

1-1-2009

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### Recommended Citation

Nazir, M. S., & Afza, T. (2009). A panel data analysis of working capital management policies. *Business Review*, 4(1), 143-158. Retrieved from <https://doi.org/10.54784/1990-6587.1170>

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## DISCUSSION

# A Panel Data Analysis of Working Capital Management Policies

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### ABSTRACT

The present study investigates into the traditional relationship of working capital management and firm's profitability. Using panel data set for the period of 1998-2005, the impact of aggressiveness of working capital investment and financing policies have been evaluated on return on assets as well as Tobin's q. Managers can create value if they are adopting for a conservative approach towards working capital investment and working capital financing policies. However, if firms are having aggressive approach to manage the short term liabilities, investors give more value to those firms in stock markets.

**Keywords:** working capital, aggressiveness, conservativeness, profitability, panel data

### INTRODUCTION

The corporate finance literature has traditionally focused on the study of long-term financial decisions, particularly investments, capital structure, dividends or company valuation decisions. However, short-term assets and liabilities are important components of total assets and needs to be carefully analyzed. Management of these short-term assets and liabilities warrants a careful investigation since the working capital management plays an important role for the firm's profitability and risk as well as its value (Smith, 1980). Efficient management of working capital is a fundamental part of the overall corporate strategy to create the shareholders' value. Firms try to keep an optimal level of working capital that maximizes their value (Howorth and Westhead 2003, Deloof 2003, Afza and Nazir 2007).

In general, from the perspective of Chief Financial Officer (CFO), working capital management is simple and a straightforward concept of ensuring the ability of the organization to fund the difference between the short term assets and short term liabilities (Harris 2005). However, a "Total" approach should be followed which cover all the company's activities relating to vendor, customer and product (Hall 2002). In practice, working capital management has become one of the most important issues in the organizations, where many financial executives are struggling to identify the basic working capital drivers and the appropriate level of working

capital (Lamberson 1995). Consequently, companies can minimize risk and improve the overall performance by understanding the role and drivers of working capital.

A firm may adopt an aggressive working capital management policy with a low level of current assets as percentage of total assets or it may also used for the financing decisions of the firm in the form of high level of current liabilities as percentage of total liabilities. Excessive levels of current assets may have a negative effect on the firm's profitability; whereas, a low level of current assets may lead to lower level of liquidity and stockouts resulting in difficulties in maintaining smooth operations (Van Horne and Wachowicz 2004).

The main objective of working capital management is to maintain an optimal balance between each of the working capital components. Business success heavily depends on the ability of financial executives to effectively manage receivables, inventory, and payables (Filbeck and Krueger 2005). Firms can reduce their financing costs and/or increase the funds available for expansion projects by minimizing the amount of investment tied up in current assets. Most of the financial managers' time and effort are allocated in bringing non-optimal levels of current assets and liabilities back toward optimal levels (Lamberson 1995). An optimal level of working capital would be the one in which a balance is achieved between risk and efficiency. It requires continuous monitoring to maintain proper level in various components of working capital i.e. cash receivables, inventory and payables etc.

In general, current assets are considered as one of the important component of total assets of a firm. A firm may be able to reduce the investment in fixed assets by renting or leasing plant and machinery, whereas, the same policy cannot be followed for the components of working capital. The high level of current assets may reduce the risk of liquidity associated with the opportunity cost of funds that may have been invested in long-term assets. The impact of working capital policies on profitability is highly important, however, a little empirical research has been carried out to examine this relationship. This paper investigates the potential relationship of aggressive/conservative policies with the accounting and market measures of profitability of Pakistani firms using panel data set for the period of 1998-2005. The present study is expected to contribute to better understand these policies and their impact on profitability especially in the emerging markets like Pakistan.

## **LITERATURE REVIEW**

Many researchers have studied financial ratios as a part of working capital management; however, very few of them have discussed the working capital policies in specific. Some earlier work by Gupta (1969) and Gupta and Huefner (1972) examined the differences in financial ratio averages between industries. The conclusion of both the studies was that differences do exist in mean profitability,

activity, leverage and liquidity ratios amongst industry groups. Johnson (1970) extended this work by finding cross-sectional stability of ratio groupings for both retailers and primary manufacturers. Pinches et al. (1973) used factor analysis to develop seven classifications of ratios, and found that the classifications were stable over the 1951-1969 time periods.

