

Impact of Macroeconomic Variables on Capital Structure Choice: A Case of Textile Industry of Pakistan

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The financing decision of a firm is influenced by both internal (firm specific) and external (macroeconomic) factors. However, most of the empirical investigations have focus on internal factors whereas the impact of macroeconomic variables on capital structure decisions is somewhat under researched particularly in the context of developing countries. The aim of the study is to analyse the impact of macroeconomic variables on the capital structure decisions of all listed textile firms in Pakistan for the period 2004-2013. Panel data regression (fixed effects model) was used to estimate the effect of macroeconomic variables on capital structure. The findings of the study reveal that public debt, exchange rates and interest rates are negatively related whereas corporate taxes, stock market development, inflation rate and GDP growth rate are positively related with economic leverage. Moreover, the relationship of corporate taxes, stock market development and exchange rates is significant with the economic leverage.

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1. INTRODUCTION

Financing a modern day business with the appropriate mix of securities is considered to be extremely important for the long-term success and survival of the business. Finding the appropriate mix of securities to finance new investments will increase the value of the firm whereas poor financing decisions will lead to loss in firm value. Hence, it is important to understand that due care must be given while making financial decisions because there are several internal and external factors that affect the speed and adjustment of capital structure. Internal factors are firm-specific and can be controlled by the management of the firm whereas macroeconomic factors are beyond the control of the management of the firm. However, the importance of these two types of factors cannot be overlooked as far as their influence on capital structures is concerned. Information regarding the level, direction and power of their impact about these factors will help organisations make better financing decision in order to ensure long-term survival and growth.

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In the academic literature, we find several theories that explain the behaviour of the firms as far as their preference for financing mode. Among these theories, Trade-off theory, pecking order theory and off late market timing theory is widely applied by researchers in their empirical investigations. Trade-off theory that stemmed from the original Modigliani-Miller (1958) irrelevance theorem assumes that the firm trades off the cost and benefit associated debt and equity financing and finds an optimal capital structure while taking into consideration the advantages of tax shields, agency costs and bankruptcy costs. Pecking order theory presented by Myers and Majluf (1984), on the other hand, based on asymmetric information between firm managers and investors, assumes that firms follow an order while making their financing decisions. Firms prefer internal funds over external funds. Hence, retained earnings get a preference over debt and equity and debt over equity in situations where retained earnings are not sufficient enough to meet the financial requirements of the firm. Market timing theory presented by Baker and Wurgler (2002) assumes that firm time their issues in particular equity issues. Firm will issue new stock when the price of the company's stock is considered to be overvalued and buy back stock when the stock price is considered to be undervalued. These theories and other capital structure theories are helpful not only in understanding the nature of corporate capital structure but also in identifying potential factors both internal and external that could influence capital structure decisions.

Empirically, numerous studies both in developed and developing countries have attempted to explore the determinants of capital structure. These studies identified key internal factors that have a significant influence on the capital structure decisions of the firms. Among these factors are: profitability [Dincergok and Yalciner (2011); Keshtkar, Valipour, and Javanmard (2012) and etc.], asset tangibility [Bastos, Nakamura, and Basso (2009); Nguyen and Wu (2011)], growth opportunities [Titman and Wessels (1988); Daskalakis and Psillaki (2008); Kouki and Said (2012)], non-debt tax shields [Kouki and Said (2012); Lim (2012)], firm size [Hanousek and Shamshur (2011); Nguyen and Wu (2011); Lim (2012)]. The relationship of these factors with corporate capital structure varies from negative to positive depending on the structure of debt and country specific factors.

In more recent studies, researchers have focused on exploring the relationship between external factors and its influence on capital structure decisions of the firm. There is general agreement among researchers that the financing decision of the firm cannot be made in isolation as both internal as well as external factors has significant influence while making such decision. Based on empirical evidence, we find that there is a relationship between external factors, commonly referred to as macroeconomic factors in empirical studies and capital structure. Studies from Booth, *et al.* (2001), Gujarel (2006), Bopkin (2009), Dincergok and Yalciner, (2011), Mokhova and Zinecker, (2014) etc. suggests that there is a significant relationship between macroeconomic factors and corporate capital structure.

