Effect of Macroeconomic Factors on Capital Structure Decisions of Firm- Evidence from a Developing Country

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Abstract

The focal theme of this research paper is to investigate the effect of macroeconomic parameters on the capital structure of Pakistani firms. According to the best of our knowledge this is the first study of its kind in Pakistan and it will open new horizons of research in this area ultimately helping practitioners and academicians. Previous researches in the context of Pakistan have taken firm specific variables only while this study considers macroeconomic factors besides company specific variables. A panel data (for a period of 2003 to 2009) for KSE-100 (non-financial firms) has been analyzed by using SUR (Seemingly Unrelated Regression) model. The main findings of this study elucidate that macroeconomic variables have varying effects as far as capital structure's measurement is concerned. The market size (stock market development) has a positive effect on debt choice of Pakistani firms. Bank size is directly related with long term debt to equity of these firms. The correlation between inflation rate and financial leverage (long term debt to equity as well) is negative, whereas, it has a positive relation with external financing ratio. GDP per capita is inversely related with all debt ratios. SBP discount rate is though negative but statistically insignificantly related with all debt ratios. All firm level variables, like ROE, ROA, Q ratio, Assets tangibility, Dividend pay out policy and risk proved to be significant with all debt ratios. Hence, this research study supports the existing literature related to capital structure, chiefly in the case of company specific variables.

Key words: Capital Structure, Macroeconomic variables, SUR Model, Firm Specific variables.

1. Introduction

Capital structure of a company remained among the main topics of interest for finance researchers for at least two decades. And the reasons could be

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the importance given to it by various stakeholders (as they take it an indicator for the firms' performance). For example, the creditors look for the share of debt in a firm's total capital and the interest payments made by the firm. The shareholders are interested in the dividends announced by the firm in regular intervals. Likewise, government agencies have interest in the tax payments made by the firm. Also suppliers and customers are affected by the way a company is financed. The last few years have witnessed a consequent development as far as the theories of optimal capital structure are concerned.

This study is designed to achieve yet another milestone in the stated area of financial management, how macroeconomic factors affect a firm's capital structure choice of Pakistani listed firms on KSE-100 index. This particular study has been undertaken to acknowledge that country specific factors (Bank size, Market size, GDP per capita, Inflation rate, and Discount rate) have some significant role in determining the choice of capital structure of the firm. As almost all studies conducted in the context of Pakistan considered the firm specific factors only while this study could claim to be the first one to consider company specific as well as macroeconomic factors.

1.1 Background

Capitalism produced the corporate enterprise in the periods of economic development. In the beginning, the process of raising capital was done through underwriter firms and banks, etc. later on the stock market came into the picture that took the responsibility of redistribution of stocks of these enterprises. Corporate decision over the structure of capital policy has remained an issue of debate for a long period and still unresolved. Traditionally the economists are of the view that capital structure results in WACC (weighted cost of capital) which is in U-shape, which means there exists an optimal combination of both debt and equity (*Mahmud, 2003*).

The main idea behind this research study is to explore how Pakistani firms determine their optimal capital structure under various macroeconomic conditions. It is the right hand side of the balance sheet (i.e., Liabilities and Owner's equity) which deals with capital structure choices of the firms. Thus, firms have a list from which they could consider alternative capital structures. Broadly speaking they can issue only debt or equity or the combination of both. While issuing debt they can raise finance by floating preferred stocks (preferred stocks is a kind of equity and due to its features which have some resemblance with debt financing, oftenly considered in debt), warrants, and the special "convertible bonds" etc. They can also arrange lease-financing and

forward contracts. And obviously, they can combine bonds with TFCs, i.e. "Term Finance Certificates" or take short-, medium-, and long-term loans from banks. Due to this long list of instruments, firms have an endless number of variations in their capital structure. To restrict this study to a reasonable limit, we will consider the decision made between debt and equity. Those macroeconomic factors along with some control (firm specific) parameters are considered here which are important for firms while choosing between debt and equity.

Nevertheless, this decision of capital structure is strategically important to firms. As in this way they can actually achieve the goal of maximization of shareholders' wealth. Managers being appointed by Board of Directors of the firms are the agents who act on-behalf of the principles (shareholders) of the organization. Therefore, they are expected to make a clever decision about the combination of capital structure to finance their firms. Thus, the question arises here is how to choose a best debt to equity ratio for a firm and the answer lying in the sentence "The Debt-Equity Ratio that maximizes the value of the firm". And surely this is dependent on the management's wisdom. This decision of capital structure comes under the domain of "financial policy" of the firms. A sound and thoughtful decision regarding capital structure choice by financial managers brings a positive and direct increase in the share prices of the firms, and ultimately enhances the market value of the firm.

We can categorize the financial responsibilities of management into two broad categories, i.e. first raising funds and then investing these funds in projects. Here, the utilization of these funds actually determines the capital structure which ultimately reveals a specific level of leverage. In response this employed debt dictates the organization's cost of capital (known as WACC, i.e. weighted average-cost of capital) and ultimately translates into financial risk of the firm.

The mystery or the puzzle around the capital-structure came out in the result of various capital structure theories. They are still evolving but none of them still proved to be a "master piece theory". Each one explains the variation in financing decision and capital structure choice of different organizations; belong to different industry, geographical area and time periods. The research carried-out so far brought into consideration a sample most from the developed and industrialized countries' firms. As far as the developing and emerging countries are concerned, e.g., Pakistan, they yet have to make their contribution in this regard. A very short list is available especially in the case of Pakistan, for instance, *Shah & Hijazi (2004)*, *Shah & Khan (2006)*, *Hijazi &*

Tariq (2006), and Jasir Ilyas (2007), etc. apart from them some work has been done by international researchers on developing countries' firms like, Mahmud (2003), Booth et al (2001 and 2008), and Agarwal & Mohtadi (2004), etc. Still their work falls short to be assumed as sufficient contribution in this regard. Thus, Pakistan is still in the initial and growing stages. The insufficient and inaccessible financial data could be the real cause of this situation in Pakistan.