Chu et al. (1991) analyzed the hospital sectors to observe the differences of financial ratios groups between hospital sectors and industrial firms sectors. Their study concluded that financial ratios groups were significantly different from those of industrial firms' ratios as well these ratios were relatively stable over the five years period. Sathyamoorthi (2002) focused on good corporate governance and in turn effective management of business assets. He observed that more emphasis is given to investment in fixed assets both in management area and research. However, effective management of working capital has been receiving little attention and yielding more significant results. He analyzed selected Co-operatives in Botswana for a period of 1993-1997 and concluded that an aggressive approach has been followed by these firms during all the four years of study.

Filbeck and Krueger (2005) highlighted the importance of efficient working capital management by analyzing the working capital management policies of 32 non-financial industries in USA. According to their findings significant differences exist between industries in working capital practices over time. Moreover, these working capital practices, themselves, change significantly within industries over time. Similar studies are conducted by Gombola and Ketz (1983), Soenen (1993), Maxwell et al. (1998), and Long et al. (1993).

However, Weinraub and Visscher (1998) have discussed the issue of aggressive and conservative working capital management policies by using quarterly data for a period of 1984 to 1993 of US firms. Their study looked at ten diverse industry groups to examine the relative relationship between their aggressive/conservative working capital policies. The authors have concluded that the industries had distinctive and significantly different working capital management policies. Moreover, the relative nature of the working capital management policies exhibited remarkable stability over the ten-year study period. The study also showed a high and significant negative correlation between industry asset and liability policies and found that when relatively aggressive working capital asset policies are followed they are balanced by relatively conservative working capital financial policies.

In literature, there is a long debate on the risk/return tradeoff between different working capital policies (Pinches 1991, Brigham and Ehrhardt 2004, Moyer et. al. 2005, Gitman 2005). More aggressive working capital policies are associated with higher return and higher risk while conservative working capital policies are concerned with the lower risk and return (Gardner et al. 1986, Weinraub and

Visscher 1998). Working capital management is important because of its effects on the firm's profitability and risk, and consequently its value (Smith, 1980). Greater the investment in current assets, the lower the risk; but also the lower the profitability obtained. In contradiction, Carpenter & Johnson (1983) provided empirical evidence that there is no linear relationship between the level of current assets and revenue systematic risk of US firms; however, some indications of a possible non-linear relationship were found which were not highly statistically significant.

For the first time, Soenen (1993) investigated the relationship between the net trade cycle as a measure of working capital and return on investment in U.S firms. The results of chi-square test indicated a negative relationship between the length of net trade cycle and return on assets. Furthermore, this inverse relationship between net trade cycle and return on assets was found different across industries depending on the type of industry. A significance relationship for about half of industries studied indicated that results might vary from industry to industry. Another aspect of working capital management has been analyzed by Lamberson (1995), who studied how small firms respond to changes in economic activities by changing their working capital positions and level of current assets and liabilities. Current ratio, current assets to total assets ratio and inventory to total assets ratio were used as measure of working capital, while index of annual average coincident economic indicator was used as a measure of economic activity. Contrary to the expectations, the study found that there is very small relationship between changes in economic conditions and changes in working capital.

In order to validate the results found by Soenen (1993) on large sample and with longer time period, Jose et al. (1996) examined the relationship between aggressive working capital management and profitability of US firms using Cash Conversion Cycle (CCC) as a measure of working capital management (where a shorter CCC represents the aggressiveness of working capital management). The results indicated a significant negative relationship between the cash conversion cycle and profitability, indicating that more aggressive working capital management is associated with higher profitability. Shin and Soenen (1998) concluded that reducing the level of current assets to a reasonable extent increases firms' profitability. Later on, Deloof (2003) analyzed a sample of large Belgian firms during the period 1992-1996 and the results confirmed that Belgian firms can improve their profitability by reducing the number of days accounts receivable are outstanding and reducing inventories. Teruel and Solano (2005) suggested that managers can create value by reducing their firm's number of days accounts receivable and inventories. Similarly, shortening the cash conversion cycle also improves the firm's profitability.

