest rate and sovereign debt. They confirmed the contagion effect only in Thailand and Malaysia. However; they found that Thailand had not played an important role in the process of contagion during the Asian crisis. Forbes and Rigobon (2002) attempted to test the existence of contagion effect during the following crisis: the U.S stock market crash of 1987, the Mexican peso crisis in 1994 and the crisis in South East Asia in 1997 using daily return data. They showed that the correlation between different countries is not significantly higher during crises. Besides, other examples of research on the co-movements of equity markets can be found in Karolyi and Stulz (1996) and Longin and Solnik (2001), while the methodology used is along the line of correlations and conditional correlations. However, several empirical studies, such as Boyer and al. (1999), Forbes and Rigobon (2001) and Corsetti and al. (2002) showed that the use of the high frequency financial series indicates three types of the bias, because of heteroskedasticity, endogeneity and other omitted variables. Since these limitations of correlation-based models, research has started to use copulas to directly model the dependence structure across financial markets. Works along this line include Rochand Alegre (2005) who tested different structures of dependence, including different type of copulas: the Gaussian, the t-Student and seven other Archimedean copulas to model the dependence of Spanish market returns. Their results reject the Gaussian copula in almost all cases and among the nine structures considered. Moreover, the Student-t-copula provides the best results. Jondeau and Rockinger (2006), Bartram and al. (2007) and Dimitris Kenourgios Aristeidis Samitas (2011) estimate the conditional copulas in order to model the dependence between the major market indices. They report asymmetric extreme dependence between equity returns. Boubaker, A., and Jaghoubi, S., (2011) employ the student-t- copula to model the dependence structure of among a sample of

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eight emerging and eight developed markets. Their results show that this new approach proves more appropriate to describe the non-linear and complex dynamics of the financial market returns than traditional modeling which imply a normality hypothesis. In addition, they confirm the contagious nature of the Subprime crisis between emerging and developed markets. While the above literature focuses on the dependence structure and co-movements in equity markets via copulas, Okimoto (2008) also employs copulas to model the asymmetric exchange rate dependence between US-UK and find that this regime is best described by asymmetric copula with lower tail dependence. Although there is wide literature analyzing the co-movements and the interdependence between the international equity markets and some literature on modeling the dependence structure between the exchange rates via copulas, few use copulas to study the co-movements across markets of different asset types, such as the stock market and foreign exchange rates.

The purpose of this paper is to examine the dynamic correlation and volatility transmission between the European Monetary Union and the FX returns and to explore the dependence structure between daily stock returns, after the occurrence of the current financial Greek crisis. Our paper has similarities and differences with the previous literature. The main similarity is that we try to estimate dependence of financial markets. However, there are several main differences. First of all, while previous empirical investigations of the link between FX markets and stock prices are mainly devoted to developed markets, and sometimes to Pacific Basin countries, our interest is focused on European markets that are member of euro-area and were affected by recent financial Greek crisis. Second, we assess dependence using both correlation and copula functions, and we are agnostic ex ante about which technique is appropriate. Third, unlike most studies in the literature that directly model the dependence structure between FX rates and stock prices, using copula approach, we attempt to estimate this dependence by combining two models which are the VAR-GARCH(p,q) and the Copula techniques to have a joint VAR-GARCH-COPULA model with possibly skewed, fat tailed return innovations and non-linear property. Although, the vector autoregressive-generalized autoregressive conditional heteroskedasticity model (VAR-GARCH) is used to explore the joint evolution of conditional returns, volatility and correlation between the European stock market returns and the exchange rate over the Greek crisis period, the multivariate dependence structure between markets is modeled by several copulas which are perfectly suitable for non-normal distributions and nonlinear dependencies.

The remainder of this paper is organized as follows: Section 2 presents the theoretical background of the dependence measures used in empirical finance and shows how they can be applied to study the extreme co-movements between the European markets. In Section 3, the empirical results are reported and interpreted. We provide summary of our conclusions in Section 4.

## II. METHODOLOGY

Our methodology is based, primarily, on the calculation of linear and rank correlation coefficients between the European market returns. We get series of correlation coefficients between these markets and we study their dynamics changes. Secondly, such as measurements based on linear correlation may lead to misspecification of the dependence structure with its nonlinear portion, copula approach is employed to provide the robust measures of dependences based on the entire joint distributions of variables and also to estimate dependence focuses on the entire structure rather than correlation. Besides, as the copula functions are used to separate the margins and the dependence structure corresponding to a joint distribution, we estimate, in the first step, the parameters of marginal distributions and those of returns and volatilities equations. Then, in the second step, the parameters of the copula taking into account the parameters estimated in the first step.

### a) Correlations

Correlations are the most familiar measures of dependence in finance. Although most studies have focused on measuring the dependence between financial markets have used the Pearson correlation, this coefficient is only reliable when the random variables are jointly Gaussian. Therefore, we consider two other measures of dependence: the Kendall's tau and the Spearman's Rho, which are measures of concordance, generalize the linear correlation, taking into account the joint distribution (and not just marginal) and are dependent on copulas. The rate of Kendall and Spearman's rho are two measures of concordance well known in statistics. They provide a measure of the correlation between the ranks of the observations, unlike the linear correlation coefficient which assesses the correlation between the values of observations. It is necessary to recall the notion of concordance. Let  $(x, y)$  and  $(\tilde{x}, \tilde{y})$  two realizations of a continuous random vector  $(X, Y)$ , then  $(x, y)$  and  $(\tilde{x}, \tilde{y})$  are called concordant if  $(x-\tilde{x})(y-\tilde{y}) > 0$  and discordant if  $(x-\tilde{x})(y-\tilde{y}) < 0$ .

- The Kendall correlation coefficient

Let  $(X, Y)$  a couple of random vectors and  $(X', Y')$  a copy of  $(X, Y)$  that is to say a pair of vectors in all respects identical to  $(X, Y)$  the Kendall's tau is then:

$$\rho_{\tau}(X, Y) = \Pr \{(X - X')(Y - Y') > 0\} - \Pr \{(X - X')(Y - Y') < 0\} \quad (3.2)$$

The Kendall's tau is simply the difference between the probability of concordance and of discordance.

- The Spearman correlation coefficient

Let  $X$  and  $Y$  are two random variables of marginal distributions  $F_X$  and  $F_Y$ . The correlation coefficient Spearman rank coefficient  $\rho_s$  is the Pearson correlation between  $F_X(X)$  and  $F_Y(Y)$  :

$$\rho_s(X, Y) = \rho(F_X(X), F_Y(Y)) \quad (3.3)$$

b) A copula model for asymmetry dependence

Copulas are multivariate distribution functions with standard uniform marginal distributions. An  $m$ -dimensional copula is represented as follows:

$$C(u) = C(u_1, \dots, u_m) \quad (3.5)$$

Where  $u_1, \dots, u_m$  are standard uniform marginal distributions. In such a context, copulas can be used to link margins into a multivariate distribution function. The copula function extends the concept of multivariate distribution for random variables which are defined over  $[0,1]$ . This is possible due to the Sklar (1959) theorem which states that copulas may be constructed in conjunction with univariate distribution functions to build multivariate distribution functions.