Pakistan is one of the leading manufacturers of textile goods in world and is a major contributor to the economy. Currently it contributes nearly 52 percent to country's exports. However, the industry is going through challenging times over the past few years. The poor law and order situation, energy crisis, rising cost of raw material and production cost and lack of modern equipment's and R & D institutions have significantly contributed to the decline of textile sector. Moreover stiff competition in the

international markets particularly from India, Bangladesh and China has also added to the declining share of textile exports in international markets. The proportion of external financing in the capital structure of textile firm has come down from 51 percent on average in 2009 to 41 percent on average in 2013 thus showing the preference for internal financing.

The aim of this paper is to explore the impact of macroeconomic variables on the corporate capital structure of listed firms in textile industry of Pakistan. Since the external environment is beyond the control of the management, therefore, changes in interest rates, inflation rates, exchange rates, tax rates etc. may affect firms negatively as well as positively depending on the nature and direction of changes in these important macroeconomic variables. Additionally, exchange rates, an important macroeconomic determinant particularly in the context of textile industry as export earnings are denominated in foreign currency has been overlooked while measuring the influence of macroeconomic variables on capital structure. Liberalisation and integration of international financial markets makes exchange rates an important factor that must be considered while making financing decisions because exchange rates affect the cost of financing, domestic interest rates, inflation rates etc. Currently, business environment in Pakistan is very challenging as the economy is experiencing lower growth due energy crisis, high interest and inflation rates, poor law and order situation etc. Hence, it was important to find out how macroeconomic variables influence firms financial decisions in this challenging environment.

2. LITERATURE REVIEW

The influence of macroeconomic variables on capital structure decisions has been widely investigated by researchers. One of the most commonly used macroeconomic variables in capital structure studies is GDP growth rate [Bokpin (2009); Dincergok and Yalciner (2011); Camara (2012) etc.]. The findings of their study revealed that there is strong negative relation between corporate capital structure and GDP growth rate. Their findings support the pecking order hypothesis i.e. internal funds are preferred over external funds because in periods of economic growth, firm profitability is expected to rise thus allowing firms to use internally generated earnings to finance future investments. On the contrary, studies from Daslakis and Psillakis (2008), Hanosuek and Shamshur (2011), Baltaci and Ayaydin (2014) etc. found out that there is a statistically significant and positive relationship between GDP growth rate and capital structure.

Another important macroeconomic factor that has been used in empirical investigations is interest rate. Interest rates have also been widely used in empirical investigations. Changes in interest rates affect the leveraging of the firm. Leverage level of firms are expected to rise with increase in interest rates because there will be tax shield advantages to exploit, at the same time some firms may reduce their financial leverage with rise in interest rates in order to reduce bankruptcy costs. Studies from Graham and Harvey (2001) and Drobetz, Pensa and Wanzenried (2006), Henderson Jedadesh and Weisbach (2006) found out that there is a negative relationship between interest rates and capital structure whereas Bokpin (2009) suggest that there is a positive relationship between interest rates and capital structure. Empirical investigations suggest that there is mixed evidence as far as the influence on the inflation rate and capital structure is

concerned. Since interest rates are indexed to inflation, therefore inflation rates become an important factor that must be considered. Studies from Dammon (1988) and Bastos, *et al.* (2009) suggest that inflation rate do not influence the capital structure decisions of the firm. However, studies from Sett and Sarkhel (2010) and Hanousek and Shamshur (2011) suggest a positive whereas Booth, Aivazian and Demeriguc-Kunt (2001) and Gujarel (2006) suggest a negative relationship between inflation and capital structure. Rising inflation rates leads to increase in interest rates which allows firm exploit more tax savings but at the same time increases financial risk leading to potential bankruptcy costs.

Influence of corporate taxes is also ambiguous as studies from Byoun (2008) and Antoniou, Guney and Paudyal (2008) suggests that debt ratios and taxes are inversely related whereas Moore and Ruane (2005) and Huizinga, Laeven and Nicodeme (2008) argued that the relationship is positive and significant also. Modigliani and Miller (1963) in extension to their earlier work argued that in presence of corporate taxes, the value of the firm can be increased by altering the capital structure. The used of debt results in tax savings but up to a certain limit after which cost of debt outweighs the benefit of debt. In the presence of financial leverage, rise in corporate taxes increases the tax savings of the firm and hence allows firms to borrow more.