The sample has been selected from the Karachi Stock Exchange i.e. KSE-100 Index. The objective of KSE-100 Index is to have a "bench-mark" through which stock-price performance is compared over a time period. It is designed such that it provides information about how the Pakistan equity market is performing. KSE-100 Index (a "capital-weighted index") consists of 100 large companies representing more than 80% of market-capitalization of Karachi Stock Exchange. KSE-100 is recomposed on semi annual basis. The "sector rule" is applied on all sectors which suggest that the company having the largest "market capitalization" in each of the 34 sectors is chosen for enclosure. For the remaining 66 companies, any company without considering sector is selected in descending order on the market capitalization basis.

3. Literature Review

Professor Franco Modigliani and Professor Merton H. Miller are considered the founding fathers of modern concept of capital structure after publishing their semi-annual paper titled as "the cost of capital, corporation finance and the theory of investment" (June, 1958). Their theory is called the "theory of irrelevance" as in that paper they argued with (some unrealistic) assumptions that firm's value has nothing to do with the way it is financed by the combination of debt and equity mix and "a firm's investment policy has an important effect on firm's value, whereas the financing decision is secondary." They explained that by excluding the cost of brokerage, the cost of tax and the cost related to bankruptcy, investors can access debt with the same rate as companies and Earning before Interest and tax is not affected with the usage of this debt. For this they built their theory on "*the perfect capital markets hypothesis*", and in reality the markets are almost always imperfect. The unrealistic and impractical assumptions made by them were: the firm's management is selfless (i.e. they always act in investors' favor) "no agency costs"; as far as the important information regarding the company is concerned, they are readily and equally available (symmetrically distributed) among the management of the firm and the investors; any debt taken by the firm is "risk-free", homogenous expectations (from either side) are prevailing, and transaction carries no costs, they also overlooked the corporate taxes and

their effects (Modigliani & Miller, 1958). But as far as “the subsequent theoretical literature” is concerned, it has been proved that a firm is able to influence and improve its value and future prospects with establishing different combinations of debt and equity. For example, the economists have identified the following conditions under which the debt-equity structure does matter and those are: Taxation on income from various sources (the firm will prefer debt financing over equity as to gain the tax advantage), asymmetric information (information is not equally distributed among various parties), risk and cost of bankruptcy (e.g. if the firm has to pay larger amount of interest as compared to its earnings, then it subsequently increases the chances of its bankruptcy), and the problems of agency (i.e. the preferences of principles (share-holders) and their agents (management)), etc. Since MM’s (Modigliani & Miller) theory, various financial economists presented “a number of leverage theories” for explaining the debt-equity ratios. To rectify and relax their unrealistic assumption (i.e. there is no corporate income tax cost) they themselves published one another research paper titled, “*Corporate Income Taxes and the Cost of Capital: A Correction*” (Miller & Modigliani, 1963). In that paper they reviewed their earlier stance and incorporated “tax benefits” as one of the leading determinant of capital structure. They argued that a firm must maintain as high as possible debt-equity ratio to boost its value. Though, the initial paper of MM was based on unrealistic assumptions which are not applicable in the business world, yet they provided a strong base for further research in the said area.

The second important theory was the “Trade Off theory” of capital structure. As the name indicated, the investor looked for a trade off between the cost and benefit of debt versus equity financing. According to Modigliani & Miller (1963) and Hovakimian *et al.* (2004), these theories were developed around the idea of targeted capital structure which strived to equalize those benefits & drawbacks associated with the mix of debt/equity. As there were benefits to be financed with debt, but on the other hand there were also some costs (fixed interest payments and the chance of bankruptcy and similarly non-bankruptcy costs, i.e. high turnover rate of employees, suppliers pressures, cutting down the R&D costs, mitigating the process of training & development of employees, and conflicting situations between bondholder and stock holders associated with debt financing, etc). These would ultimately lead to lowering the quality of the firm’s products, destroying the image of firm in the eyes of customers and finally reducing the market value and share of the company. This postulated that the potential advantages from debt were eaten-up by the potential disadvantages of bankruptcy. This theory suggested that a firm’s objec-

tive leverage was determined by taxes and other financial costs. As a general rule, interest payment on debts is tax deductible while dividend payments on stocks are not. And actually, this is that point where companies prefer to be financed with debt, as a result their tax liability decreases and at the same time their "after-tax cash flow" increases. So, this establishes a strong relationship (positive) between corporate taxes with the value of the company. Myers (1984) divided the trade-off theory into: Static Trade-off (STT) and Dynamic Trade-off theories. The STT defined that initially companies set a target debt-equity ratio and then act accordingly. And this target ratio was led by the benefits and costs associated with the debt option (which were: tax benefit increased with high level of debt, cost of bankruptcy and non-bankruptcy also increased but if the firms were large enough then it constituted a very minimal amount). Hackbarth et al. (2006) built a model according to which firm's cash-flows relied upon "idiosyncratic (individual) shock" and "aggregate (combined) shock" that represented the conditions of an economy (i.e. boom or recession). They also argued that one should determine the optimum debt level by equalizing the tax advantage with bankruptcy cost, but both of them depended upon the macroeconomic conditions of the country. The anticipated advantage was always contingent upon the conditions of the economy of the country (whether there was expansion or recession). Thus, the perceptions and anticipation from economy was an important determinant regarding capital structure.

Another important theory was the pecking order theory.³ A more serious attempt to develop the Pecking order theory was made by Myers & Majluf (1984). The theory proposed a way for the companies to prioritize their choice of capital structure according to the least effort/resistance. They argued that firms would finance their business activities with "retained earnings" first, however, if they came out to be insufficient, then they would be financed with debt, and as a last resort they would be financed with equity. Here, raising the capital with equity was used as the "last resort". This process was done in somewhat a hierarchical manner. This theory identified a negative relationship among profitability and debt ratios.