*Sklar's Theorem:* Let  $F_{XY}$  be a joint distribution function with margins  $F_X$  and  $F_Y$ . Then there exists a copula  $C$  such that for all  $x, y$  in  $R$ ,

$$\begin{aligned} C(u_x, u_y) &= C(F_X(x), F_Y(y)) \\ &= F(F_X^{-1}(u_x), F_Y^{-1}(u_y)) \end{aligned} \quad (3.6)$$

$$C(u_x, u_y) = F(x, y)$$

$$h_t^{EMU} = c_{EMU} + \alpha_{EMU} (\varepsilon_{t-1}^{EMU})^2 + \beta_{EMU} h_{t-1}^{EMU} + \alpha_{FX} (\varepsilon_{t-1}^{FX})^2 + \beta_{FX} h_{t-1}^{FX} \quad (3.8)$$

$$h_t^{FX} = c_{FX} + \alpha_{FX} (\varepsilon_{t-1}^{FX})^2 + \beta_{FX} h_{t-1}^{FX} + \alpha_{EMU} (\varepsilon_{t-1}^{EMU})^2 + \beta_{EMU} h_{t-1}^{EMU} \quad (3.9)$$

From these two equations above, we can see how volatility is transmitted over time across the EMU and the FX markets. Thus, the past shock and volatility of one market are allowed to impact the future volatility not only of itself but also of all other markets in the system.

ii. Specification of the dependence structure

Here we study five copulas with different dependence structure: the Gaussian copula, the Student-t-copula, the Frank copula, the Clayton and the Gumbel copula. From them, the Gaussian copula is the most popular in finance and used as the benchmark. The following table shows the characteristics of the best known models where the parameter  $C_R$  is the distribution function of joint variables,  $v$  is the degree of freedom,  $\Sigma$  is the variance-covariance matrix,

If  $F_X$  and  $F_Y$  are continuous, then  $C$  is unique; otherwise,  $C$  is uniquely determined on  $\text{Ran } F_X \times \text{Ran } F_Y$  and  $C$  is invariant under strictly increasing transformations of the random variables. Our model aims at capturing the type of asymmetric dependence found in financial markets. For that, two models are specified: the marginal distribution model and the joint distribution model.

i. Specification of the marginal distribution

For marginal distributions, we use a bivariate VAR(1)-GARCH(1,1)<sup>1</sup> model developed by Ling and McAleer (2003) which allows for spillover effects in both returns and conditional volatilities to examine both own conditional volatility for each market and conditional cross market volatility transmission among European Monetary Union (EMU) and the FX rate.

The conditional mean equation of the VAR (1)-GARCH (1, 1) system is giving by:

$$\begin{cases} y_t = c + \phi y_{t-1} + \varepsilon_t \\ \varepsilon_t = h_t^{1/2} \eta_t \end{cases} \quad (3.7)$$

Where

- $y_t = (R_t^{EMU}, R_t^{FX})$ ;  $R_t^{EMU}$  and  $R_t^{FX}$  are the returns on the EMU and FX market indices at time  $t$ , respectively.
- $\varepsilon_t = (\varepsilon_t^{EMU}, \varepsilon_t^{FX})$ ;  $\varepsilon_t^{EMU}$  and  $\varepsilon_t^{FX}$  are the residual of the mean equations for the EMU and FX markets returns, respectively.
- $\eta_t = (\eta_t^{EMU}, \eta_t^{FX})$ , refers to the innovation and is an i.i.d distributed random vectors.
- $h_t^{1/2} = \text{diag}(\sqrt{h_t^{EMU}}, \sqrt{h_t^{FX}})$ ; with  $h_t^{EMU}$  and  $h_t^{FX}$  being the conditional variances of  $R_t^{EMU}$  and  $R_t^{FX}$ , respectively given by:

the parameter  $\theta$  measures the degree of dependence between risks.

<sup>1</sup>See Chan et al. 2005; Hammoudeh et al., 2009 and Arouri et al., (2011) for further details about the VAR-GARCH model.



Table 1 : Copulas models

Noun	Parameters	Copulas
Gaussian	$R$	$C_R(u_1, \dots, u_m) = \Phi_R(\Phi^{-1}(u_1), \dots, \Phi^{-1}(u_m))$
Student	$R, \nu$	$C_T(u_1, \dots, u_m) = T_{\nu, m, \Sigma}(T_\nu^{-1}(u_1), \dots, T_\nu^{-1}(u_m))$
Clayton	$\theta > 0$	$C(u, v, \theta) = (u^{-\theta} + v^{-\theta} - 1)^{-\frac{1}{\theta}}$
Gumbel	$\theta \geq 1$	$C(u, v, \theta) = \exp[-\{(-\ln(u))^\theta + (-\ln(v))^\theta\}^{\frac{1}{\theta}}]$
Frank	$\theta \neq 0$	$C(u, v, \theta) = -\frac{1}{\theta} \ln \left[ 1 + \frac{(\exp(-\theta u)^{-1})(\exp(-\theta v)^{-1})}{\exp(-\theta) - 1} \right]$

### III. DATA AND RESULTS

#### a) Descriptive statistics

We use daily market data from seventeen European stock market indices, for a sample period of February 1, 2007 to December 21, 2011. We choose this period to investigate the impact of the 2009 Greek crisis on the rest of European monetary countries. The countries used in our sample are France (CAC40),

Germany (DAX), Belgium (BEL-20), Spain (IGBM), Ireland (ISEQ), Italy (FTSE MIB), Luxembourg (LUX GENERAL), the Netherlands (AEX), Ostrich (ATX), Portugal (PSI20), Finland (OMX H25), Greece (ATHEN COMPS), Slovenia (SBI TOP), Cyprus (CYSE GENERAL), Malta (MSE), Slovakia (SAX) and Estonia (OMXT). The total number of observations is 1253 for the full sample. We briefly overview summary statistics, then discuss the correlation and copula estimates.

Table 2 : Descriptive statistics of daily stock prices and foreign exchange rates

Stock and FX returns	Mean	S.D	Skewness	kurtosis	Jarque-Bera
CAC40	-0.021238	0.779427	0.139538	7.969773	1289.906 [0.000]
DAX	-0.005244	0.746523	0.118501	8.201018	1414.069 [0.000]
BEL-20	250412.4	138032.6	-0.370712	2.493563	2286.917 [0.000]
IGBM	-0.022659	0.785953	0.240945	8.821721	1777.869 [0.000]
ISEQ-20	-0.041144	0.905208	-0.400758	8.079340	1379.045 [0.000]
FTSE-MIB	-0.038663	0.819882	0.042126	7.258653	944.1836 [0.000]
LUXx	0.001546	0.000965	1.588051	4.654095	649.3023 [0.000]
ATX	1.152728	24.24244	20.33048	415.0361	8928443 [0.000]
PSI 20	-0.027363	0.643563	-0.013060	9.880040	2465.221 [0.000]
OMX H25	-0.016295	0.793113	0.101068	5.686303	377.7563 [0.000]
ATHEN. COMPOS	-0.068151	0.901909	0.168730	6.378040	602.4575 [0.000]
SBI-TOP	0.046487	0.378522	-0.170289	10.76016	3145.580 [0.000]
CYSE	0.018518	0.974732	-0.021023	7.124780	885.2031 [0.000]
MSE	-0.017356	0.305635	0.065548	9.336490	2088.362 [0.000]
SAX	0.023580	0.595649	1.592428	42.12614	60751.30 [0.000]
OMXT	-0.022058	0.657041	0.165734	8.714507	1708.529 [0.000]
EURO/USD	9.05E-05	0.316340	-0.192636	6.300257	577.9667 [0.000]

The returns are in national currencies. The sample contains daily market returns from February 1, 2007 until December 21, 2011. The values in parenthesis are the probability values.

The descriptive statistics for daily returns shown in table 2 suggest that the mean daily stock returns range between -0.068151 and 250412.4 and the standard deviation between 0.000965 and 138032.6. Jarque-Bera tests on log returns data indicate that the normality hypothesis cannot be accepted for these stocks. Furthermore, European stock market returns and exchange rates show the properties of asymmetry, leptokurtosis, and tail dependence; hence, the normality assumption has been severely challenged.