Stock markets play an important role in meeting the financial requirements of the firm. Developed financial markets not only reduce the cost of financing but also provide access to firms to borrow funds. Listed firms have to meet strict criteria before they get listed on the stock exchange. This improves the quality of information available about the firm and also helps in monitoring and controlling the firm. As a result, the availability of quality information about firm reduces its overall risk level and may find it easier to raise funds through the stock market. Firm level leverage is high in countries where stock markets are developed or in the developing phase [Gajurel (2006); Dincergok and Yalciner (2011)], at the same time, Sett and Sarkhel (2010) suggest that there is negative relationship between stock market development and capital structure.

Borrowing by the government to meet budgetary deficits from local market affects the supply of funds to the private sector particularly in developing countries where saving rates are comparatively low. Mokhova and Zinecker (2014) in study on European economies found out inverse relationship between public debt and capital structure. However, Dincergok and Yalciner (2011) concluded that public debt is positively related to capital structure.

Lastly, changes in exchange rates can significantly affect the earnings as well as the cost of foreign currency denominated debt. Changes in exchange rates affect domestic interest rates as well as earnings of companies particularly those that are directly involved in business with international markets. Calvo (2001), Eichengreen (2005) and Cavoli and Rajan (2005) argued that devaluations leads to decline in output due to lower aggregate demand which may result in widespread bankruptcies.

To conclude, generally most of the empirical studies in developing countries have focused on GDP growth rates, interest rates, taxes etc. whereas we find very limited studies particularly in Pakistan that have used public debt and exchange rates as variables influencing financing decisions. Therefore this study will add to the already limited literature particularly in the context of public debt, stock market development and exchange rates and will provide meaningful insights with respect to their impact on firm financing decision.

Based on the literature review mentioned above particularly in the context of developing countries, we expect the following relationship between macro-economic variables and capital structure for this study.

Table 1

<i>Expected Relationship between Macroeconomic Variables and Capital Structure</i>	
Variable	Expected Relationship
GDP Growth Rate	Positive
Public Debt	Negative
Real Interest rate	Positive
Stock Market Development	Positive
Corporate Taxes	Positive
Exchange rates	Negative

3. DATA AND METHODOLOGY

Data for this study was collected from secondary sources. Data concerning macroeconomic variables and firm level variables was collected from World Bank database and State Bank of Pakistan. Last ten years data was used in this study from 2004-2013. The sample consisted of all listed firms (textile industry) in KSE. Only those firms were considered that remained listed in the last ten years. Firms listed for less than ten years were removed from the final sample. The final sample comprised of 154 firms.

During the process of data collection it was found out that some of the data for firm level variables was missing. In literature we find variety of techniques used to handle missing data such as complete case analysis, available case analysis, single imputation, multiple imputations etc. Considering the merits and demerits of each technique, multiple imputations were used to handle missing data. In this technique possible estimates are generated for the missing value and then the average of these estimates is used as the estimated value for missing data. Therefore, in order to find estimates for missing values five separate data sets were generated. After analysing these datasets, the expected estimate of each missing value was added together in order to get the average value from these estimates. Schafer (1997) argued that in order to get an unbiased estimate for missing value, five data sets are enough.

The skewness value of economic leverage and corporate taxes was high which indicated that the data for these two variables is skewed. In order to ensure normal distribution for these two variables, log transformations were applied.

Macroeconomic variables used in this study are real interest rates (RIR), corporate taxes (CT), GDP growth rate (GDPR), exchange rate (EXG), public debt (PD) and stock market development (SMD). The dependent variable capital structure choice (leverage) was measured as economic leverage (LEV). Real interest rates was measured as lending rates less inflation measured through GDP deflator¹ [ECB (2001); Oxelheim and

¹Inflation can be measured in a number of ways i.e. Consumer Price Index (CPI), GDP deflator etc. CPI considers the prices of baskets of goods for measuring inflation whereas GDP deflator considers the prices of all goods while measuring inflation. Since real interest rate is nominal interest rate less inflation, therefore, in this study inflation rate was measured through GDP deflator.