From another angle, Chiou and Cheng (2006) have analyzed the determinants of working capital management by using net liquid balance and working capital requirements of a firm as measures of working capital management of a firm. The

paper explored that how working capital management of a firm is influenced by the different variables like business indicators, industry effect, operating cash flows, growth opportunity for a firm, firm performance and size of firm. Economic recession, age and firm size were relating to working capital requirements positively and significantly, whereas, cycle, leverage, operating cash flow; growth and return on assets were having significant negative relationship with firm's requirements of working capital. The result showed that firms operate on a loose working capital policy in the times of economic recession because it is hard to acquire external capital during recession so a relatively higher level of liquid assets is maintained.

In the Pakistani context, Rehman (2006) investigated the impact of working capital management on the profitability of 94 Pakistani firms listed at Islamabad Stock Exchange (ISE) for a period of 1999-2004. He studied the impact of the different variables of working capital management including Average Collection Period, Inventory Turnover in Days, Average Payment Period and Cash Conversion Cycle on the Net Operating Profitability of firms. He concluded that there is a strong negative relationship between above working capital ratios and profitability of firms. Furthermore, managers can create a positive value for the shareholders by reducing the cash conversion cycle up to an optimal level. Similar studies on working capital and profitability includes Smith and Begemann (1997), Howorth & Westhead (2003), Ghosh & Maji (2004), Eljelly (2004), and Lazaridis and Tryfonidis (2006).

Finally, Afza and Nazir (2007) investigated the relationship between the aggressive/conservative working capital policies for seventeen industrial groups and a large sample of 263 public limited companies listed at Karachi Stock Exchange using cross sectional data for a period of 1998-2003. Using ANOVA and LSD test, the study found significant differences among their working capital investment and financing policies across different industries. Moreover, rank order correlation confirmed that these significant differences were remarkably stable over the period of six years of study. Finally, ordinary least regression analysis found a negative relationship between the profitability measures of firms and degree of aggressiveness of working capital investment and financing policies. The current study further validates the impact of the degree of aggressiveness of working capital policies on market measures of profitability i.e. Tobin's q using panel data approach.

## **RESEARCH METHODOLOGY**

### **VARIABLES OF THE STUDY**

The study used aggressive investment policy and aggressive investment policy as measuring variables of working capital management as used by Weinraub and Visscher (1998), who analyzed working capital policies of 126 industrial firms in US market. **Aggressive Investment Policy (AIP)** results in minimal level of investment

in current assets versus fixed assets. In contrast, a conservative investment policy places a greater proportion of capital in liquid assets with the opportunity cost of lesser profitability. As the level of current assets increased in proportion to the total assets of the firm, the management is being more conservative in managing the current assets of the firm. In order to measure the degree of aggressiveness of **Working Capital Investment Policy**, following ratio has been used:

$$= \frac{\text{Total Current Assets (TCA)}}{\text{Total Assets (TA)}}$$

: Where a lower ratio means a relatively aggressive policy.

On the other hand, **Aggressive Financing Policy (AFP)** utilizes higher levels of current liabilities and less long-term debt. In contrast, a conservative financing policy uses more long-term debt and capital and less current liabilities. The firms are more aggressive in terms of current liabilities management if they are concentrating on the use of more current liabilities, which put their liquidity on risk. The degree of aggressiveness of a financing policy adopted by a firm will be measured by **Working Capital Financing Policy** and following ratio has been used:

$$= \frac{\text{Total Current Liabilities (TCL)}}{\text{Total Assets (TA)}}$$

: Where a higher ratio means a relatively aggressive policy.

The impact of working capital policies on the profitability has been analyzed through *accounting measures* of profitability as well as *market measures* of profitability i.e. *Return on Assets (ROA)* and *Tobin's Q*. These variables of return are calculated as:

$$\text{Return on Assets (ROA)} = \frac{\text{Net Earnings after Taxes (NEAT)}}{\text{Book Value of Assets (BVA)}}$$

Tobin's q compares the value of a company given by financial markets with the value of a company's assets. A low q (between 0 and 1) means that the cost to replace a firm's assets is greater than the value of its stock. This implies that the stock is undervalued. Conversely, a high q (greater than 1) implies that a firm's stock is more expensive than the replacement cost of its assets, which implies that the stock is overvalued. It is calculated as:

$$\text{Tobin's } q = \frac{\text{Market Value of Firm (MVF)}}{\text{Book Value of Assets (BVA)}}$$

Where:

*: Market Value of Firm (MVF) is the sum of Book Value of long plus short term and market value of equity. Market value of equity is calculated by multiplying the number of shares outstanding with the current market price of the stock in a particular year.*

### CONTROL VARIABLES

In working capital literature, various studies have used the control variables along with the main variables of working capital in order to have an apposite analysis of working capital management on the profitability of firms (Lamberson 1995; Smith & Begemann 1997; Deelof 2003; Eljelly 2004; Teruel and Solano 2005; Lazaridis and Tryfonidis 2006). On the same lines, along with working capital variables, the present study has taken into consideration some control variables relating to firms like the size of the firm, the growth in its sales, and its financial leverage. The size of the firm (SIZE) has been measured by the logarithm of its total assets as the original large value of total assets may disturb the analysis. The growth of firm (GROWTH) is measured by variation in its annual sales value with reference to previous year's sales  $[(Sales_t - Sales_{t-1})/Sales_{t-1}]$ . Moreover, the financial leverage (LVRG) has been taken as the debt to equity ratio of each firm for the whole of sample period. Some researchers like Deelof (2003), in his study of large Belgian firms, also considered the ratio of fixed financial assets to total assets as a control variable; however, this variable can not be included in current study because of unavailability of appropriate data as most of firms don't disclose the full information in the financial statements. Finally, since good economic conditions tend to be reflected in a firm's profitability (Lamberson 1995), this phenomenon has been controlled for the evolution of the economic cycle using the variable GDPGR, which measures the real annual GDP growth in Pakistan for each of the study year of 1998-2005.

### STATISTICAL ANALYSIS

The impact of aggressive and conservative working capital policies on the profitability of the firm has been evaluated through applying the panel data regression analysis. The performance variables (ROA, and Tobin's q) as well as the TCA/TA and TCL/TA along with the control variables have been regressed in SPSS software. The following regression equations are run to estimate the impact of working capital policies on the profitability measures.

$$\text{ROA}_i = \alpha + \beta_1(\text{TCA/TA}_i) + \beta_2(\text{SIZE}_i) + \beta_3(\text{GROWTH}_i) + \beta_4(\text{LVRG}_i) + \beta_5(\text{GDPGR}_i) + \varepsilon \dots\dots\dots (1)$$

$$\text{Tobin's } q_i = \alpha + \beta_1(\text{TCA/TA}_i) + \beta_2(\text{SIZE}_i) + \beta_3(\text{GROWTH}_i) + \beta_4(\text{LVRG}_i) + \beta_5(\text{GDPGR}_i) + \varepsilon \dots\dots\dots (2)$$



And

$$ROA_i = \alpha + \beta_1(TCL/TA_i) + \beta_2(SIZE_i) + \beta_3(GROWTH_i) + \beta_4(LVRG_i) + \beta_5(GDPGR_i) + \varepsilon \dots\dots\dots (3)$$

$$\text{Tobin's } q_i = \alpha + \beta_1(TCL/TA_i) + \beta_2(SIZE_i) + \beta_3(GROWTH_i) + \beta_4(LVRG_i) + \beta_5(GDPGR_i) + \varepsilon \dots\dots\dots (4)$$

Where:

- $TCA/TA_i$  = Total Current Assets to Total Assets Ratio
- $TCL/TA_i$  = Total Current Liabilities to Total Assets Ratio
- $ROA_i$  = Return on Assets
- $\text{Tobin's } q_i$  = Value of  $q$
- $SIZE_i$  = Natural Log of Firm Size
- $GROWTH_i$  = Growth of Sales
- $LVRG_i$  = Financial Leverage of Firms
- $GDPGR_i$  = Real Annual GDP Growth rate of Pakistan
- = intercept
- $\varepsilon$  = error term of the model

### SAMPLE & DATA

The total population of the study is all non-financial firms listed at Karachi Stock Exchange. Karachi Stock Exchange (KSE) has divided the non-financial firms into various industrial sectors based on their nature of business. In order to be included in the population, firms must be in their businesses for the whole study period. Neither of the firms should be de-listed by the Karachi Stock Exchange (KSE) nor should it be merged with any other firm during the whole window period. The merged and de-listing from the Karachi Stock Exchange, due to any reason/restriction imposed by the regulators, make the firm ineligible to be included in the study. New incumbents in the market during the study period have also not included in the population. Furthermore, firms must have complete data for the period of 1998-2005. Firms with negative equity during the study period have also removed for the population of study leaving us with the final population of 204 non-financial firms from 17 various industrial sectors. The whole population has been taken as the sample for analysis of working capital policies.