#### b) Empirical results

##### i. Correlation estimates of dependence

Table 3 presents linear correlations, the Kendall's tau and the Spearman's rho rank correlations

between the stock and the exchange rate return pairs, before the financial Greek crisis. We observe that the pair wise correlations are positive for France, Germany, Belgium, Cyprus, Estonia, The Netherlands, Finland, Ireland, Luxembourg, Portugal, Slovakia and Slovenia, indicating that the increase (decrease) of the local stock market is associated with the appreciation (depreciation) of the exchange rate EURO/USD. The Kendall's Taus for our pairs of stock market returns and stock exchange rate are all positive, except for Malta, Ostrich, Athens, Spain, Slovenia, Portugal and Slovakia; showing the probability of concordance is significantly higher than the probability of discordance. The Spearman's Rhos for the pairs in each country are also positive for eleven countries from seventeen which are France, Germany, Belgium, Ireland, Italy, Cyprus, Estonia, the Netherlands, Finland, Portugal and finally Luxembourg. However, the Spearman Rhos are negative



for the rests of European markets. From these results, we can conclude that there are strong rank correlations. The German pair has the strongest dependence,

followed by the Finland pair and the French pair. However, the weakest is in the Spanish pair.

*Table 3* : Correlation measures (2007-2009)

Pairs	Pearson correlation	Kendall's Tau	Spearman's Rho
French pair	0.217002*	0.120057*	0.178925*
German pair	0.241257*	0.127205*	0.191042*
Maltin pair	-0.013309	-0.002404	-9.58E <sup>-0.4</sup>
Belgium pair	0.159411*	0.08665	0.128747*
Irish pair	0.015392	0.021143	0.034781
Austrian pair	-0.053048	-0.050691	-0.072301***
Greek pair	-0.038951	-0.022945	-0.029832
Italian pair	0.093629*	0.048453	0.075733**
Spanish pair	-0.08543**	-0.052023	-0.073413
Slovenian pair	0.007018	-0.002555	-0.001342
Cyprus' pair	0.048925	0.005701	0.0095
Estonian pair	0.118461*	0.059192	0.090004*
The Netherland's pair	0.214112*	0.120367*	0.179963*
The Finnish pair	0.222949*	0.148791*	0.219887*
Luxemburg's pair	0.035408	0.021129	0.037361
Portugal's pair	0.020022	-8.26 E <sup>-0.4</sup>	0.02933
Slovaquie pair	0.014043	-0.005785	-0.007046

*This table gives different correlation measures for each stock-EUR/USD exchange rate daily return pair over the period February 1, 2007 to October 15, 2009. \*, \*\*, \*\*\* denote significance level at the 1%, 5% and 10% respectively. Total observations are 691.*

In table 4, we present these linear correlations and rank correlations measures for each stock-exchange rate return pair after the current financial Greek crisis. The linear correlation, Pearson coefficients, for our pairs of returns are all positive, except for the Cyprus market, showing that, for these sixteen European markets, the increase (decrease) of the local stock market is associated with the appreciating (depreciating) of the exchange rate EURO/USD. Besides, for the Cyprus, when the CYSE price increase (decrease), the EURO/USD exchange rate depreciate (appreciate). Thus, the Cyprus stock market return and the exchange rate evolve in a reverse sense. The Kendall's Taus for our pairs are all positive expecting for

Cyprus, Luxemburg and Slovakia indicating that the probability of concordance is higher than the probability of discordance. The Spearman's Rhos indicate strong rank correlations. The values of Taus and Rhos are consistent with each other and the linear correlation. The Spanish market has the strongest dependence with the EURO/USD exchange rate, followed by the French pair, and the weakest is the Cyprus which has a negative dependence with the exchange rate. Further, the correlation increase and became strong in the post-crisis period. Thus, the stock-exchange rate returns become more dependent when financial extreme events (Greek crisis) occurs.

*Table 4* : Correlation measures (2009-2011)

Pairs	Pearson correlation	Kendall's Tau	Spearman's Rho
French pair	0.399639*	0.261639*	0.38908*
German pair	0.366664*	0.241558*	0.355483*
Maltin pair	0.010872	0.001135	0.005995
Belgium pair	0.328631*	0.231164*	0.338939*
Irish pair	0.309094*	0.186582*	0.281274*
Austrian pair	0.394895*	0.243991*	0.360439*
Greek pair	0.356695*	0.230517*	0.3457*
Italian pair	0.193274*	0.119417**	0.180844*
Spanish pair	0.421876*	0.278678*	0.411704*
Slovenian pair	0.071381***	0.039933	0.063891
Cyprus' pair	-0.066602*	-0.052188	-0.071521***
Estonian pair	0.026679	0.0021	0.00999
The Netherland's pair	0.366036*	0.236823*	0.349146*
The Finnish pair	0.358086*	0.232382*	0.343484*
Luxemburg's pair	0.005246	-0.037053	-0.051663

Portugal's pair	0.202091*	0.113606*	0.173636*
Slovakian pair	0.025096	-0.017324	-0.021232

This table gives different correlation measures for each stock-euro/usd exchange rate daily return pair over the period October 16, 2009 to December 21, 2011. Total observations are 562. \*Indicates statistical significance at the 1% level. \*\*Indicates statistical significance at the 5% level. \*\*\*Indicates statistical significance at the 10% level.

c) Copula results

As the copula model allows us to separate the marginal behavior from the dependence structure, the estimation of copula models is decomposed into two steps: the first for the marginals and the second for the copulas. We employ the VAR-GARCH model for the marginal distributions of each stock index return and exchange rate return series. For the Joint model, we employ copulas with different dependence structure.

market volatility transmission and shocks between the Eurozone stock returns and the foreign exchange rate returns. For that, we use the Euro Stoxx 50<sup>2</sup> stock index for Eurozone (EMU) stocks and the EUR\_USD returns for the foreign exchange market. We experiment on GARCH terms up to p=1 and q=1. The optimal lag order for the VAR model is selected using the AIC and SIC information criteria. The estimation of the bivariate VAR (1)-GARCH (1, 1) for the two sub-period, is presented in table 5.

i. Results of the marginal models

Our objective is to examine both own conditional volatility and shocks and conditional cross-

Table 5: Estimation of marginal models

Variables	EMU		EUR USD	
	Pre-crisis	Post-crisis	Pre-crisis	Post-crisis
Mean equation				
c	0.008778 (0.7207)	0.010827 (0.6136)	-0.007896 (0.5634)	0.017586** (0.0367)
AR(1)	-0.796434* (0.0000)	-0.772413* (0.0000)	-0.570339 (0.7914)	-0.922066* (0.0000)
Variance equation				
c	0.449347* (0.0000)	0.002431 (0.5677)	0.159475* (0.0000)	-6.39E <sup>-05</sup> (0.7902)
$\epsilon_{EMU}^2(t-1)$	0.174233* (0.0000)	0.119697* (0.0002)	-0.000154 (0.9617)	0.045474* (0.0000)
$\epsilon_{FX}^2(t-1)$	0.071939** (0.0424)	0.088273*** (0.0116)	-0.010155 (0.5691)	0.949245* (0.0000)
$h_{EMU}(t-1)$	0.807429* (0.0000)	0.795420* (0.0000)	0.033828 (0.3117)	0.000948 (0.4297)
$h_{FX}(t-1)$	-4.636284* (0.0000)	0.088273*** (0.0116)	-0.894132* (0.0000)	0.003578** (0.0387)

Notes:  $\epsilon_j^2(t-1)$  represents the past unconditional shocks of the j<sup>th</sup> market in the short run, or news.  $h_j(t-1)$  denotes the past conditional volatility dependency. J= EMU, FX. \*, \*\*, \*\*\*indicate statistical significance level at the 1%, 5% and 10%.

We will discuss the empirical results of bivariate VAR(1)-GARCH(1,11) models in terms of own volatility and shock dependence, cross market volatility and shock spillover for the Eurozone stock index and the FX rate, both for the pre-crisis and the post-crisis. During the pre-crisis period and for the EMU, the sensitivity to past own conditional volatility and cross market volatility transmission are significant at the level of 1%, showing that future volatility can be predicted by both the past own conditional volatility in the long run and the cross market volatility spillover. We found the same result for the own shocks or news and cross market shock transmission, indicating a short run persistence. However, the effect of past volatilities is much bigger than the effect of past shocks. This implies that fundamentals matter more than news.