The cost of internal funds (retained earnings) was almost zero, whereas, for debt it was relatively low and for equity it was the highest. Likewise, positive signals travelled into the market with issuance of more debt, whereas, negative signals travelled with issuance of more equity.

Various studies could be found that tried to relate these two theories to macroeconomic conditions of a country. In this regard Myers & Majluf (1984) work was noteworthy. They associated the increase/decrease in equity issue

(volume) with certain economic conditions. In the expansion periods of economy equity market performed well. Bankruptcy risk reduced; corporations were more probably to have tax shields and they had more "free cash" suggesting debt to be more attractive. However, in recession the whole scenario was vice versa. Similarly, in these situations managers got small share of wealth. Household wealth increased and there was also a relative increase in their demand for securities.

Bebczuk (2000) pointed out that credit markets were important and volatility of the overall economy had some great effects on the decisions of capital structure of a firm. To be more specific, the observed results exposed that major trends were determined between debt and equity by uncertainty in the expectations of inflation rate. Korajczyk & Levy (2000) identified that firms determined their combination of security based on firm-specific parameters and on macro-economic conditions of the country, they found that more leveraged managers reduce their wealth in recession against outside equity holders, which clearly intensified the "agency problems". They further concluded that firms issued equity when the stock market was experiencing high-ups and when economy was promising good prospects revealed by business cycle variables, e.g., interest rates and term or credit spreads. Drobetz et al. (2007) identified during their determination of "the impact of macroeconomic factors on the speed of adjustment towards target leverage" that in favorable macroeconomic environment firms were more towards adjustment of their targeted leverage as compared to unfavorable macroeconomic environment. They argued that for last 50 years the debt to asset ratio for US firms was negatively related with macroeconomic parameters. Thus, when the interest rates and the risk of disturbance in financial systems were minimum and avoidable then firms were more towards their adjustment of leverage. Loof (2004) was of the same point of view as well; he discussed and compared "dynamics of capital structure adjustments" in his research about the two archetypes present in the financial system. The one was called "arm's-length" (i.e. equity/market dominant system), e.g., US and UK and the other one was "relation-based" (i.e. debt/bank dominant system), e.g., Sweden, and other Scandinavian countries, etc. He concluded that though firms were mostly not at "target debt level", the divergence was insignificant for the market/equity dominant firms and they were faster towards "target capital structure" as compared to bank/debt dominant companies. Harkbarth et al. (2006) went one step further and argued that not only the pace but the size of capital also was determined by macroeconomic conditions of a country and one must not only consider the firm specific characteristics but also take in to account the general state of the economy.

An inverse relationship between interest rates and the level of long-term and short-term debt issuance was established by Graham & Harvey (2001). However, they were not able to clarify the exact role of macroeconomic factors in the determination of capital structure. Booth et al. (2001), and Agarwal & Mohtadi (2004) and many others were of the opinion that Stock market and its development had a very strong impact on the financing decisions of a company and each had given their own conclusions regarding this. Agarwal & Mohtadi (2004) found a relationship between their long term debts with stock market development. Gajural (2006) diverted the attention towards fiscal and monetary policy (as it determined the interest rates) of a country and argued that they played a major role in determining the capital structure choice. Similarly, evidence was provided by Rajan & Zingales (1995) in their study that economic development played a significant role in the determination of capital structure choice of a firm. Therefore, some recent studies focused on the macroeconomic factors in capital structure determinations like Rajan & Zingales (1995), Booth et al (2001), Bokpin (2009) but most of them were in the context of developed countries and few of them conducted on the cluster of developing economies. In this regard, an inverse relationship had been found out by Kunt & Maksimovic (1996) among stock market development and two debt ratios (long and short term), whereas a positive relationship had been observed between leverage and bank sector development. Moreover, as stock market developed the firms issued more debt, true for developing countries. An inverse impact was observed by Booth et al. (2001) in the stock market ratio along with inflation rate over long and total debt ratios, and some positive impacts were found between GDP rate, tax advantage and liquidity.

Since MM's theory (1958), much work was devoted to understand the firm's financing decisions. However, least effort was made to find out the impacts of macroeconomic indicators on the choice of capital structure of a firm (Harkbarth et al., 2006); this is true in the context of developing countries, such as Pakistan (Shah & Khan, 2007).

Shah & Khan (2007) applied the debt ratio by using total debt to total assets for measuring the capital structure. After Shah & Hijazi (2004) and Shah & Khan (2007), a detailed sector-wise systematic analysis of determinants of capital structure of non-financial listed firms on Karachi Stock Exchange (KSE) was conducted by Ilyas (2007). The results were shown by the weighted least square regression: 99% variation in leverage of the firm was explained by independent variables of the model, profitability was negatively related and assets tangibility was positively related. He concluded that the Pakistani firms preferred internal sources of finance than debt. And particu-

larly, long-term debt was avoided as bond market in the country was under developed. On the other hand, the main source of debt was commercial banks which discouraged long term loans and extended secured loans only. Another reason for avoidance of loan was to avoid legal obligations and the small and medium size of companies. The other possible, but not yet proven practically, reason for non debt financing of Pakistani firms was the religious teachings against interest, called "ribba" in Arabic, strictly forbidden in Quran, (Ilyas, 2007). Regarding company specific factors along with some macroeconomic factors that influenced capital structure choice of firms a detailed study was conducted by Mahmud (2003) in the context of developing (Pakistan), emerging (Malaysia) and developed (Japan) countries; his study involved three kinds of leverage ratios and 9 independent variables reflecting factors which had an impact upon capital structure of different firms. Important variables of study included growth in assets, growth in sales, firm size regarding book value of assets, firm size on the basis of total net sales, fixed asset ratio, profitability (return on assets, return on sales), degree of operating leverage and dividend policy. Along with variables mentioned above the research estimated per capita GNP growth, creditor's rights, prime lending rate and enforcement of country's economic development. The country factor results showed that Pakistan and Japan had similar proportion of total liabilities to asset ratio. In case of Pakistan, though hard to predict, floating the equity was a harder task for the companies (as the equity market was undeveloped). In case of Malaysia and Pakistan the results did not show the significance of firm size with respect to debt level. In this study, the variables like total assets (positive for Japan), fixed asset ratio and ROA came out to be significant (ROA was positive for Japan but negative for both Pakistan and Malaysia), whereas GNP per capita and interest rate were significant for both Japan and Malaysian companies (no evidence for Pakistan, Mahmud (2003)). Booth et al. (2001) placed Pakistan along with some other countries in high-debt level category, and found that companies in these countries relied more on the short and intermediate term loans rather than long-term loans as compared to the developed countries and the reason could be the strong legal system which was developed in the developed countries but could not be seen in the developing countries. The tax advantage and high inflation rate also played a significant role in determining the leverage level for them. Profitable firms finance their growth by using retained earnings, whereas, less profitable firms would go for debt financing. And for the measurement of profitability they used ROA. Their results of various tests showed that the profit and debt ratio of firms were negatively related and this was consistent with Pecking Order Theory. Similarly, the tangibility of assets was positively related with long-term debt and average tax rate had no effect.