Wihlborg (2008)], corporate taxes was measured as tax expense divided profit before taxation, public debt was measured as public debt as percentage of GDP, market capitalisation ratio was used as a measured of stock market development. For measuring GDP growth rate and exchange rates annual GDP growth rate and average exchange rate was used and lastly, economic leverage was measured through return on equity divided by return on assets.

3.1. Estimated Model

Panel data regression was used to measure the influence of macroeconomic variables on the choice of capital structure in listed firms of textile industry of Pakistan. Panel data present several advantages over other estimation techniques such as it provides more informative data, variability, efficiency, degrees of freedom and less collinearity among explanatory variables. In financial studies using annualised data such as ours, panel data is extremely important as it offers large number of data points to the researcher [Hiaso (1986)]. Furthermore, the use of panel data is more useful in detecting and measuring effects that cannot be observed in pure time series or pure cross section data [Baltagi (1995)]. The empirical model used to estimate the relationship between macroeconomic variables and capital structure is given bellow:

$$LEV_{it} = \alpha_0 + \beta_1 GDPR_{it} + \beta_2 INR_{it} + \beta_3 IR_{it} + \beta_4 CT_{it} + \beta_5 EXG_{it} + \beta_6 PD_{it} + \beta_7 SMD_{it} + \mu_{it}$$

In literature, we find two common panel data models that are being used by researchers. They are: random effects model and fixed effects model. The difference between the two models is that random effects model assumes that the intercept of each firm is a random drawing from a much larger population with constant mean value whereas fixed effects models assumes that each firm differs in its intercept term. Fixed effects model is more appropriate in cases where the panel is balance as is in our case. Random effects model, on the other hand, might be appropriated in cases where the sample contains limited observations of the existing cross-sectional units [Gujarati (2004)]. Though it looks like fixed effects is more appropriate for our study, but the final decision on the estimation model was based on Hausman test. Hausman test (1978) is a specification test which helps us determined which model is more appropriate; random effects or fixed effects. The test basically assesses the consistency of an estimator when compared with a less efficient estimator that is already known to be consistent. The results from Hausman test suggest that fixed effects model is more appropriate for our study.

Correlated Random Effects - Hausman Test			
Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	104.6750	6	0.0010

Since we are applying panel regression, there are several aspects like multicollinearity and heteroscedasticity that must be considered while running regression. Table 2 presents the correlational matrix of variables whereas Table 3 presents variance inflation factors of variables used in this study. Values from Table 3 suggest that multicollinearity is not an issue in our study. Multicollinearity exists when two more independent variables in a regression equation are moderately or highly correlated. The existence of multicollinearity results in high R^2 , insignificant t-values, large variances and co-variances thus making precise estimation difficult. Multicollinearity is not a problem if the VIF value is less than 10 [Gujarati (2004)]. One of the key assumptions of regression model is that the variances or error term must be equal across all observations. Heteroscedasticity occurs when the variance of error term is not equal across all observations and can invalidate our tests of significance that were based on the assumption that error term in the regression model is uncorrelated and constant. In order to address the issues of heteroscedasticity, white cross section test was used and to overcome the problem of unequal variances, the model was estimated by assigning estimated Generalised Least Squares (EGLS) weights (cross-sectional) of the balanced panel where a single observation for each firm constituted a cross-section.

Table 2
Correlation Matrix

	LEV	CT	RIR	GDP	SMD	PD	EXG
LEV	1.000						
CT	0.174	1.000					
RIR	-0.025	-0.044	1.000				
GDP	0.141	-0.159	0.072	1.000			
SMD	0.155	-0.078	0.142	0.664	1.000		
PD	-0.003	-0.136	0.268	0.363	-0.236	1.000	
EXG	-0.148	0.005	0.299	-0.435	-0.696	0.181	1.000

