RELATIONSHIP BETWEEN WORKING CAPITAL OF FIRMS LISTED IN THE NARIROBI STOCK EXCHANGE AND ECONOMIC ACTIVITY IN KENYA

BY

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Declaration

This project is my original work and has not been submitted for a degree in any other University

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This project has been submitted for examination with my approval as the University Supervisor

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Dedication

To my parents Paul Omanyo and Waltruda Aluoch for everything. Also to my family, wife, children and all my sisters and brothers

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Abstract

The objective in this study was to examine the relationship between working capital positions of firms listed in the Nairobi Stock exchange and major economic indicators in Kenya. The firms were studied over a period from 1989 to 2003. The findings from this study showed that liquidity increased slightly for these firms during economic expansion and reduced during economic slowdowns. Their investment in working capital, as measured by current assets to total assets ratios, showed a relatively active shift up and down over the time period of this study. Findings suggest that working capital management practices of large firms in response to changes in economic activity follow commonly held expectations. However, as expected financial firms showed deviation from this norm. This was however expected given their nature of current assets. It therefore shows that proper management and forecasting working capital requirements in line with projected economic growth is a very important task of finance managers and policy makers.

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1 INTRDUCTION

Weinraub (1998) defines working capital as the funds available to a firm for carrying on the activities of a business after an allowance is made for bills that have to be settled in the short-term. Working capital is therefore calculated by deducting current liabilities from the current assets of a firm, it's an indicator of a firm's liquidity i.e. the firm's ability to meet its short-term obligations to creditors and suppliers.

Working capital is indeed the excess of current assets over current liabilities (Lamberson 1991). In light of the turbulent business environment of the 21 century, its imperative that financial managers in partnership with other strategists for the business realize that formulating proper working capital policies is not only a managerial ritual but an undertaking that besides ensuring a firms success and competitiveness, needs a thorough audit of both internal and external aspect of the firm that have both direct and implied relationships with a firms working capital needs (Weinraub and Sue 1998).

In their book Measuring Business Cycles, Arthur Burns and Wesley Mitchell (1946) defined the business cycle as a type of fluctuation found in the aggregate economic activity of nations that organize their work mainly in business enterprises: a cycle consists of expansions occurring at about the same time in many economic activities, followed by similarly general recessions, contractions, and revivals which merge into the expansion phase of the next cycle (Measuring Business Cycles p3). Many theories have been floated to try and explain the courses of such fluctuations in the business or economic environment.

Clement Juglar (1862) was among the first to call for an "economic" theory of the cycle. He himself found the business cycle to be related to the credit cycle. However, Juglar had no explanation of the credit cycle - he only posited that a relationship existed.

The dynamism of the business environment especially in this age of information communication technology (ICT), calls for vigilance and accuracy especially in policy formation (Lamberson 1991). Managers including financial planners must thus be well versed not only with the traditional skills of running a firms affairs but must also be able to synthesise a firm's working capital needs within background of competition within the industry, a firms weaknesses as identified in SWOT analysis and the firms needs of maximizing shareholders' wealth, growth and profitability, achieving success in customer satisfaction and corporate social responsibility. (Moyer, McGuigan and Kretlow)

Gitman and Maxwell (1985), observe that financial managers devote approximately 60 percent of their time on short-term activities. The dynamic and highly volatile nature of short-term markets, the constant need to replace current assets and to pay off current liabilities, and the fact that long-term funds are raised infrequently help explain the larger time allocation to short-term activities.

While recent research supports the view that smaller firms do tend to be more liquid than large firms, the availability of short-term funds throughout the economy is affected by economic conditions that exist at a point in time (Lamberson 1991).

The purpose of this study is to analyze how the working capital positions of firms listed in the Nairobi stock exchange respond to changes in the level of economic activity. A commonly held view is that short-term credit is more readily available during periods of low economic activity in contrast to periods of high economic activity (Lamberson 1991). Further, business needs for working capital increase during expanding economic activity and decrease during contracting economic activity. According to Gup (1983) and
Schall and Haley (1991), the level of investment in working capital accounts should increase as economic activity increases and decrease as economic activity decreases

Large firms expected to increase their investments in receivables, inventories, and other current assets, their use of spontaneous sources of funds and short-term debts during economic expansion. The opposite would be expected during economic contraction. Based on the matching principal, during economic expansion it's likely that the firms liquidity will trend downwards (more especially during the short-run) the opposite is likely to be true during the economic contraction (Lamberson 1991).