4. Methodology

4.1 Dependent and Independent Variables:

4.1.1 Dependent Variables (Capital Structure Ratios):

For the measurement of capital structure, the following debt ratios are used consistent with *Bokpin (2009)*:

- 1) **ST Debt Ratio:** This ratio is defined as *Short Term Debt over Shareholders' Equity*. This ratio is suitable in the context of developing economies and especially in the case of Pakistan where firms do not opt for long term loan from banks, as bank are reluctant to issue long term debt (*Shah and Hijazi, 2004; Booth et. al, 2001*).
- 2) **Financial Leverage:** Consistent with the findings of *Agarwal & Mohtadi (2004)* who discovered a strong relation ship between 'Financial Leverage' and the development of stock markets; this ratio has been used and is calculated as *Long Term Debt over Equity*.
- 3) **Debt Ratio:** Debt Ratio is measured as *Total Liabilities divided by Total Assets*, serves the similar purpose as debt to equity ratio. It shows the percentage of firm's assets that are backed by debt financing.
- 4) **External Financing Ratio:** In the financial theory of capital structure, 'External Financing' is used to prescribe funds which a firm acquires from outside of the firm. So, it is in contrast to the 'Internal Financing' that consists of retained earnings, etc. External Financing is observed to be more expensive source as to internal financing (as heavy transaction costs are involved) to generate funds. It is calculated as: *External Financing divided by Total Financing*.

4.1.2 Independent Variables:

4.1.2.1 Macroeconomic Variables:

For macroeconomic variables, the following factors are employed:

- 1- **GDP per capita:** It is a guess value of goods that is produced per person in a country. This macroeconomic factor is expected to have an inverse relationship with Financial Leverage, Debt ratio, and Short Term Debt ratio. While a positive relation is expected between GDP per capita and External Financing ratio. The reason could be that as high rate of GDP per capita means more retained earnings and thus less reliance on external sources.

Measurement of GDP/capita:

GDP per capita = GDP divided by total number of people of a country

Hypothesis 1:

GDP per capita is expected to have a negative relationship with Financial Leverage, Debt ratio, and Short Term Debt ratio. While a positive relation is expected between GDP per capita and External Financing ratio.

2- **Inflation rate:** In the wordings of *Rajan & Zingles (1995)*, and *Booth et al (2001)*, the pressure which is put by inflation actually reduces the reliance of a firm on debt. On the other hand, *Gajurel (2006)*, in his study based upon Nepalese firms, also validates the same argument. This research also assumes a negative relationship between inflation rate of the economy and Financial Leverage, Debt ratio, and Short Term debt ratio. However, inflation rate is expected to have a positive relationship with External Financing ratio.

Measuring Inflation rate:

Inflation rate = Annual %age increase in Consumer Price Index (CPI)

Hypothesis 2:

Inflation rate is expected to have a negative relation with Financial Leverage, Debt ratio, and Short Term debt ratio and has a positive relation with External Financing ratio.

3- **Discount rate (of central bank):** As our analysis uses the annual data of all variables and in case of discount rate which is announced by the State bank of Pakistan on quarter basis so we have taken the year-ended value for it. Interest rate is expected to be positively related to External Financing Ratio, and Short Term debt ratio.

Hypothesis 3:

Interest rate is expected to be positively related to External Financing Ratio, and Short Term debt ratio.

4- **Bank size/Bank credit:** This variable is calculated by taking the broad money₃ (M3) divided by GDP (see *Agarwal & Mohtadi, 2004*). As positive relation has been established between the bank size and debt financing by *Maksimovic (1996)*, thus, the relationship between bank size with financial leverage and short term debt ratio is expected to be positive and the argument

for this could be that with the development of banking industry, firms tend more towards long term debt over equity financing. As the cost of transaction and other interest rates become lower with this progress, and hence, the firms are motivated to attain funds on low interest rates. However, an inverse relationship is expected of bank credit with external financing ratio. Similarly, a direct relationship is expected between bank size and debt ratio.

Measurement of Bank size:

Bank size = $M3 / \text{GDP growth rate}$

Hypothesis 4:

The relationship between bank size with financial leverage, debt ratio, and short term debt ratio is expected to be positive. At the other hand, an inverse relation is expected of bank credit with external financing ratio

5- Market size: Yet another macroeconomic factor "Size of the Market" exhibits the extent of access to capital market. According *Maksimovic (1996)*, an inverse relation is existing between stock market development and the choice of leverage for capital structure (both long term and short term debt). So, it is expected to be negatively related with the financial leverage ratio and debt ratio. However, a positive relation ship is expected with both external financing ratio and short term debt ratio (*Bokpin; 2009*). Though, *Gajurel* in 2006 found a positive impact of stock market development upon the choice of leverage. However, *Booth et al (2001)* with the help of their cross sectional study found an inverse relation between stock market size and firm's leverage. The ratio of stock market capitalization (KSE in our case) divided by GDP has been taken as proxy for market size.