Table 3
Variance Inflation Factors

Variable	VIF
CT	1.042
GDP	4.959
RIR	2.317
SMD	8.754
PD	3.389
EXG	3.411

3.2. Descriptive Statistics

Table 4
Descriptive Statistics of Variables

	LEV	CT	GDP	RIR	SMD	PD	EXG
Mean	0.571	0.223	4.510	0.180	0.262	0.614	75.715
Median	0.426	-0.282	4.400	0.900	0.213	0.611	76.018
Maximum	3.307	2.580	7.700	7.900	0.461	0.683	101.510
Minimum	-1.880	-2.089	1.600	-8.100	0.138	0.549	58.329
Std. Dev.	0.927	1.192	2.156	4.992	0.106	0.036	15.063
Skewness	1.086	0.373	0.085	-0.273	0.703	0.084	0.238
Kurtosis	6.402	1.562	1.570	1.870	2.136	2.734	1.613
Jarque-Bera	1255.662	168.462	133.005	101.029	174.767	6.373	138.003
Probability	0.000	0.000	0.000	0.000	0.000	0.041	0.000
Observations	1540	1540	1540	1540	1540	1540	1540

The above table present the descriptive statistics of the variables. The mean value of economic leverage is 0.571 whereas the standard deviation which shows the dispersion from mean is 0.927. The mean value of corporate taxes is 0.223 whereas the standard deviation is 1.192. Mean value of GDP is 4.51 whereas the standard deviation is 2.156. Mean value of real interest rate is 0.180 whereas the standard deviation is 4.992. The mean value of stock market development is 0.262 whereas the standard deviation is 0.106. The mean value of public debt is 0.614 whereas the standard deviation of public debt 0.036. Lastly, mean value of exchange rate is 75.715 whereas the standard deviation is 15.063. The skewness values of all variables are within the range of a normal distribution.

4. EMPIRICAL RESULTS

The empirical results obtained from this study suggest that corporate taxes, GDP growth rate, stock market development and exchange rate have a statistically significant relationship with economic leverage in the textile industry of Pakistan. Corporate taxes, GDP growth rate and stock market development are positively related whereas exchange rate is negatively related to economic leverage. The use of debt offers tax shield advantages to the firm. Increase in tax rates presents more tax savings for the firm. Hence, leverage levels of firm tend to rise with increase in tax rates and fall with decline in tax rates. Studies from De Jong et al. (2008), Sayeed (2011) also finds statistically significant and positive relationship between corporate taxes and leverage.

Table 5
Expected and Actual Relationship between Macroeconomic Variables and Economic Leverage

Variable	Expected Relationship	Actual Relationship
GDP Growth Rate	Positive	Positive
Public Debt	Negative	Negative
Real Interest rate	Positive	Negative
Stock Market Development	Positive	Positive
Corporate Taxes	Positive	Positive
Exchange rates	Negative	Negative

Developed financial markets play an important role in the meeting the financing needs of the firm. They not only reduce the cost of financing but also provide access to funds. Furthermore, stock markets help in improving the quality of information, monitoring and control of the firm which makes it is easier for the firm to borrow from external sources as well as allow lenders to lend to creditworthy firms. In case of developing financial markets Demircuc-Kunt and Maksimovic (1996) argued that leverage ratios of firms tend to rise as stock market develops. Since Pakistan is a developing economy and the financial markets are in the developing stage, firms are more inclined to use stock market to raise funds from external sources.

Table 6

Dependent Variable: LEV				
Method: Panel EGLS (Cross-section weights)				
Sample: 2004 2013				
Periods included: 10				
Cross-sections included: 154				
Total panel (balanced) observations: 1540				
Linear estimation after one-step weighting matrix				
White cross-section standard errors and covariance (d.f. corrected)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.777	0.269	2.892	0.004
CT	0.027	0.007	3.824	0.000
RIR	-0.002	0.002	-0.937	0.349
PD	-0.033	0.352	-0.095	0.925
SMD	0.480	0.191	2.521	0.012
GDP	0.024	0.008	3.171	0.002
EXG	-0.006	0.001	-7.895	0.000
<i>Effects Specification</i>				
<i>Cross-section fixed (dummy variables)</i>				
R-squared	0.749	F-statistic		25.921
S.E. of regression	0.664	Prob(F-statistic)		0.000

The positive relationship between GDP growth rate and economic leverage indicate that leverage level of firms tends to rise as the economy grows. Growth opportunities for firms rise in periods of economic growth thus leading to increase in firm level leverage and declines when the economy is in recession [Yeh and Roca (2010)]. Majority of the firm's particularly small and medium size firms may not have sufficient internally generated funds to exploit these profitable opportunities; hence they resort to borrowing from external sources.