If a company's current liabilities exceed their current asset; that is if the working capital of a firm is in the negative, it's true that a firm may run into trouble paying creditors especially when creditors' dues are demanded quickly. In such a situation, a firm may also not be able to meet its obligations such as financing daily operations of the business. A study conducted among the Fortune 1000 firms in 1985 by Gitman et al found that financial planning and budgeting were ranked as highly important and practitioners devote greater time to the management of assets while textbooks seem to place greater emphasis on liabilities and equities. An article by Gitman and Mercurio (1982) suggested that finance academicians and financial managers should develop a stronger communication link to enhance the transfer of knowledge and needs between them. Working capital ratio is important in describing a firm's liquidity i.e. a firm's ability in meeting short-term obligations as they fall due. The goal of working capital management is to ensure that a firm is able to continue its operations and it's sufficiently able to satisfy maturing short-term debt and potential operational expenses.

Working capital management therefore is probably one of the most central and most important responsibilities of finance managers. Current assets and current liabilities represent a significant investment by business and the liquidity position of the firm is determined by the composition and financing of these current accounts. Adequate working capital for business firms relative to their size is a requisite for proper conduct of business (Lamberson 1991). It's important therefore that financial managers better understand Working Capital Management Practices and allocate considerable time in the management of current assets and the short-term financing of these assets.
This management becomes even more critical when the movement of business cycles is brought into the picture. The difficulty of predicting such things as drought, calamities and political changes and their effect on the economy calls for greater vigilance and proper Working capital management (Gitman et al 1985)

Some companies are inherently better placed than others. Insurance companies, for instance receive premiums upfront before having to make any payments (though they have unpredictable outgoings as claims come in.) also normally, a big retailer like

Nakumatt has little to worry about when it comes to accounts receivables. Majority of customers pay for the goods on the spot. Inventories represent the greatest problem for retailers .They must perform vigorous inventory forecasting or risk being out of business in a short time. Timing and lumpiness of payments can pose serious troubles.

Manufacturing companies for example incur substantial upfront costs for materials, machinery and labour before receiving payment. Indeed, much of the time, before sales, they consume more cash than they generate. A research carried out in the USA in 1991 by Lamberson showed that there was more liquidity in large firms compared to small firms. Current assets accounted for 68.3% of the total assets among the manufacturing firms with assets valued under $5 million while the same accounts made up only 35.7% of total assets for all manufacturing firms. It also indicated that small firms in recent years have had current and quick ratios that exceeded those of large firms. The primary reasons that can be attributed to the differences between large and small firms with respect to working capital are; large firms can devote more resources and expertise to manage current assets, large firms have an advantage of economies of scales. According to Pinches (1990) firms can become capital intensive relative to small firms. Indeed small firms have got fewer alternatives than the large counterparts in raising funds as well as fewer safety nets on which to rely.

Based on the above expected relationships and the relatively large investment in current accounts, large firms should respond to expanding economic activity by increasing their investment in the various components of current assets such as receivables, inventories, and other current assets. Also, firms would likely increase their use of short term financing. The expected impact of such actions would be a decrease in the liquidity position of large firms and an increase in the percentage of assets held in the form of current assets during an expanding economy. The opposite impact would be expected during a downturn in the economy. In other words, the working capital position of small firms would be expected to change with a change in the level of economic activity.

A review of the literature indicated an increasing volume of research on the subject of working capital management, but very little published local research was related to large firms and their activity in relation to economic activity. No published research was found that addressed the subject of the relationship between changes in working capital position of large firms and changes in the level of economic activity. Since these firms make such an enormous contribution to the economy (Martin, Petty, Scott, and Keown1991), research is needed that will provide insight into the behaviour of these businesses. A better understanding of the working capital management practices of large businesses is especially beneficial because of the urgency of adequate working capital in the success of these firms.

The purpose of this study is to conduct a historical analysis of how the working capital position of small firms responded to changes in the level of economic activity. Firms are expected to increase their investment in receivables, inventories, and other current assets and their use of spontaneous sources of funds and Short-term debt during economic expansion. The opposite would be expected during economic contraction. Based on the matching principle of financing, the above increases in current assets would likely cause the liquidity of these firms to trend downward during economic expansion. The opposite would be expected during economic contraction.