The study has used annual financial data of 204 non-financial firms for the period of 1998-2005. The panel data set has been developed for eight years of study and 204 sampled firms which produced 1632 year-end observations. For the data collection purpose, various sources have been utilized. The book based required financial data of these firms was obtained from the companies' annual reports and publications of

State Bank of Pakistan. The data regarding annual average market prices has been collected from the daily quotations of Karachi Stock Exchange (KSE).

### ANALYSIS

Some descriptive statistics have been reported in Table 4.1 for the study variables. There are 1632 observations for the panel data set for 204 non financial firms over the 8 years of period from 1998-2005. The firms tend to keep, on average, more than fifty percent of their total assets in the current portion which varies from 4% to 98%. Whereas, the level of current liabilities is found to be approximately 45% of the total liabilities which also ranges from 4% to 94% on the extreme values. The average size of the studied firms is found to be 4000 millions rupees where the smallest firm has 50 millions rupees and largest firm has 134 billions rupees of total assets. The mean growth rate of the sales of the sample for 204 firms is a bit low i.e. 16.65% with the huge variation of 140% in the sales. The average real annual Gross Domestic Product (GDP) growth rate for the last eight years of study is 4.72% with 8.96% at the highest growth. Some other descriptive statistics regarding the variables of study are also given in Table 4.1.

**Table 4.1: Descriptive Statistics**

Variable	N	Minimum	Maximum	Mean	SD
Investment Policy	1632	.0379	.9769	.5354	.202
Financing Policy	1632	.0445	.9406	.4425	.169
Size (in million rupees)	1632	49.92	134433.64	4012.89	11895.81
Growth of Sales (%)	1632	-201	495	16.65	140.97
GDP Growth (%)	1632	1.97	8.96	4.72	2.19
Leverage	1632	-88.68	84.14	2.71	14.02
ROA (%)	1632	-19.68	67.68	5.68	11.31
Tobin's Q	1632	.29	18.09	1.14	1.12

Table 4.2 represents the result of regression model in which the impact of working capital investment policy on performance measurements has been examined. The F-values of regression models run are found statistically significant whereas Durbin-Watson statistics of more than 1.8 indicating less correlation between the independent variables of the regressions models. The t-statistics of working capital investment policy is positive and statistically significant at 1% level for Return on Assets and Tobin's q. The positive coefficient of TCA/TA indicates a negative relationship between the degree of aggressiveness of investment policy and return on assets. As the TCA/TA increases, degree of aggressiveness decreases, and return on

assets increases. Therefore, there is negative relationship between the relative degree of aggressiveness of working capital investment policies of firms and both performance measures i.e. ROA and Tobin's q. This similarity in market and accounting returns confirms the notion that investors do not believe in the aggressive approach of working capital management, hence, they don't give any additional value to the firms in Karachi Stock Exchange.

**Table 4.2: Regression Analysis of Performance Measures & Working Capital Investment Policy**

Variables	ROA		Tobin's q	
		t-value		t-value
TCA/TA	.158	6.506***	.149	6.156***
SIZE	.082	3.363***	.092	3.771***
GROWTH	.137	3.805	-.004	-.104
GDPGR	.043	1.759*	.162	6.627***
LVRG	-.202	-5.606***	.004	.101
F-Value	17.166***		19.245***	
D-W	1.875		1.948	

\*\*\* Significant at 1% Level \*\* Significant at 5% Level \* Significant at 10% Level

Table 4.3 reports regression results for working capital financing policy and the performance measures. The F-value of regression models and Durbin-Watson statistics indicate same results as we have in Table 4.2. The negative value of  $\beta$  coefficient for TCL/TA also points out the negative relationship between the aggressiveness of working capital financing policy and return on assets. Higher the TCL/TA ratio, more aggressive the financing policy, that yields negative return on assets. However, surprisingly, the relationship between Tobin's q and working capital financing policy has been established as positive and statistically significant. Investors in the stock exchange are giving more value to the firms which are adopting an aggressive approach towards working capital financing policy and having higher levels of short term and spontaneous financing in their balance sheets.