Measurement of Market size:

Market size = Annual Stock Market Capitalization divided by GDP growth in % age.

Hypothesis 5:

Market size is expected to be inversely related with financial leverage ratio and debt ratio, while positively related with both external financing ratio and short term debt ratio.

4.1.2.2 Firm Specific Variables:

To minimize the error effect, firm specific factors such as Profitability (empirically shows an inverse relationship), risk, investment opportunity set,

asset tangibility and dividend policy (dividend divided by capital) are also included.

- 1- **ROE:** It is expected to have an inverse relation with financial leverage, external financing ratio, debt ratio and short term debt ratio.
- 2- **ROA:** This control variable is expected to have a positive relation ship with financial leverage (long term debt over equity). However, a negative relation is expected with debt ratio, external financing ratio, and short term debt ratio.
- 3- **Tobin's Q ratio (investment opportunity set):** A positive impact is expected between Q ratio and external financing ratio. The argument could be that the firms with a large number of growth opportunities often go for external financing. On the other hand a negative relation is expected with financial leverage, and short term debt ratio.
- 4- **Risk:** A positive relation is expected between risk and all debt ratios except the financial leverage that is expected to have an inverse relation.
- 5- **Dividend Pay out ratio:** A direct relationship is expected between dividend policy of the firm and financial leverage ratio and same is the case for Short term debt ratio. At the other hand, debt ratio and external financing ratio are expected to have an inverse relationship.
- 6- **Asset Tangibility ratio:** Asset tangibility ratio is expected to have an inverse relation with financial leverage, external financing, and short term debt ratio.

4.2 Nature and Sources of Data:

Various types of data is utilized for estimating a model, e.g. time series, cross sectional and panel data (it surveys across section in various period of times, thus, combines the first two approaches together). Therefore, panel data for this study is used due to some of the advantages it offers.

The main source of data for this research study is the official website of SBP, where the "Balance Sheet Analysis of joint stock companies listed at KSE from 2003-2008 and 2004-2009" is available. Our research has targeted only the non-financial firms included in the KSE-100 index and the reason is that the financial firms have a capital structure which is greatly at variance from these non-financial firms. So, after filtering the KSE-100 Index in this fashion the sample was left with only 54 companies.

4.3 The Problem of Multicollinearity:

The term, " multicollinearity" refers to the situation in which the explanatory variables have a linear (or near to linear) relationship among themselves (experts suggest that 0.8 or more co-linearity among independent variables is an alarming point). The problem of multicollinearity may arise due to:

- Most of economic variables move in the same direction in various phases of economic cycle.
- When a lagged value (of independent variable) is used, etc.

No doubt the problem of multicollinearity does exist here, due to the first reason mentioned above (as we are using the macroeconomic factors as our independent variables and most of them, e.g. GDP per capita, market size, bank size and SBP Discount rates and inflation rate usually move in the same direction). For this problem, SUR model has been used which actually removed it completely.

4.3 The problem of Heteroskedasticity:

It refers to the situation where the 'random' variables have "different" variances. Here term 'Hetero' stands for difference and 'skedasticity' stands for dispersion. This problem was encountered here and was resolved by taking logs of the variables.

4.4 Empirical model:

For this research study the model of *Bokpin* (2009) is used in its original format. The regression model he chose is called "Seemingly Unrelated Regression" (SUR). SUR is ideal for a situation where one has to measure multiple equations simultaneously. It has the capability to mitigate multicollinearity and avoid endogeneity (a situation in which a variable is correlated with the error term) from the data. SUR was introduced for the first time by *Arnold Zellner* in 1962. This model is the generalization of "linear regression model" which usually consists of several equations, and each one has its own "dependent" variable and potentially different sets of independent variables (could be estimated independently). SUR is sometimes referred as "Seemingly Related" term, as the error-terms are considered to be co-related across these equations.

SUR is more efficient as compare to "ordinary least square" (OLS), where more than one equation is involved. We have two situations in which SUR is

in fact at par with OLS and those are: when the error-terms are uncorrelated among equations or when each and every equation consists of the same set of independent variables. Otherwise, it is equal to “General Linear Model”, where the independent variables are different in each equation. Similarly, SUR can be classified as “Simultaneous Equations Model”, in which the regressors also play the role of endogenous variables.

This model of *Bokpin (2009)* basically estimates various capital structure ratios against various macroeconomic and control variables. The macroeconomic factors that affect the capital structure ratios include: Market Size, Bank Size, Inflation rate, GDP per capita, and Discount rate. On the other hand, the control factors include: Dividend Policy, Asset Tangibility, ROE, ROA, Q ratio, and Risk of the firm.

4.5 Model Specification:

In line with the literature and the model specified by *Bokpin (2009)*, we employ the ‘panel data regression’ as given below:

$$Y_{it} = \alpha + \pi \text{Macro}_{it} + \beta X_{it} + \mu_{it} \dots \dots \dots (1)$$

Where ‘i’ and ‘t’ in subscript represent the company and time period respectively. In our panel data case, the ‘i’ will represent the “cross-section” and ‘t’ will represent the “time-series” component. ‘Y’ being the dependent variable represents the “measure” of capital structure ratios. ‘ α ’ denotes the constant of equation, ‘ μ ’ represents the error term, and ‘ δ ’, and ‘ α ’ represents the macroeconomic and company specific (control) variables.

5. Results and Discussion

This section explains and interprets the results derived from the descriptive statistics and regression equations using SUR technique.

5.1 Descriptive Statistics: The following table shows the descriptive statistics for independent & dependent variables. This table reports the measures like mean, median, minimum, maximum, and standard deviation.