RESEARCH PROBLEM

Modern Micro-economic theory on how the private firm should behave is based on profit –maximization as a decision criterion (Ezra and John, 1997). Actions that increase a firms profit are undertaken and those that decrease profit are avoided. To maximize profit it implies that the firm must maximize output for a given set of scarce inputs or equivalently minimize the cost of producing a given output (Weinraub 1998). In short the firm must be efficient in its use of working capital. Thus, from the perspective of economic theory, profit maximization is a criterion for economic efficiency. In light of the foregoing, it would be right to speculate that a number of factors that may both be internal and external to the business would affect the management and planning of the working capital available to the business. Some factors would include the amount of funds available in the economy .The availability of short-term funds throughout the economy is affected by economic conditions that exist at a point in time. A commonly held view is that short-term credit is readily available during periods of low economic activity (Lamberson 1991). It is possible that during periods of low economic activity most investors would prefer to lend on short-term basis due to risks associated with long-term lending in a declining economy (Weinraub 1998).

Therefore the management of working capital is critical during decline. This study will evaluate managerial responses to management of working capital during periods of changing economic activity.

Research Objective

Examine how the changes in economic activity affect changes in working capital by firms listed at NSE.

Justification of the Study

Efficient financial management requires the existence of some objective or goal (Kim et al 1992). This is because judgment as to whether or not a financial decision is efficient must be made in light of some standard. This study would greatly benefit finance managers and chief executives of large and small firms. By understanding the relationship between the economic cycle and the management of working capital, finance managers would be able to plan their working capital strategy well based on the economy.

The study would also be important to government planners and human resources professionals to enable them in planning for required resources over an economic period.

2 LITERATURE REVIEW

Introduction

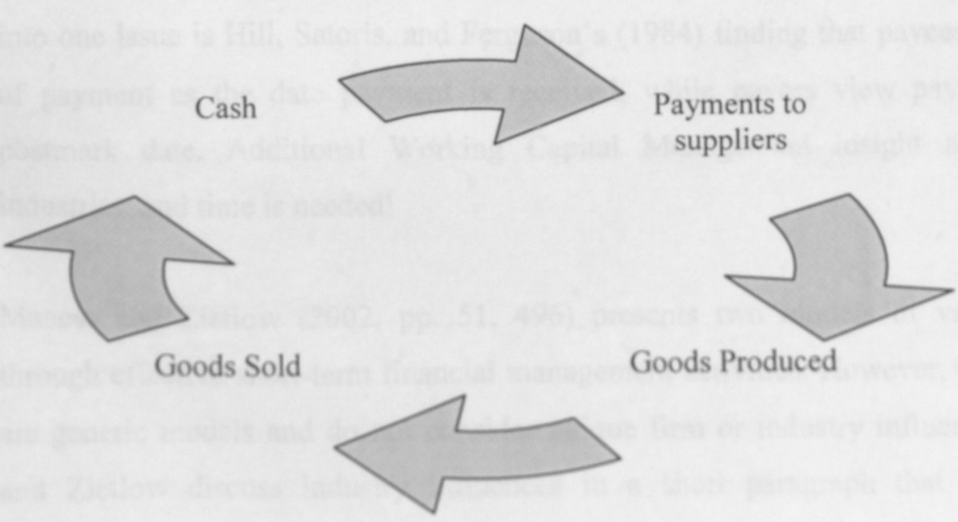
Working capital management is concerned with making sure the firm has exactly the right amount of money and lines of credit available to the business at all times (McClure 2003). Cash is the lifeline of a company. If this lifeline deteriorates, so does the company's ability to fund operations, reinvest and meet capital requirements and payments (McClure 2003). Understanding a company's cash flow health is essential to making investment decisions. A good way to judge a company's cash flow prospects is to look at its working capital management (David 2003).

The efficient management of short-term financial accounts by corporations throughout the world continues to increase in importance. Although financial managers have in the past focused primarily on transactions in domestic markets, the rapid expansion of global trade today requires them to be equally concerned with (and skilled) in transactions involving global securities and markets. The increase in global trade, with its concomitant increase in global competition, has forever expanded the role of corporate responsibility for short-term financial management; now, both large and small firms are affected (directly or indirectly) by economic and political changes in home, host, and seemingly unrelated countries. This suggests that opportunities and responsibilities for short-term financial management have significantly changed in recent years.

A study by Gitman, Moses, and White (1979) (GM&W) reported corporate cash management practices of both large and small US corporations; it provided useful information that helped to bridge the gap between the theory and the practice of cash management in the United States. Other studies followed (see, for example, Gitman and Goodwin, 1979, or Smith and Sell, 1980), which primarily investigated various aspects of domestic corporate cash management. Gitman and Maxwell (1985), in a survey of chief financial officers of major US firms, found, among other things, that financial planning and budgeting and working capital management are the activities on which domestic financial managers spend most of their time; this study confirmed anecdotal evidence relating to the high relative importance of short-term financial management. The expansion of short-term financial management into global markets has been studied by several analysts who report a number of causes, the most important being the need to have the right amount of money in the right currency in the right place at the right time.