Changes in exchange rates influence domestic economy and firms in a number of ways. Firms that are directly involved in borrowing from international markets or dealing with international markets for business are exposed to exchange rate risk. The cost of foreign currency denominated debt rises with the fall in the value of home currency thus increases financial risk and the potential cost of bankruptcies. Additionally, devaluation increases the cost of imports which leads to increase in production cost and decline in firm revenues. Lastly, exchange rates influence domestic interest rates. Domestic interest rise with the fall in value of home currency thus making it difficult for firms to borrow due to increased financial risk. Pakistan, for the last decade or so has experience significant loss in the value of its currency. Pakistani Rupee has lost its value by more than 60 percent since 2008. As a result, inflation, domestic interest rates have gone up considerably thus discouraging firms to borrow.

Additionally, the depreciation of Pakistani rupee should have resulted in a positive effect on sales of textile products in the international markets due to cheap prices but the falling value of home currency has led to rise in inflation domestically thus leading to increased raw material prices and cost of production. The withdrawal of subsidies on electricity and gas to the manufacturing sector from the government has also contributed to rising production costs of textile firms thus limiting the capacity of textile firms to fully exploit the benefits devaluation.

We find a statistically weak relationship between real interest rate, public debt and economic leverage. Both real interest rate and public debt are negatively related to economic leverage. We expected a positive relationship between real interest rates and economic leverage because rise in interest rates offers more tax savings to firm. However, the actual relationship is contrary to our expectations. Possible explanation for this can be that interest rates in Pakistan are comparatively high and firms may be reluctant to borrow at these high rates because the cost of financial distress outweighs the benefits of debt. Henderson, *et al.* (2006) and Antoniou, *et al.* (2008) also found out negative association between interest rates and leverage and explained that firms prefer to borrow when the rates are lower and vice versa. As far as public debt is concerned, the decision to borrow from the local market leaves very little funds to be used by the private sector. Hence, rise in domestic debt has a negative effect on private sector borrowing.

5. LIMITATIONS OF THE STUDY

Due to data availability constraints the study was limited only to listed firms of textile industry of Pakistan and non-listed textile firms were ignored in this study. However, non-listed firms may give meaningful insights about macroeconomic variables and their influence on capital structure. Furthermore, the study was limited to only one sector of KSE. In future other sectors of KSE should also be investigated as far as the influences of macroeconomic variables on capital structure decisions are concerned.

6. POLICY IMPLICATIONS

The aim of the study was investigate the influence of macroeconomic variables on capital structure in textile industry of Pakistan. The findings of the study revealed that there is a significant relationship between corporate taxes, GDP growth rate, stock market development, exchange rates and economic leverage. The economic environment is

uncertain in Pakistan as the economy is plagued by energy crisis, law and order situation etc. In order to ensure long-term growth in economy, government should undertake necessary measures that will stabilise the economy, ensure the development of financial markets and develop economic policies that will help stabilise exchange rates as these are important factors that influence the financial decisions of the firm. Additionally, the findings of the study will help corporate managers in making long-term financing decisions while considering the potential impact that these macroeconomic variables can have on their financing decisions and their impact on the overall performance of the firm.

7. CONCLUSION

To conclude, since the focus of the study was explore the effect of macroeconomic factors on the capital structure decisions of the firms listed in textile industry of Pakistan, the findings of the study revealed that macroeconomic variables do influence the capital structure decisions of the firm. GDP growth rate, corporate taxes and stock market development are positively related to economic leverage whereas interest rate, public debt and exchange rates are negatively related to economic leverage. The relationship between GDP growth rates corporate taxes and economic leverage supports the trade-off theory. Furthermore, the relationship of corporate taxes, GDP growth rates, exchange rates and stock market development is statistically significant whereas the remaining variables had a weak relationship with economic leverage.

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