The first independent variable, ‘financial leverage’ (measured as long term debt to equity ratio) has mean value equal to 0.308, variation (standard deviation) equal to 1.120. Debt Ratio (measure as, total liabilities to total assets), has 0.503 as a mean value and 0.216 as standard deviation. External Financing has 0.731 as average and 14.54, similarly this dependent ratio has the smallest value (-105.00) as well as minimum among all the other variables. Short term

Table: Table of Descriptive Statistics for 378 observations

Variable	Mean	Median	Minimum	Maximum	Std. Dev.
Financial Leverage	0.308	0.012	-3.95	15.46	1.119
Debt Ratio	0.502	0.545	0.031	1.103	0.216
External Financial Ratio	0.730	0.310	-105.0	235.571	14.54
Short Term Debt Ratio	1.570	0.931	0.033	86.45	4.85
Dividend Payout Policy	0.130	0.066	0.000	2.541	0.250
Asset Tangibility Ratio	0.432	0.401	0.020	9.017	0.506
Return on Equity	0.262	0.281	-17.42	4.089	1.0124
Return on Assets	0.146	0.138	-0.360	0.462	0.132
Tobin's Q Ratio	1.494	0.934	0.058	39.33	2.550
Risk	0.155	0.139	-26.35	20.21	2.009
Market Size	0.301	0.296	0.142	0.491	0.119
Bank Size	0.585	0.580	0.521	0.636	0.038
Inflation Rate	9.832	7.921	2.914	20.29	5.16
GDP per Capita	795.14	801.0	561.0	994.0	154.88
Discount Rate	10.1%	9.5%	7.5%	15%	2.5%

debt ratio has a mean as 1.570 (before taking the log 10), while 4.85 is the standard deviation of this ratio.

The average score of dividend pay-out ratio (policy) is 0.130 and the standard deviation is equal to 0.25. Asset tangibility ratio (before taking the log) registers a mean score of 0.432 and shows a variation of 0.506. For ROE, the mean value is 0.262. Interestingly, we have a large variation (1.0124) with -17.42 as minimum value for this independent (control) variable as some companies reported negative return on equity in their financial statements. Another proxy for profitability, i.e. ROA registers a mean value of 0.146 with standard deviation of 0.132. Tobin's Q ratio, yet another investment opportunity ratio shows a mean value of 1.494 (before taking log of 10 of it for regres-

sion purposes) shows that all original values of this variable are positive for all companies in all periods, and standard deviation is equal to 2.550 which is quite large. Risk suggests an average figure equals to 0.155 and variation of 2.009.

Stock market size (which is calculated as stock market capitalization to GDP %age) shows a mean value of 0.301 and variation as 0.119. As for the other macroeconomic variable, the bank-size is concerned it shows an average value of 0.585 with standard deviation of 0.038. Inflation rate, another macroeconomic factor, depicted a mean value that is 9.832% with 5.16 variations in the values (with 2.914% as minimum in 2003 and 20.29% as maximum in 2008). GDP per capita has a mean value of \$795.14, variation as \$154.88 and the last variable, SBP discount rate has an average value of 0.101% with variation of 0.025% (with maximum value equals to 15% and minimum with 7.5% announced by SBP over the sample periods).

5.2 Correlation Analysis:

Before running regression, the possible extent of multicollinearity was checked among the independent variables. As we are going to see the effects of macroeconomic factors, thus, the existence of multicollinearity is a natural phenomenon. Three of the macroeconomic variables, i.e. Bank size had a negative correlation with GDP per capita equal to -0.94. Inflation rate had a positive relation with two other macro variables, i.e. with GDP per capita equals to 0.82 and with discount rate equals to 0.95. Similarly, GDP per capita had significant positive relationship with discount rate equals to 0.89.

5.3 Regression Analysis

Seemingly Unrelated Regression technique is employed for the determination of the co-efficient of independent variables (for each of the four equations) and to observe their level of significance with relation to the dependent variables.

From the above table, after observing the results of regression, the following relationship can be established:

$$\text{Financial Leverage} = -0.47 + (0.53)\text{DivPay_Policy} + (0.44)\text{Asset_Tangibili} + (-0.83)\text{ROE} + (0.91)\text{ROA} + (-0.24)\text{Q_Ratio} + (-0.03)\text{Risk} + (0.23)\text{Mkt_Size} + (2.46)\text{Bank_Size} + (-2.71)\text{INF_Rate} + (-0.36)\text{GDP_capita} + (7.98)\text{Disc_rate}$$

It is obvious from the results; the independent variables like Dividend Policy, Assets Tangibility, ROA, Market Size, Bank Size, and Discount rate

Expected and Observed Relationships with various capital structure ratios:

Dep. Variables	Independent Variables	Measurement	Expected Relation	Observed Relation
Fin_ Leverage	DivPay_ Policy	Dividend to equity	positive	positive
	Asset_ Tangibiliy	Fixed assets to Total assets	negative	positive
	ROE	Net profit before tax/equity	negative	negative
	ROA	Net profit before tax/total assets	positive	positive
	Q_Ratio	Market capitalization/ total assets of the company	negative	negative
	Risk	EBIT(current)-EBIT (previous)/EBIT (previous)	negative	negative
	Mkt_Size	Stock Market capitalization to GDP in %age	negative	positive
	Bank_Size	M3 / GDP growth rate	positive	positive
	INF_Rate	Annual %age increase in CPI	negative	negative
	GDP_ Capita	GDP / total # people of country	negative	negative
	Disc_Rate		negative	positive
Debt_ Ratio	DivPay_ Policy	Dividend to equity	negative	positive
	Asset_ Tangibili	Dividend to equity	negative	negative
	ROE	Net profit before tax/equity	negative	negative
	ROA	Net profit before tax/ total assets	negative	negative
	Q_Ratio	Market capitalization/total assets of the company	positive	negative
	Risk	EBIT(current)-EBIT previous)/EBIT (previous)	positive	positive
	Mkt_Size	Stock Market capitaliza- vious)/EBIT(previous)	negative	positive
	Bank_Size	M3 / GDP growth rate	positive	negative
	INF_Rate	Annual %age increase in CPI	negative	positive