Advancements in funds transmission technology make the task of accurately and efficiently moving money among countries and currencies far easier. Technology also has played a central role in short-term financial management with its ability to seamlessly transfer various sums of money denominated in any desired currency to any country in the world. Gilbert and Reichert (1992) reported that many firms regularly use the services of an automated clearing house (ACH) to transmit payments, with a smaller number of them use a financial form of electronic data interchange (FEDI) to accomplish the same objective. As might be expected, the study found that larger firms tend to lead in use of both technologies, but smaller firms were quickly adopting them.

According to John Petroff in his paper 'Financial Analysis (2000) , the way working capital moves around the business is modelled by the working capital cycle .This cycle shows the cash coming into the business , what happens to it while the business has it and then where it goes .A simple working capital cycle may look like:



Source: John Petroff, Financial Analysis 2000

Significance of working capital management

The importance of cash flow is not new to the finance literature. Over twenty years ago, Largay and Stickney (1980) reported that the then-recent bankruptcy of W.T. Grant, a nationwide chain of department stores, should have been anticipated because the corporation had been running a deficit cash flow from operations for 8 of the last 10 years of its corporate life. As part of a study of the Fortune 500's financial management practices, Gilbert and Reichert (1995) found that time value of money cash flow analysis is used to select projects in 91 percent of the firms. Accounts receivable management models are used in 59 percent of these firms, while inventory management models were used in 60 percent of the companies. Recently, Farragher, Kleiman and Sahu (1999) found that 55 percent of firms in the S&P Industrial index complete some form of a cash flow assessment, but did not present insights regarding accounts receivable and inventory management, or variations of any current account asset or liability accounts across industries.

Theoretical determination of optimal trade credit limits are the subject of many articles over the years (e.g., Schwartz, 1974 and Scherr, 1996), with scant attention paid to actual accounts receivable management. Across a limited sample, Weinraub and Visscher (1998) observe a tendency of firms with low levels of current ratios to also have low levels of current liabilities. Combining accounts receivable and payable into one issue is Hill, Satoris, and Ferguson's (1984) finding that payees define date of payment as the date payment is received, while payers view payment as the postmark date. Additional Working Capital Management insight across firms, industries, and time is needed!

Maness and Zietlow (2002, pp. 51, 496) presents two models of value creation through effective short-term financial management activities. However, these models are generic models and do not consider unique firm or industry influences. Maness and Zietlow discuss industry influences in a short paragraph that includes the observation that "An industry a company is located in may have more influence on that company's fortunes than overall GDP" (2002, p. 507)." In fact, a careful review of this 627-page textbook finds only sporadic information on actual firm levels of WCM dimensions, virtually nothing on industry factors except for some boxed items with titles such as "Should a Retailer Offer an In-House Credit Card" (p. 128), and nothing on WCM stability over time.

Working capital management is important for several reasons, for one the current assets of a manufacturing firm account for over half of its assets Weinraub and Visscher (1998). For a distribution company they account even more. Excessive levels of current assets can easily result in a firm realizing a sub-standard return on investment. However, the firms with too little current assets may incur shortages and difficulties in maintaining smooth operations Gilbert and Reichert (1995)

For small companies current liabilities are the principal sources of external funding. Such firms do not have access to long term financing apart from mortgages on buildings. Fast growing and larger firms also make use of current liability financing. For these reasons, the financial managers devote considerable time working on these matters.

The management of working capital , i.e. marketable securities, accounts receivable, accounts payable, accruals and other means of short term financing is the direct responsibility of the finance manager (Markowitz 1988)

Unlike dividend and capital structure decisions, working capital issues cannot be studied and a decision reached and the issues set aside for months to come. It's a constant management required on the part of the finance manager. More fundamental is the effect that the working capital has on companies risk, return and share price.