Considering now the FX rate, only the past own volatility is significant but has a negative coefficient, displaying that own shocks and cross market volatility transmission and shocks cannot be used to predict either the future volatility in the long run and the short run persistence. After the occurrence of the Greek crisis, the behavior of these markets changes considerably. Indeed, the cross market volatility and shocks remains significant for the EMU stocks but their persistence diverge. The results show the effect of past shocks on the Eurozone (EMU) become bigger after the crisis, in contrast with the past own shocks effects', showing that news coming from the FX market affect more returns dynamics than past own EMU news. Moreover, cross shocks (or spillover) are more widespread inter-markets after the crisis. However, for the FX market, both own shocks and cross shocks become significant at different level and have a positive effect in the short run. This finding show that past own shocks and shock spillover can be used in predicting future shocks or new. Besides, the foreign exchange market becomes more

<sup>2</sup> Euro Stoxx 50 which is a stock index of Eurozone stocks. This index represents 50 of the largest companies in the Eurozone based on market capitalization and it is reconstituted at the end of each month of August. The Euro Stoxx stock index includes 50blue chip stocks across 12 Eurozone countries.

sensitive to past shocks related to changes in news or noise than fundamentals.

ii. *Results of the joint copula models*

We now present results from our copula estimation. We consider five multivariate copulas, the

multivariate normal, multivariate Student-t, multivariate Gumbel, multivariate Clayton and the multivariate Frank. We first discuss the dependence structure using information criteria for European stock markets and exchange rates. **Table 6** report results from AIC, SIC and HQIC information criteria.

*Table 6* : Comparing dependence structures using information criteria

Models	SIC	AIC	HQIC
Panel A: Pre-crisis			
Clayton	-1266.40	-1270.93	-1269.18
Gumbel	-1093.80	-1098.33	-1096.58
Normal	-6894.37	-7500.95	-7320.14
Student-t	<b>-7450.90</b>	<b>-8060.71</b>	<b>-7879.46</b>
Frank	-972.22	-976.75	-975.00
Panel B: Post-crisis			
	SIC	AIC	HQIC
Clayton	-1144.87	-1149.20	-1147.51
Frank	-888.76	-893.08	-891.40
Gumbel	-1001.04	-1005.36	-1003.68
Normal	-6033.35	-6580.57	-6437.33
Student-t	<b>-6230.29</b>	<b>-6780.04</b>	<b>-6636.91</b>

Notes: AIC, SIC and HQIC are the average Akaike, Schwarz and Hannan-Quinn information criteria. These criteria were chosen to select the appropriate multivariate copula to model the dependence between daily stock-exchange market returns.

For the pre-crisis period, the best model which has lowest AIC, SIC and HQIC is the multivariate Student-t copula, with an average AIC of -8060.71, a SIC of -7450.90 and a HQIC of -7879.46 across countries, closely followed by the multivariate Gaussian copula. In the post-crisis period, the lowest AIC of -6780.04 corresponds to the Student-t copula, followed closely by the Gaussian model. The same results for the SIC and the HQIC information criteria. Thus, according to AIC, SIC and HQIC, the best fitting copula is the Student-t with symmetric tail dependence for the two sub-periods.

To better assess the degree as well as the dependence structure in the euro area, we will examine the relationship between each pair of stock-FX return separately, for the two sub period.

Table 7.A below, reports parameters estimates of bivariate copulas for each pair, before the occurrence of the financial Greek crisis. We note that the parameters  $\theta$  and  $\rho$  measure the degree of dependence between returns and DoF is the degree of freedom in the Student-t copula.

*Table 7.A* : Estimation of copula parameters for the pre-crisis period

Pairs	Copula models	Parameters			Information criteria		
		$\rho$	DoF	$\theta$	SIC	AIC	HQIC
France	Student-t	0.1871			-32.08	-41.14	-37.65
German	Student-t	0.1997	6		-34.16	-43.22	-39.72
Ostrich	Student-t	0.2388	5		-51.96	-61.02	-57.52
Belgium	Student-t	0.1347	5		-24.18	-33.24	-29.75
Netherland	Student-t	0.1882	5		-31.60	-40.65	-37.16
Athens	Student-t	0.2102	4		-47.92	-56.98	-53.48
Malta	Gaussian	-0.001325			11.17	2.11	5.60
Slovakia	Student-t	-0.005494	12		9.37	0.31	3.80
Cyprus	Gaussian	0.01002			6.18	1.65	3.40
Spain	Student-t	0.1805	5		-33.39	-42.45	-38.95
Ireland	Student-t	0.1085	4		-33.60	-42.66	-39.17
Luxemburg	Gumbel			1.026	13.28	4.22	7.71
Italy	Student-t	0.07914	4		-20.55	-29.61	-26.12
Finland	Student-t	0.2297	5		-47.34	56.39	52.90
Estonie	Student-t	0.09449	6		-7.96	-17.02	-13.53
Portugal	Student-t	0.003059	7		3.68	-5.38	-1.88
Slovenia	Gaussian	-0.001467			16.26	7.20	10.69

For all pairs, the dependence parameters; the correlation coefficient  $\rho$  in both Gaussian and Student-t copulas, the degree of freedom DoF in the Student-t copula and the asymmetric dependence parameter  $\theta$  in the Clayton, Gumbel and Frank copulas are positive with the expect for Malta, Slovakia and Slovenia in the pre-crisis period. The correlation coefficient  $\rho$  from the Gaussian or Student-t copula is close to the usual correlation coefficient. The DoF of the Student-t copulas are from 4 to 12, indicating the presence of extreme co-movements and tail dependence. The tail dependence

parameter  $\theta$  for pre-crisis period is 1.026 for the Luxemburg-foreign exchange rate pair. Thus, we can conclude that only the LUX/EUR\_USD pair has asymmetric tail dependence. All the other stock market returns have elliptical symmetric dependence structure (the case of the Gaussian or the Student-t copulas) with the foreign exchange rate.

In order to appreciate both, the dependence structure and the degree of this dependence, after the Greek crisis; we estimate the copula parameters in the post-crisis period.

Table 7.B : Estimation of copula parameters for the post-crisis period

Pairs	Copula models	Parameters			Information criteria		
		$\rho$	DoF	$\Theta$	SIC	AIC	HQIC
France	Gumbel			1.36	-85.73	-94.37	-91.01
German	Student-t	0.3699	7		-73.82	-82.46	-79.10
Ostrich	Gumbel			1.331	-80.20	-88.84	-85.48
Belgium	Student-t	0.353	7		-70.48	-79.12	-75.76
Netherland	Gumbel			1.317	-67.56	-76.20	-72.84
Athens	Gaussian	0.3599			-69.99	-74.32	-72.63
Malta	Student-t	0.006634	40		13.06	4.42	7.78
Slovakia	Clayton			0.02788	13.24	4.60	7.96
Cyprus	Gaussian	-0.07477			2.62	1.70	0.02
Spain	Gaussian	0.4277			-98.60	-102.92	-
Ireland	Clayton			0.471	-38.85	-47.49	-44.13
Luxemburg	Gaussian	-0.05397			7.21	2.89	4.75
Italy	Gumbel			1.139	-20.59	-29.23	-25.87
Finland	Student-t	0.3576	8		-68.87	-77.51	-74.15
Estonie	Gaussian	0.01011			-6.05	-1.73	-3.41
Portugal	Clayton			0.2614	-20.45	-29.09	-25.73
Slovenia	Gaussian	0.06729			3.57	-0.76	0.93

For all pairs, the dependence parameters; the correlation coefficient  $\rho$  in both Gaussian and Student-t copulas, the degree of freedom DoF in the Student-t copula and the asymmetric dependence parameter  $\theta$  in the Clayton, Gumbel and Frank copulas are positive, expect for Cyprus and Luxemburg.