Ext_Fin Ratio	GDP_Capita	GDP / total # people of country	negative	negative
	Disc_Rate		positive	negative
	DivPay_Policy	Dividend to equity	negative	positive
	Asset_Tangibilit	Dividend to equity	negative	positive
	ROE	Net profit before tax/equity	negative	negative
	ROA	Net profit before tax/total assets	negative	positive
	Q_Ratio	Market capitalization/total assets of the company	positive	negative
	Risk	EBIT(current)-EBIT previous)/EBIT (previous)	positive	negative
	Mkt_Size	Stock Market capitalization to GDP in %age	positive	positive
	Bank_Size	M3 / GDP growth rate	negative	negative
	INF_Rate	Annual %age increase in CPI	positive	positive
	GDP_Capita	GDP / total # people of country	positive	negative
	Disc_Rate		positive	negative
STD_Ratio	DivPay_Policy	Dividend to equity	positive	positive
	Asset_Tangibilit	Dividend to equity	negative	negative
	ROE	Net profit before tax/equity	negative	negative
	ROA	Net profit before tax/total assets	negative	negative
	Q_Ratio	Market capitalization/total assets of the company	negative	negative
	Risk	EBIT(current)-EBIT previous)/EBIT (previous)	positive	positive
	Mkt_Size	Stock Market capitalization to GDP in %age	positive	positive
	Bank_Size	M3 / GDP growth rate	positive	negative
	INF_Rate	Annual %age increase in CPI	negative	positive
	GDP_Capita	GDP / total # people of country	negative	negative
	Disc_Rate		positive	negative

Correlation Matrix using Gretl

[illegible]

Table: Regression Results
Dependent Variables

Independ. Variables	Financial Leverage		Debt Ratio		External Financial		Short Term Debt Ratio	
	Co-Eff.	T-ratio	Co-Eff.	T-ratio	Co-Eff.	T-ratio	Co-Eff.	T-ratio
Const	-0.4724	-0.0286	1.42405	0.3407	360.046	1.189	3.4030	0.3846
DivPay_ Policy	0.5342	3.022***	0.2524	5.642***	11.2113	3.458***	0.6464	6.824***
Asset_ Tangi- bility	0.4393	4.005***	-0.0471	-1.696*	0.8684	0.4316	-0.2393	-4.071***
ROE	-0.8258	-18.88***	-0.0006	-0.0568	-0.4786	-0.5966	-0.0625	-2.665***
ROA	0.9088	2.177**	-0.4305	-4.074***	12.7242	1.662*	-0.6538	-2.922***
Q_Ratio	-0.2384	-1.846*	-0.1547	-4.730***	-3.5647	-1.504	-0.2650	-3.827***
Risk	-0.0315	-1.580	0.0017	0.3383	-0.0071	-0.0194	0.0094	0.8808
Mkt_ Size	0.2273	0.2686	0.0899	0.4199	9.73627	0.6273	0.1638	0.3613
Bank_ Size	2.4626	0.3862	-0.1811	-0.1122	-199.69	-1.708*	-1.1030	-0.323
INF_ Rate	-2.7119	-0.7439	0.1813	0.1965	76.7681	1.148	0.6351	0.3251
GDP_ Capita	-0.3586	-0.0750	-0.2858	-0.2363	-84.783	-0.9674	-1.0573	-0.413
Disc_ Rate	7.9800	0.9154	-0.3205	-0.1453	-104.92	-0.6562	-0.1166	-0.025
No. of Obser- vations	78		378		378		378	
Para- meters	11		11		11		11	
R-Square	0.532103		0.195701		0.067115		0.205748	
Adj. R-Square	0.518041		0.171528		0.039078		0.181877	
S.E. of Regres- sion	0.764760		0.193590		14.02658		0.409854	

Equation 1: Financial Leverage

have positive relationships, while ROE, Q ratio, Risk, Inflation rate, and GDP per capita all have negative relationship with the dependent variable.

Equation 2: Debt Ratio

$$\text{Debt_Ratio} = 1.42 + (0.25)\text{DivPay_Policy} + (-0.047)\text{Asset_Tangibili} + (-0.0006)\text{ROE} + (-0.43)\text{ROA} + (-0.154)\text{Q_Ratio} + (0.0017)\text{Risk} + (0.089)\text{Mkt_Size} + (-0.18)\text{Bank_Size} + (0.18)\text{INF_Rate} + (-0.285)\text{GDP_capita} + (-0.32)\text{Disc_rate}$$

Here Dividend Policy, Risk, Market size, and Inflation rate are having positive relation, while Assets tangibility, ROE, ROA, Q ratio, Bank size, GDP per capita, and Discount rate all have indirect relationship with the dependent variable, i.e. Debt Ratio. A 1% positive variation in Dividend Policy, Risk, Market size, and Inflation rate leads to a 0.25%, 0.0017%, 0.089%, and 0.1813% positive change in Debt ratio respectively. On the other hand, a 1% positive change in Assets tangibility, ROE, ROA, Q ratio, Bank size, GDP per capita, and Discount rate leads to a 0.047%, 0.00062%, 0.4305%, 0.1547%, 0.181%, 0.2858%, and 0.3206% negative change in Debt ratio (dependent variable).

Equation 3: External Financing Ratio

$$\text{Ext_Fin_Ratio} = 360.046 + (11.21)\text{DivPay_Policy} + (0.868)\text{Asset_Tangibili} + (-0.48)\text{ROE} + (12.72)\text{ROA} + (-3.56)\text{Q_Ratio} + (-0.007)\text{Risk} + (9.74)\text{Mkt_Size} + (-199.70)\text{Bank_Size} + (76.77)\text{INF_Rate} + (-84.78)\text{GDP_capita} + (-104.92)\text{Disc_rate}$$

Dividend policy, asset tangibility, ROA, market size, and inflation rate have positive effects on external financing ratio. However, ROE, Q ratio, Risk, Bank size, GDP per capita, and Discount rate are negatively associated with external financing ratio. 1% up-ward trend in the dividend policy, asset tangibility, ROA, market size, and inflation rate shows 11.21%, 0.868%, 12.72%, 9.74%, and 76.77% increase in the dependent variable respectively. Similarly, a 1% upward trend in ROE, Q ratio, Risk, Bank size, GDP per capita, and Discount rate shows 0.48%, 3.56%, 0.007%, 199.7%, 84.78%, and 104.92% decrease in the dependent variable.