Inventory Management

The need for inventory is driven by customer demand that is, the parts, materials, and supplies required by maintenance departments and other customers to perform the day-to-day business activities (Revised Inventory Management Desk Guide Number 40). Material requirements can include such diverse items as vehicle parts (for example, parts for bus, rail, inclined plane, and trolley), infrastructure materials (for example, materials for guide way systems, tracks, and bridges), office supplies, and janitorial maintenance supplies. In this context, the primary goal of inventory is to provide the right item, at the right location and time, at the lowest cost (http://gulliver.trb.org/publications/). To meet this goal, inventory professionals work with two major (and sometimes conflicting) objectives in mind:

1. Maximize customer service (that is, provide material when the customer needs it)
2. Minimize inventory dollars (that is, control the amount of money invested in parts and material).

Inventory management departments must work with purchasing departments and customers to reconcile the two conflicting objectives. Ways to accomplish this reconciliation include the following:

- Clear and frequent communication among maintenance, inventory management, and purchasing departments;
- A customer service orientation by inventory management and purchasing departments;
- Active material planning by maintenance, inventory management, and purchasing departments;
- Efficient material flow from the storehouse to the customer site;
- Effective physical control of parts; and
- Enhanced item accuracy.

Lowering inventories is one of the quickest ways to decrease working capital needs (Supply Chain Planet July 2004). Performance measurements, such as the old standby ROA (return on assets) and the newer EVA (economic value added), as well as other measures that gauge how efficiently capital is used, have become more common organizational drivers Gruenwald (2004). In fact, many times an executive's bonus depends, at least in part, on how efficiently capital is used. Couple the drive for efficient capital use with the need to respond more quickly to changes in customer demand, with shorter and shorter order-to-delivery cycle times, and you have a problem that is challenging many organizations (http://www.supplychainplanet.com/e_article000274581.cfm).

Excess Inventory has a significant impact on a company's financial performance – from a direct impact on the bottom line, to a depressed stock price, higher insurance costs and higher taxes Mateus-Tique (2004). Many of these costs are hidden and/or hard to calculate so they are easily over looked.

According to Investment Recovery Association member data, 70% to 90% of every sales dollar generated by investment recovery goes straight to the bottom line as profit (Supply Chain Planet , July 2004).. That's because the costs of producing that merchandise have already been accounted for, and once they become excess inventory every dollar spent to maintain them is a dollar that could be better invested if assets were sold and converted into cash. For every dollar generated by investment recovery efforts, $20 in sales would be required to generate the same net effect to the company's profit

In addition to providing material to customers, another goal of inventory management is to establish, by centralizing decision making and issue resolution, a full-time authority responsible for materials. The inventory managers also works with maintenance and procurement departments to forecast and plan the transit agency's material requirements and to monitor the effectiveness and cost efficiency of the firm's material-related activities (http://gulliver.trb.org/publications/).

Cash Management

Business analysts report that poor management is the main reason for business failure. Poor cash management is probably the most frequent stumbling block for entrepreneurs (http://smallbusiness.findlaw.com/business-operations/accounting/accounting-cash-management.html). Cash is ready money in the bank or in the business. It is not inventory, it is not accounts receivable (what you are owed), and it is not property John Petroff (2000). These can potentially be converted to cash, but can't be used to pay suppliers, rent, or employees.

Firms hold cash for three major reasons

a) ***Speculation*** Economist Keynes described this reason for holding cash as creating the ability for a firm to take advantage of special opportunities that if acted upon quickly will favour the firm. An example of this would be purchasing extra inventory at a discount that is greater than the carrying costs of holding the inventory.

b) ***Precaution*** Holding cash as a precaution serves as an emergency fund for a firm. If expected cash inflows are not received as expected cash held on a precautionary basis could be used to satisfy short-term obligations that the cash inflow may have been bench marked for.

c) ***Transaction*** Firms are in existence to create products or provide services. The provision of services and creating of products results in the need for cash inflows and outflows. Firms hold cash in order to satisfy the cash inflow and cash outflow needs that they have.

The Business Cycle

Definition

Business cycles as we know them today were first identified and analyzed by Arthur Burns and Wesley Mitchell in their 1946 book, Measuring Business Cycles. They defined the business cycle as a type of fluctuation found in the aggregate economic activity of nations that organize their work mainly in business enterprises: a cycle consists of expansions occurring at about the same time in many economic activities, followed by similarly general recessions, contractions, and revivals which merge into the expansion phase of the next cycle (Measuring Business Cycles p3).