The Spain return has the highest correlation coefficient with  $\rho = 0.4277$ . The DoF of the Student-t copulas are from 7 to 40, indicating the presence of strongly extreme co-movements and tail dependence. The tail dependence parameter  $\theta$  for post crisis period, are from 0.02788 to 1.36. The French pair has the highest tail dependence after the crisis, followed by the Ostrich pair and the Netherland pair. Moreover, the dependence structure between each stock index returns and exchange rate returns is largely changed from a symmetric structure with or not symmetric tail dependence to an asymmetric structure with non-zero and asymmetric upper and lower tail dependence. From our results, we find The Gumbel copula which is limited to the description of a positive dependence structure. Thus, it allows only positive dependence structures or

upper tail dependence, for which the parameter belongs to the interval  $[1, +\infty)$ . We find also the Clayton copula which possesses similar properties to the Gumbel copula. Consequently, the degree of the dependence varies when the financial Greek crisis occurs. Indeed, as we see in tables above, it increased after the crisis, expect of Cyprus which remains symmetric but with zero tail dependence. The degree of the dependence becomes weaker and moves from a positive to a negative one.

Our findings may have important implications in the risk management. First, symmetric dependence structure with zero tail dependence can specify different levels of correlation between the marginals; however, it must possess radial symmetry which doesn't allow to extreme values correlation. Thus, in this case, the dependence has the linear correlation coefficient as measure of dependence. Second, asymmetric dependence structure can have upper tail dependence, lower tail dependence, or both; as such, they can better describe the reality of the behavior of financial markets. Additionally, it indicates the potential of simultaneous

extreme events in both the stock and foreign exchange market. This property of dependence structure is important to international investors who invest in foreign stock markets.

#### IV. CONCLUSION

This paper examines the dynamics relationship between foreign exchange and stock markets in the Economic European Market, after the occurrence of the Greek crisis, using daily data from February 2007 to December 2011. Based on the VAR(1)-GARCH(1,1) model, the results show that past own volatilities matter more than past shocks (news) and there exist moderate cross market volatility transmission and shocks between the markets, indicating that the past innovation in stock market have great effect on future volatility in foreign exchange market and vice versa.

Copula models are used to specify the dependence structure and to examine the degree of the dependence between these two financial markets when the Greek crisis takes place. We employ five multivariate copulas; the multivariate normal, multivariate Student-t, multivariate Gumbel, multivariate Clayton and the multivariate Frank to directly model the underlying dependence structure. We find that, during the pre-crisis period, the major of stock-foreign exchange market returns have elliptical symmetric dependence structure. However, the degree of the dependence become stronger when the financial Greek crisis occurs, presenting asymmetric upper and lower tail dependence between the two financial markets expect of Cyprus which remains symmetric but with zero tail dependence.

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# A Real Options Approach to Contractual Agreements and Value Flexibility

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**Abstract-** Contracts are usually analyzed in the light of the reduction of transaction costs that they may ensure. But this disregards the advantages of strategic flexibility in business relations. In this paper we consider a model of provider-client relation and see how flexibility in the contract (seen as a combination of a *put* and a *call* option) ensures a higher payoff to the involved parties.

**Keywords:** *contracts, transaction costs, real options.*

**GJMBR-C Classification :** *JEL Code: P34*



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# A Real Options Approach to Contractual Agreements and Value Flexibility

Gastón Milanesi<sup>α</sup> & Fernando Tohmé<sup>σ</sup>

**Abstract-** Contracts are usually analyzed in the light of the reduction of transaction costs that they may ensure. But this disregards the advantages of strategic flexibility in business relations. In this paper we consider a model of provider-client relation and see how flexibility in the contract (seen as a combination of a *put* and a *call* option) ensures a higher payoff to the involved parties.

**Keywords:** contracts, transaction costs, real options.

## I. INTRODUCTION

A firm can be seen, abstractly, as a portfolio of agreements with outside partners, yielding costs and benefits. The firm lowers its exposition to uncertainty by means of rigid contracts, but their positive effects are overshadowed by the corresponding loss of strategic flexibility: expected benefits from future business opportunities can be lost due to the binding obligations that force their rejection.

The advantages of contracts, particularly those intended to protect investments in specific assets has been predicated in terms of the reduction of transaction costs [21] [14]. The protection is obtained through low-yield, transaction specific investments, covering the risks derived from three possible sources: malicious behaviors of other agents, contingencies of the market or changes in technology. Most of this literature treats only static models, focusing on behavioral risks. But this approach disregards the maneuvering possibilities of benefitting the strategic flexibility provided by the dynamics of potential market opportunities.

This paper intends to suggest ways to enhance contracts by means of Real Options. We derive decision-making models in which a balance is reached between protection (with its concomitant loss of flexibility) and openness to business opportunities. Our approach complements the literature on strategic trade-offs between flexibility and contracts [2] [3][4] [14]. A brief discussion of these references can help to put into context our own take on the problem. [2] and [3] explore the consequences of contracts over corporate governance, claiming that real options are the right tools for the design of corporate structures. [14], in turn, develops a binomial options model that trades-off agreement and strategic flexibility. Following this lead we will consider a binomial model of valuation of

exchange options on provision contracts. Considering complete information firm-client games, we will see that an adequate balance between profits and punishments allow to support, in Nash equilibria, both the enforcement of contracts and the adequate means to breach them when better alternatives become available.

The plan of the paper is as follows. Section 2 compares the literature on transaction costs with the recommendations of real options analysis, in order to see which aspects should be taken from each of these two approaches. Section 3 develops an example in which a stepwise analysis shows that an adequate degree of flexibility can be good for both parties in a contract. Section 4 draws the conclusions of the exercise and concludes.

## II. TRANSACTIONS COST ANALYSIS VS. REAL OPTIONS

Transaction Cost Analysis (TCA) seeks to design efficient mechanisms, minimizing transaction costs [20] [21]. The ensuing contracts are intended to protect economic relations among agents. Some of their associated costs are due to the transactions leading to agreements. The main sources of transaction costs considered in this literature are:

- *Bounded rationality:* agents are assumed to have only limited capacity of acquiring and processing information, restricting their self-interested decision-making abilities.
- *Generalized uncertainty:* while the intentional behavior of other agents is its main source, the business context in which the firm acts (the economy, the production sector to which it belongs, the technology, etc.) adds more uncertainty to decision-making.
- *Specificity of transactions:* non-specific liquid assets provide efficient mechanisms supporting exit or sale options. Exiting is more costly for specialized and less liquid assets that demand extra provisos for the protection of investments.

Of these, the existence of investments in specific assets and the pervasiveness of uncertainty are perhaps the most important factors. The former involves assets satisfying only specific exchange relations, having low recovery value outside those relations. They are risky in the sense that their excess value can be appropriated by the business counterparts of the firm [10]. Transactional uncertainty, on the other hand, arises

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from unforeseen contingencies. For instance, in the main application of this paper, namely provider-client relations, it amounts to the difficulty of predicting the volume that will be actually demanded to the supplier, due to the volatility of the market in which the client operates. The ensuing renegotiations induce extra costs to be accounted for in the contracts.

While exchange relations could arise without any previous agreement, TCA prescribes vertical integration as a way of minimizing transaction costs, providing coverage against uncertainty. This allows those costs by substituting the market by agreed-on buyer-supplier actions in coordinated fashion [8]. The advantages of vertical integration are evident in stable business contexts, where transaction dynamics and the possibility of new opportunities can be disregarded [14]. If the latter is not the case it becomes necessary to allow a degree of strategic flexibility.

A possible way of achieving strategic flexibility is by means of options and concomitant incentives to respect (or break) contracts. The former bound the responses to the dynamics of the business context, amplifying gains or fixing a lowest value to losses [7]. The theoretical framework in which real options (RO) are analyzed arises with the Black-Scholes-Merton model [5] [11]. While financial problems are mostly analyzed through continuous-time models ([22]), the valuation of strategic flexibility has been carried out in discrete-time frameworks ([19] [1] [12]), which are variants of the classical binomial model [6]. The use of this models allow firms to increase gains and cut down losses [16].