**Table 4.3: Regression Analysis of Performance Measures & Working Capital Financing Policy**

Year	ROA		Tobin's q	
		t-value		t-value
TCL/TA	-.171	-6.940***	.087	3.506***
SIZE	.064	2.630***	.087	3.522***
GROWTH	.116	3.204***	.011	.312
GDPGR	.011	.440	.163	6.578***
LVRG	-.168	-4.628***	-.013	-.354

F-Value	18.363***	13.946***
D-W	1.822	1.923

\*\*\* Significant at 1% Level \*\* Significant at 5% Level \* Significant at 10% Level

The control variables used in the regression models are natural log of firm size, sales growth, real GDP growth and average leverage. All the control variables have their impact on the performance of the firms. Firm's size causes the returns of the firms to be increased and it is statistically found significant. Moreover, GROWTH and LVRG is found to be significantly associated with the book based returns on assets which confirms the notion that leverage and growth are strongly correlated with the book value based performance measures (Deloof 2003; Eljelly 2004). Real GDP growth may not be affecting the returns based on book values; however, investors working in the economy may react positively to a positive change in the level of economic activity which is in accordance with the findings of Lamberson (1995).

The above results are contradictory with Gardner et al. (1986), Deloof (2003), Eljelly (2004), Teruel & Solano (2005) as well as in accordance with Afza and Nazir (2007) and produced negative relationship between the aggressiveness of working capital policies and accounting measures of profitability. Managers cannot create value if they are adopting for an aggressive approach towards working capital investment and working capital financing policy. However, if firms are having aggressive approach to manage the short term liabilities, investors give more value to those firms in stock markets. The degree of aggressiveness of working capital policies is worthwhile only for creating shareholders' wealth through increasing market performance, whereas accounting performance cannot be increased by being aggressive in managing of working capital. Our results are somewhat different from those studies conducted in the developed economies. The Pakistan is one of the emerging economies and Pakistani markets are not much transparent and efficient to fully absorb the impact of information. The results found are the clear example of this state of Pakistani markets.

## CONCLUSION

The present study investigates the relationship of the aggressive and conservative working capital asset management and financing policies and its impact on profitability of 204 Pakistani firms divided into sixteen industrial groups by Karachi Stock Exchange for a period of 1998-2005. The impact of aggressive/conservative working capital investment and financing policies has been examined through panel data regression models between working capital policies and profitability. We found a negative relationship between the profitability measures of firms and degree of aggressiveness of working capital investment and financing policies. The firms yield negative returns if they follow an aggressive working capital policy. These results are further validated by examining the impact of aggressive working capital policies

on market measures of profitability which was not tested before. The results of Tobin's q were in line of the accounting measures of profitability and produced almost the same results for working capital investment policy. However, investors in the stock markets are giving more value to the firms through q if they are more aggressive in managing their current liabilities.

As we used a new measure of profitability i.e. Tobin's q and panel data regression analysis to estimate the relationship of working capital management and firm returns in Pakistan, the present study is expected to be a significant contribution in finance literature. Although the results of present study are in contradiction to some earlier studies on the issue, yet, this phenomenon may be attributed to the inconsistent and volatile economic conditions of Pakistan. The reasons for this contradiction may further be explored in upcoming researches and this topic is left for future.

The study also suggests some policy implications for the managers and prospective investor in the emerging market of Pakistan. Firms with the more aggressive policy towards working capital may not be able to generate more profitability. So, as far as the book value performance is concerned, managers can not yield more return on assets by following aggressive approach towards short term assets and liabilities. On the other hand, investors are giving more value to the aggressiveness of firms towards working capital financing policies. Firms which are using high level of current liabilities in their financing their market value is more than the book value. The investors believe that firms using less equity and less amount of long term loans would be performing better than the others. However, other factors, like agency problem, may play a pivotal role in such firm, and so these factors may further be explored in future.

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Man often acquires just so much knowledge as to discover his ignorance, and attains so much experience as to see and regret his follies, and then dies. – *Clulow*.



To comprehend a man's life it is necessary to know not merely what he does, but also what he purposely leaves undone. There is a limit to the work that can be got out of a human body or a human brain, and he is a wise man who wastes no energy on pursuits for which he is not fitted; and he is still wiser who, from among the things that he can do well, chooses and resolutely follows the best. – *Gladstone*.