Equation 4: Short Term debt ratio

$$\text{STD_Ratio} = 3.40 + (0.646)\text{DivPay_Policy} + (-0.239)\text{Asset_Tangibili} + (-0.0624)\text{ROE} + (-0.6538)\text{ROA} + (-0.265)\text{Q_Ratio} + (0.009)$$

$$\text{Risk} + (0.1638)\text{Mkt_Size} + (-1.103)\text{Bank_Size} + (0.635)\text{INF_Rate} + (-1.057)\text{GDP_capita} + (-0.1166)\text{Disc_rate}$$

Those variables in this equation which showed positive relationship with the dependent variable are: Dividend Policy, Risk, Market size, and Inflation rate. The variables that were negatively related: Assets tangibility, ROE, ROA, Q ratio, Bank size, GDP per capita and Discount rate. It means that 1% positive variation in Dividend Policy, Risk, Market size, and Inflation rate leads to a 0.646%, 0.009%, 0.1638%, and 0.635% increase in short term debt ratio, while a 1% positive variation in Assets tangibility, ROE, ROA, Q ratio, Bank size, GDP per capita and Discount rate brings about a 0.239%, 0.0624%, 0.6538%, 0.265%, 1.103%, 1.057%, and 0.1166% decrease in short term debt ratio.

Significance of variables (measured through T-test):

T-test is executed to find-out the significance of independent variables with respect to the dependent variable.

Financial Leverage (Equation 1):

By carefully observing the values of t-test, Dividend Policy, Assets Tangibility, and ROE are significant at 99% confidence level, whereas, ROA and Q ratio are significant at 95% and 90% confidence level respectively. On the other hand variables like Market Size, Bank Size, Inflation rate, GDP per capita and Discount rate are insignificant for this equation and don't have much effect on dependent variable.

Debt Ratio (Equation 2):

According to t-values Dividend Policy, ROA, and Q ratio are significant at 99% confidence level, whereas, Assets tangibility is significant at 90% confidence level. And all the other variables are unsuccessful in showing their significance with respect to debt ratio.

External Financing Ratio (Equation 3):

Again dividend policy passed the T-test and proved to be the most significant among others with respect to external financing ratio; it is significant at 99% level of confidence. ROA proved to be significant at 90% level and yet another variable, Bank size in this case proved to be significant at 90% level. All the other variables do not fulfill the criteria and thus, considered to be insignificant.

Short Term Debt Ratio (Equation 4):

The T-test shows some healthy signs for this equation and five variables, i.e. Dividend policy, Assets tangibility, ROE, ROA, and Q ratio are proved to be significant at 99% level of confidence while the other variables are proved to be insignificant in this case.

R² (Coefficient of Determination):

R² value shows the degree up to which the independent variables explain the changes in dependent variable. The R-squared value obtained from SUR analysis for the first equation of Financial Leverage is equal to 0.5321, that means the independent variables explained up to 53.21% change in the financial leverage. The second equation, Debt Ratio, reports 0.195701, which means that the independent variables explained up to 19.57% change in the debt which is very weak. The third equation External Financing Ratio shows a weak relation of independent variables to the dependent variable, i.e. 0.067115 which is equal to almost 6.7% which is very low. The last equation, Short Term Debt Ratio, has R-squared equal to 0.205748, which is 20.57%.

6. Conclusion

The general theme of this research study is to pinpoint those factors which influence the determination of debt choice of firms and for that reason the case study of Karachi Stock Exchange-100 Index has been taken. The physical skeleton of the subject "capital structure" is in the process of development especially in Pakistan and other developing countries; the case requires more consideration from financial experts. This study attempts to fulfill the shortcomings of previous studies, particularly by including micro as well as macro-economic factors that could play an important role in determining the debt-equity structure.

Seemingly Unrelated Regression (SUR) model was applied on the panel data (2003-2009) of 54 non-financial firms listed on KSE-100 index. Five macro-economic and six microeconomic were regressed against four dependent variables. According to *Frank & Goyal (2003)*, around 30% variance is shown by "internal factors", so it is important to find-out what the other 70% are? Various European studies show the major role played by stock market's performance and the development of banking sector in determining the choice of capital structure. This study shows some interesting findings with respect to macroeconomic factors. Here, market size has an insignificant and positive impact on the capital structure choice, true for all dependent variables. This

study also documents that bank size (development of banking industry) has some positive effects in the case of financial leverage (long-term debt to equity). So, as the banking sector develops it encourages firms to borrow long term loans from them. However, bank size is negatively related with external financing ratio, debt ratio, and short-term debt ratios. Remember, that the financial market significance depends heavily upon the condition that whether the economy is bank or stock-market based and the policies of these financial firms like low cost, less rigidity, also enhance reliance on them. Another variable, inflation rate, is positive in the cases of external financing, debt ratio, and short term debt ratio, while negative in the case of financial leverage. Therefore, in high inflationary periods, firms stay away from long term loans to avoid high cost of debt. GDP per capita shows an inverse impact for all financial ratios. Thus, one can conclude that the general improvement in the economy leads to a lesser reliance on external sources of debt. Yet another macro variable is the discount rate, though it has a negative impact upon all debt ratios but this impact is statistically insignificant. However, one can conclude that as the discount rate is raised by the state bank, it will lead to increase in the general rate of interest in the economy and ultimately discourage firms to avoid high cost loans. So, it is mandatory for the state to craft the policies in such a manner that improve the macro-economic environment in general. This research study also posits that firm specific variables, e.g. ROE, ROA, Q ratio, asset tangibility, dividend payout, and risk are very important in the determination of capital structure of KSE-100 firms. The firms with large profits are less interested in debt financing. It means that the pecking order theory is applicable in Pakistani firms, i.e. as those firms that have larger profits prefer less borrowing.

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