To further compare the prescriptions of TCA and RO notice the both consider sequential decision-making under uncertainty ([21] [18]) as well as the irreversibility and specificity of investments [7] [17]. But they differ in their underlying notions of rationality and their effects on how they handle uncertainty: while RO assumes full rationality and information processing capacity, TCA considers, as said, boundedly rational agents. In the latter case, contracts are incomplete, since not all possible states are conceivable and consequently incorporated into contracts. But these differences allow complementarities between the two approaches. On one hand, TCA focuses on the protection against unexpected behaviors, reducing flexibility, while RO, on the other, provides coverage against environment uncertainty yielding more strategic alternatives. Our approach will take the best from both approaches.

### III. REAL OPTIONS AND GAME-THEORETICAL CONSIDERATIONS: PROVISION CONTRACTS

We will develop a model featuring all the aspects we intend to capture. Consider a input supply contract for which we will determine the benefits of the preservation of assets compared against the loss of

flexibility. More precisely, we will contrast the current value of the contract with that of the option of changing to a potential alternative client. Since transactions are carried out in discrete time we will use a binomial approach for the stochastic model of uncertainty.

On the other hand, the agreement on payments and punishments for breakups are determined as Nash equilibria in complete and perfect information games.

We break our analysis in three: **Case A** assumes a technologically stable environment, determining the value of the contract and the cost of breakup. Uncertainty of demand is obtained in a binomial model. **Case B** adds an option of changing to a new contract. The comparison of the values of the old contract and the option yields costs and benefits of renouncing to the former. Finally, **Case C** introduces further flexibility into the contract, defining:

- 1) The minimal price to be agreed on with the new client, taking into account the costs involved in breaking up the original contract.
- 2) The optimal amounts to be supplied to both the old and new client, assuming that the prices and the plant capacity are fixed.

#### a) Case A: Agreement in a Stable Environment

Consider a supplier  $P$  providing some input to a client  $C$  who uses it to make some final product. To provide this input, a previous investment  $I$  in period  $t_0$  is necessary, yielding benefits starting in  $t_1$ . This investment is highly specific and irreversible. It cannot be deferred and has no certain recovery value. The parties agree to carry out transactions for three periods, negotiating prices ex ante. Suppose the agreed on unit price  $p_c$  of a unit of the final product in  $t_0$  such that  $p_c > c_o$ , where the operation cost is  $c_o$  per unit. Thus, the benefits for  $P$  at any period  $t_1, t_2$  and  $t_3$  are  $p_c - c_o$ . The market value of the product  $v_c$  is such that  $v_c > p_c$ . The demand of input is uncertain, but can modeled as a binomial process where the initial demand of  $C$ 's product is  $q_c \cdot 0$ . Two states are possible: a "good" one in which demand grows by a factor of  $u > 0$ , and a "bad" one in which the demand falls by a factor  $d > 0$ . The risk-less rate of interest is  $r$  per period. The risk-neutral probabilities are thus [6]:

$$p = \frac{(1+r) - d}{u - d} \quad \text{and} \quad 1 - p.$$

<sup>1</sup> This means that in time the demand evolves as follows:

$t_0$	$t_1$	$t_2$	$t_3$
			$q_c \cdot 0 u^3$
		$q_c \cdot 0 u^2$	$q_c \cdot 0 u^2 d$
$q_c \cdot 0$	$q_c \cdot 0 u$	$q_c \cdot 0 u d$	$q_c \cdot 0 u d^2$
	$q_c \cdot 0 d$	$q_c \cdot 0 d^2$	$q_c \cdot 0 d^3$

and the expected demand at period  $t$ ,  $E(q)^t_c = \sum_{k=0}^t \frac{t!}{k!(t-k)!} p^k (1-p)^{t-k} q_{c,0} u^k d^{t-k}$ .

The benefits of a binding contract have to be compared to the results of only agreeing on an initial price without a long term commitment. Assume that both parties agree on an initial price  $\bar{p}_c$  per unit and that in the next three periods each party will try to capture the excess benefits, based on their respective bargaining powers. Furthermore, assume that while  $v_c > \bar{p}_c > c_o$ ,  $\bar{p}_c > \frac{v_c + c_o}{2}$ , i.e.  $\bar{p}_c$  is in the right half of the interval  $[c_o, v_c]$ . At  $t_1$ ,  $P$  worries that  $C$ , being his only customer, will try to get hold of the current value of  $P$ 's own benefits, offering a price  $p_c = c_o$ . On the other hand,  $C$  fears that the monopoly power of  $P$  will allow the latter to fix a higher price  $p_c = v_c$ . Without external providers or customers, both are in a bilateral monopoly situation. In this case  $P$  and  $C$  might agree on keeping the pre-agreed price  $\bar{p}_c$ , or might agree in deviating, sharing the excess benefits in proportion to their bargaining power, which we assume is the same for both. Alternatively, one of the parties may try to impose its terms on the other. In the next periods the parties repeat the game, either agreeing to keep the original price or engaging in another round of bargaining. The following matrix exhibits the strategies and the payoffs the players would get if the parties follow suit:

$P/C$	Keep	Deviate
Keep	$\bar{p}_c - c_o, v_c - \bar{p}_c$	$\bar{p}_c - v_c, v_c - c_o$
Deviate	$v_c - c_o, \bar{p}_c - v_c$	$\frac{v_c - c_o}{2}, \frac{v_c - c_o}{2}$

Since  $v_c - c_o > 0$   $\bar{p}_c - c_o$ , for  $P$  and both  $v_c - c_o > v_c - \bar{p}_c$  for  $P$ , the only Nash equilibrium (in dominant strategies) is that both players *Deviate*. The following matrix shows the corresponding asked prices at all four possible outcomes:<sup>2</sup>

$P/C$	Keep	Deviate
Keep	$\bar{p}_c$	—
Deviate	—	$\frac{v_c + c_o}{2}$

To analyze the outcome in the repeated game consider the discounted cashflows of the agents, represented by the net present value of both agents, given  $C$ 's demand constraints:

$$NPV_P(s_P, s_C) = -I + \sum_{t=1}^3 \frac{1}{(1+r)^t} [E(q)_c^t B_P(s_P, s_C)]$$

$$NPV_C(s_P, s_C) = \sum_{t=1}^3 \frac{1}{(1+r)^t} [E(q)_c^t B_C(s_P, s_C)]$$

Where  $s_P, s_C \in \{Keep, Deviate\}$  while  $B_P(s_P, s_C)$  and  $B_C(s_P, s_C)$  are the instantaneous unit benefits for  $P$  and  $C$  respectively, when they choose  $s_P$  and  $s_C$  at period  $t$ .

<sup>2</sup> Notice that disagreements lead to break-ups of the contract, since a player that chooses to keep the original price would not accept the terms of the other player.

There are of course many cases that can be analyzed. But recall that unilateral deviation leads to the breakup of the contract and zero benefits for both parties. So we will focus on the cases in which either both agree in keeping  $\bar{p}_c$  or both deviate, sharing in equal parts the excess benefits. We have that  $NPV_P(Deviate, Deviate) < NPV_P(Keep, Keep)$ <sup>3</sup> and we assume that  $I$  is less than the discounted flow of benefits at least at  $(Keep, Keep)$ .<sup>4</sup>

But then, if  $C$  agrees on keeping the original price,  $P$  has incentives to deviate. On the other hand,  $NPV_C$  is larger in the stage Nash equilibrium than when both parties agree on keeping  $\bar{p}_c$  and thus has no incentive to agreeing on that.

The traditional way of addressing this in a repetition is by means of a *trigger strategy*, which punishes any move that goes against a desired result [13]. Consider the case in which the original contract is to be enforced, i.e.  $(Keep, Keep)$ . We need to establish the appropriate punishments for both parties,  $(M_P, M_C)$  that make agreeing the dominant strategy in the game and thus keep the price at  $\bar{p}_c$ . Consider the benefits at each period  $t$  when these penalties are enforced:<sup>5</sup>

$P/C$	Keep	Deviate
Keep	$\bar{p}_c - c_o, v_c - \bar{p}_c$	$M_C, v_c - c_o - M_C$
Deviate	$v_c - c_o - M_P, M_P$	$\frac{v_c - c_o}{2} - M_P, \frac{v_c - c_o}{2} - M_C$

To ensure that  $(Keep, Keep)$  is the only Nash equilibrium, it suffices to fix  $M_P$  and  $M_C$  to be larger than  $v_c - c_o$ . That is, larger than the excess benefits of the transaction.

*b) Case B: Agreement on the provision in a dynamic environment*

Let us assume now that the technological environment is dynamic, due to the entrance of new agents, in this case potential customers of  $P$ . As before, assume an agreement between  $P$  and  $C$  at  $t_0$ . But at  $t_1$   $P$  finds a potential new customer  $Z$ . Assuming that  $P$  has a limited capacity of provision, she has to decide on either to respect the original agreement or to break it and make an agreement with  $Z$ . This can be seen as if  $P$  had an option that combines a long call and a put position. Breaking the agreement with  $C$  is like enabling an European sale option, while starting a new relation with  $Z$  is like activating an European buy option (*call*). The latter is exerted at  $t_2$ , at which point  $C$  is dropped by  $P$ . The *put* has null exercise price while the new contract demands a marginal investment in the production facilities of  $Z$ ,  $I_z \ll I$  at  $t_1$  ensuring the flow of resources to  $Z$  in  $t_2$  and a further period  $t_3$ . Given  $Z$ 's initial demand

<sup>3</sup> Due to the condition on  $\bar{p}_c$ .

<sup>4</sup> Since otherwise it wouldn't be rational to sign the initial contract.

<sup>5</sup> We assume that if only one party deviates, the penalty it pays is transferred to the other.



$q_{z,1}$  its uncertainty is described also by a binomial process with rates  $u_z$  and  $d_z$ .

With an agreed on price  $\bar{p}_z$ , given the operational cost  $c_z$  the instantaneous profit of  $P$  is  $\bar{p}_z - c_z$ . On the other hand, the value of one unit for  $Z$  is  $v_z$ . As before, we assume  $0 < c_z < \bar{p}_c < v_z$  with  $\bar{p}_z > \frac{v_z + c_z}{2}$ .

The ensuing game between  $P$  and  $Z$  is summarized as follows (to be repeated in  $t_2$  and  $t_3$ ):

$P/Z$	Keep $_Z$	Deviate $_Z$
Keep $^Z$	$\bar{p}_z - c_z, v_z - \bar{p}_z$	$\bar{p}_z - v_z, v_z - c_z$
Deviate $^Z$	$v_z - c_z, \bar{p}_z - v_z$	$\frac{v_z - c_z}{2}, \frac{v_z - c_z}{2}$

If an agreement with  $Z$  is reached, the penalties for breaking up the contract with  $C$  are  $(MP, MC)$  determined as in case **A**.

The combined option of  $P$  is exerted if the benefits plus the incremental investment and less the penalty for breaking up the agreement with  $C$  yield higher returns than the flow of funds expected from keeping the agreement with this client between  $t_2$  and  $t_3$ .<sup>6</sup>

$$\begin{aligned}
 & -(I + I_z) + \frac{1}{(1+r)} \sum_{k=0}^1 [p^k (1-p)^{t-k} q_{c,0} u^k d^{t-k} B_P(\text{Keep}^C, \text{Keep}_C)] + \\
 & + \sum_{t=2}^3 \frac{1}{(1+r)^t} \left[ \sum_{k=0}^t \frac{t!}{k!(t-k)!} p^k (1-p)^{t-k} (q_{z,1} u_z^k d_z^{t-k} B_P(\text{Keep}^Z, \text{Keep}_Z) - MP) \right] > \\
 & -I + \sum_{t=1}^3 \frac{1}{(1+r)^t} \left[ \sum_{k=0}^t \frac{t!}{k!(t-k)!} p^k (1-p)^{t-k} q_{c,0} u^k d^{t-k} B_P(\text{Keep}^C, \text{Keep}_C) \right]
 \end{aligned}$$

This shows the trade off between respecting an original contract and using the strategic flexibility of options. While a contract reduces exposure to risk it also reduces the possibility of recontracting with a new client.

A  $MP$  defined as in case A ensures that  $P$  will be able to enjoy the benefits of switching to  $Z$  while  $P$  gets compensated for the period of break-up obtaining the equivalent to the highest possible benefit.

c) Case C: Further Flexibility

$P$  can further try to size the largest possible share of the excess benefits in the negotiation with  $Z$ . This involves solving the following problem:

$$\begin{aligned}
 & \max_{\bar{p}_z \in [\frac{c_z + v_z}{2}, v_z]} NPV_P(\text{breakup}) \\
 & s.t. NPV_Z(\text{Keep}^Z, \text{Keep}_Z) > 0
 \end{aligned}$$

where

$$\begin{aligned}
 NPV_P(\text{breakup}) = & -(I + I_z) + \frac{1}{(1+r)} \sum_{k=0}^1 [p^k (1-p)^{t-k} q_{c,0} u^k d^{t-k} (\bar{p}_c - c_o)] + \\
 & + \sum_{t=2}^3 \frac{1}{(1+r)^t} \left[ \sum_{k=0}^t \frac{t!}{k!(t-k)!} p^k (1-p)^{t-k} (q_{z,1} u_z^k d_z^{t-k} (\bar{p}_z - c_z) - MP) \right] >
 \end{aligned}$$

and

$$NPV_Z(\text{Keep}^Z, \text{Keep}_Z) = \sum_{t=2}^3 \frac{1}{(1+r)^{t-1}} \left[ \sum_{k=0}^t \frac{t!}{k!(t-k)!} p^k (1-p)^{t-k} q_{z,1} u_z^k d_z^{t-k} (v_z - \bar{p}_z) \right]$$

The linearity of the problem allows to reduce it to find  $\bar{p}_z$  such that  $NPV_Z(\text{Keep}^Z, \text{Keep}_Z) = 0$ .<sup>7</sup> That is,  $\bar{p}_z = v_z$ .

Another possibility is for  $P$  instead of selling the product to only one client, to sell a fraction to each of them. That is, at  $t_2$  provide a proportion  $f_c$  of the

production to  $C$  and  $f_z$  to  $Z$  (i.e.  $f_c + f_z = 1$ ). Of course,  $C$  and  $P$  will face a potential excess demand of their production, which in turn may impact on larger values of  $v_c$  and  $v_z$  respectively. The contract specifies only the

<sup>6</sup> Here  $(\text{Keep}_C, \text{Keep}_C)$  represents the situation in which the original price  $\bar{p}_c$  is kept between  $P$  and  $C$  while  $(\text{Keep}_Z, \text{Keep}_Z)$  reflects the agreement between  $P$  and  $Z$  on  $\bar{p}_z$ .

<sup>7</sup> We intend an expression  $x \approx y$  to mean that  $x = y$  but  $|x - y|$  close to 0.

provision of amounts  $f_c E(q)_c^t$  and  $(1 - f_c) E(q)_z^t$  at prices  $\bar{p}_c$  and  $\bar{p}_z$  (where  $E(q)_c^t$  and  $E(q)_z^t$  are the expected demands of the final products of  $C$  and  $Z$ , respectively).

It can be easily seen that the incentives to keeping or deviating from the contracts with  $C$  and  $Z$  are the same as before. Thus, the goal of  $P$  would be now:

$$\begin{aligned} & \max_{f_c \in (0,1)} NPV_P(f_c) \\ & s.t. NPV_C(f_c; \text{Keep}_C) > 0 \text{ and } NPV_Z(1 - f_c; \text{Keep}_Z) > 0 \end{aligned}$$

where

$$\begin{aligned} NPV_P(f_c) = & -(I + I_z) + \frac{1}{(1+r)} \sum_{k=0}^1 [p^k (1-p)^{t-k} q_{c,0} u^k d^{t-k} (\bar{p}_c - c_o)] + \\ & + \sum_{t=2}^3 \frac{1}{(1+r)^t} \left[ \sum_{k=0}^t \frac{t!}{k!(t-k)!} p^k (1-p)^{t-k} (q_{c,0} u^k d^{t-k} f_c (\bar{p}_c - c_o) + q_{z,1} u_z^k d_z^{t-k} (1-f_c) (\bar{p}_z - c_z)) \right] \end{aligned}$$

while

$$\begin{aligned} NPV_C(f_c; \text{Keep}_Z) = & \frac{1}{(1+r)} \sum_{k=0}^1 [p^k (1-p)^{t-k} q_{c,0} u^k d^{t-k} (v_c - \bar{p}_c)] + \\ & + \sum_{t=2}^3 \frac{1}{(1+r)^t} \left[ \sum_{k=0}^t \frac{t!}{k!(t-k)!} p^k (1-p)^{t-k} q_{z,1} u_z^k d_z^{t-k} f_c (v_c - \bar{p}_c) \right] \end{aligned}$$

and

$$NPV_Z(\text{Keep}^Z, \text{Keep}_Z) = \sum_{t=2}^3 \frac{1}{(1+r)^{t-1}} \left[ \sum_{k=0}^t \frac{t!}{k!(t-k)!} p^k (1-p)^{t-k} q_{z,1} u_z^k d_z^{t-k} (1-f_c) (v_z - \bar{p}_z) \right]$$

Again, the linearity of the problem reduces it to the comparison between  $\bar{p}_c - c_o$  and  $\bar{p}_z - c_z$ . That is, the optimal level  $f_c^*$  is:

$$f_c^* \begin{cases} \simeq 1, & \text{if } (\bar{p}_c - c_o) > (\bar{p}_z - c_z) \\ \simeq 0, & \text{if } (\bar{p}_c - c_o) < (\bar{p}_z - c_z) \\ \frac{1}{2}, & \text{otherwise.} \end{cases}$$

#### IV. CONCLUSION

We have examined the pros and cons of using a RO approach to contracts. We compare it to the rigidity predicated by the Neo-Institutional line of thought that sees flexibility as a source of additional transaction costs. We illustrated this comparison in the light of a model of a client-provider problem. We saw that adequate penalties enforce the relation if no outside parties exist, but allow the break-up of the relation to seek better opportunities. This possibility of switching partners can be fully captured in a real options framework and the optimal values can be assessed through game-theoretical analyses.

These formal explorations have been carried out assuming the full rationality of the involved parties and common knowledge of all the relevant future events. We think that the advantages of the RO approach still stand if we drop these assumptions and change towards a *behavioral* set of hypothesis (*a la* [9]), in which the

agents use heuristics instead of seeking optimal solutions. Further work involves exploring this intuition.

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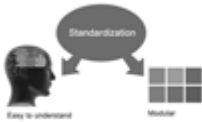




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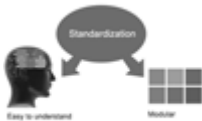
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## Format

*Language: The language of publication is UK English. Authors, for whom English is a second language, must have their manuscript efficiently edited by an English-speaking person before submission to make sure that, the English is of high excellence. It is preferable, that manuscripts should be professionally edited.*

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Abbreviations supposed to be used carefully. The abbreviated name or expression is supposed to be cited in full at first usage, followed by the conventional abbreviation in parentheses.

Metric SI units are supposed to generally be used excluding where they conflict with current practice or are confusing. For illustration, 1.4 l rather than  $1.4 \times 10^{-3} \text{ m}^3$ , or 4 mm somewhat than  $4 \times 10^{-3} \text{ m}$ . Chemical formula and solutions must identify the form used, e.g. anhydrous or hydrated, and the concentration must be in clearly defined units. Common species names should be followed by underlines at the first mention. For following use the generic name should be constricted to a single letter, if it is clear.

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A major linchpin in research work for the writing research paper is the keyword search, which one will employ to find both library and Internet resources.

One must be persistent and creative in using keywords. An effective keyword search requires a strategy and planning a list of possible keywords and phrases to try.

Search engines for most searches, use Boolean searching, which is somewhat different from Internet searches. The Boolean search uses "operators," words (and, or, not, and near) that enable you to expand or narrow your affords. Tips for research paper while preparing research paper are very helpful guideline of research paper.

Choice of key words is first tool of tips to write research paper. Research paper writing is an art. A few tips for deciding as strategically as possible about keyword search:



- One should start brainstorming lists of possible keywords before even begin searching. Think about the most important concepts related to research work. Ask, "What words would a source have to include to be truly valuable in research paper?" Then consider synonyms for the important words.
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- One should avoid outdated words.

Keywords are the key that opens a door to research work sources. Keyword searching is an art in which researcher's skills are bound to improve with experience and time.

Numerical Methods: Numerical methods used should be clear and, where appropriate, supported by references.

*Acknowledgements: Please make these as concise as possible.*

#### References

References follow the Harvard scheme of referencing. References in the text should cite the authors' names followed by the time of their publication, unless there are three or more authors when simply the first author's name is quoted followed by et al. unpublished work has to only be cited where necessary, and only in the text. Copies of references in press in other journals have to be supplied with submitted typescripts. It is necessary that all citations and references be carefully checked before submission, as mistakes or omissions will cause delays.

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Even though low quality images are sufficient for review purposes, print publication requires high quality images to prevent the final product being blurred or fuzzy. Submit (or e-mail) EPS (line art) or TIFF (halftone/photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Do not use pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings) in relation to the imitation size. Please give the data for figures in black and white or submit a Color Work Agreement Form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

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**26. Go for seminars:** Attend seminars if the topic is relevant to your research area. Utilize all your resources.





**27. Refresh your mind after intervals:** Try to give rest to your mind by listening to soft music or by sleeping in intervals. This will also improve your memory.

**28. Make colleagues:** Always try to make colleagues. No matter how sharper or intelligent you are, if you make colleagues you can have several ideas, which will be helpful for your research.

**29. Think technically:** Always think technically. If anything happens, then search its reasons, its benefits, and demerits.

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**33. Report concluded results:** Use concluded results. From raw data, filter the results and then conclude your studies based on measurements and observations taken. Significant figures and appropriate number of decimal places should be used. Parenthetical remarks are prohibitive. Proofread carefully at final stage. In the end give outline to your arguments. Spot out perspectives of further study of this subject. Justify your conclusion by at the bottom of them with sufficient justifications and examples.

**34. After conclusion:** Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium through which your research is going to be in print to the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects in your research.

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- Write your paper in the form, which is presented in the guidelines using the template.
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- Fundamental goal
- To the point depiction of the research
- Consequences, including definite statistics - if the consequences are quantitative in nature, account quantitative data; results of any numerical analysis should be reported
- Significant conclusions or questions that track from the research(es)

## Approach:

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- Present a justification. Status your particular theory (es) or aim(s), and describe the logic that led you to choose them.
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## Approach:

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- Report the method (not particulars of each process that engaged the same methodology)
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The page length of this segment is set by the sum and types of data to be reported. Carry on to be to the point, by means of statistics and tables, if suitable, to present consequences most efficiently. You must obviously differentiate material that would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matter should not be submitted at all except requested by the instructor.



## Content

- Sum up your conclusion in text and demonstrate them, if suitable, with figures and tables.
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### Approach

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- Give details all of your remarks as much as possible, focus on mechanisms.
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- Submit to generally acknowledged facts and main beliefs in present tense.





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Topics	Grades		
	A-B	C-D	E-F
<i>Abstract</i>	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form  Above 200 words	No specific data with ambiguous information  Above 250 words
<i>Introduction</i>	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
<i>Methods and Procedures</i>	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
<i>Result</i>	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
<i>Discussion</i>	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
<i>References</i>	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring



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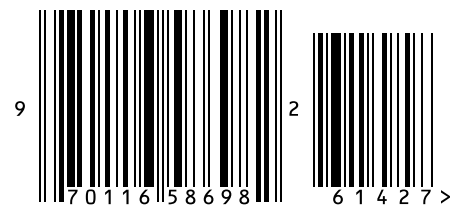
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