In the decade that followed the Great Depression, economists developed an interest in the possible existence of (more or less systematic) cycles in the economy; see, for example, Haberler (1944) or Shumpeter (1939). It became apparent that in order to identify economic cycles, one had to remove from the series seasonal fluctuations, associated with short-term behaviour, and the long term secular trend, associated mostly with technological progress. Burns and Mitchell (1946) provided perhaps the first main reference point for much of the posterior research. Statistical measurement of the cycle was broadly seen as capturing the variation of the series within a range of frequencies, after the series has been seasonally adjusted and detrended. (Burns and

Mitchell suggested a range of frequencies associated with cycles with a period between, roughly, 2 and 8 years.) Statistical methods were devised to estimate cyclical variation, and these gradually evolved towards methods fundamentally based on the application of moving average filters to the series; Bry and Boschan (1971). These moving-average filters were "ad-hoc" filters, in the sense that they were fixed, independent of the particular series being analyzed; they were designed as linear "band-pass" filters. That is, as filters aimed at capturing the series variation within a certain band of frequencies.

The last 20 years have witnessed methodological research on two broad fronts. The first front dealt with further developments of the moving-average type of approach; the second front was the development of more complex statistical approaches oriented towards capturing cyclical features, such as asymmetries and varying period lengths that could not be captured with univariate linear filters. Examples of research in both directions can be found in Sims (1977), Lahiri and Moore (1991), Stock and Watson (1993) and Hamilton (1994) and (1989). Although the first approach is known to present serious limitations, the new and more sophisticated methods developed in the second approach (most notably, multivariate and nonlinear extensions) are at an early stage, and have proved still unreliable, displaying poor behaviour when moving away from the sample period. Despite the fact that business cycle estimation is basic to the conduct of macroeconomic policy and to monitoring of the economy, many decades of attention have shown that formal modelling of economic cycles is a frustrating issue. As Baxter and King (1999) point out, we still face at present the same basic question as did Burns and Mitchell fifty years ago: "how should one isolate the cyclical component of an economic time series? In particular, how should one separate business-cycle elements from slowly evolving secular trends, and rapidly varying seasonal or irregular components?" Be that as it may, it is a fact that measuring (in some way) the business cycle is an actual pressing need of economists, in particular of those related to the functioning of policy-making agencies and institutions, and of applied macroeconomic research. Lacking a practical and reliable alternative, moving-average methods are the ones actually used, to the point that economic agencies (such as the OECD, the International Monetary Fund, or the European Central Bank) often have internal rules or recommendations to measure economic cycles that are moving average-type methods. One can say that, very broadly, within the set of applied business cycle analysts, there has been a convergence towards what could be called "Hodrick-Prescott" (HP) filtering, a methodology proposed by Hodrick and Prescott (1980); see also Kydland and Prescott (1982) and Prescott(1986). The emergence of the HP filter as a paradigm has, probably, been fostered by economic globalization and European integration, which has required a relatively high level of methodological homogeneity in order to compare countries. It is important to point out that, because seasonal variation should not contaminate the cycle, for series with a higher than annual frequency of observations, the HP filter is applied to seasonally adjusted (SA) series. Seasonal adjustment is most often performed with the program X11, also an ad-hoc filter designed to remove seasonal variation (see Shinkin et al, 1967). Therefore, the present paradigm in applied work having to do with business cycle estimation is to apply the HP filter to X11 filtered series. An unavoidable consequence is that, to some degree, the procedure eventually is often used as a black box.

One of their key insights in these studies however was that many economic indicators move together. During a boom, or expansion, not only does output rise, but also employment rises and unemployment falls. New construction and prices typically rise during a boom as well (http://www.econlib.org/library/Enc/BusinessCycles.html). Conversely, during a downturn, or depression, not only does the output of goods and services decline, but employment falls and unemployment rises as well. New construction also declines. In the era before World War II, prices also typically fell during a recession; since the fifties, prices have risen during downturns, though usually more slowly than during booms.

Burns and Mitchell's definition of business cycles had two key features. The first is the co-movement among individual economic variables. Indeed, the co-movement among series, taking into account possible leads and lags in timing, was the centerpiece of Burns and Mitchell's methodology. In their analysis, Burns and Mitchell considered the historical concordance of hundreds of series, including those measuring commodity output, income, prices, interest rates, banking transactions, and transportation services. They used the clusters of turning points in these individual series to determine the monthly dates of the turning points in the overall business cycle. Similarly, the early emphasis on the consistent pattern of co movement among various variables over the business cycle led directly to the creation of composite leading, coincident, and lagging indexes (e.g., Shishkin, 1961).

The second prominent element of Burns and Mitchell's definition of business cycles is their division of business cycles into separate phases or regimes. Their analysis, as was typical at the time, treats expansions separately from contractions. For example, certain series are classified as leading or lagging indicators of the cycle, depending on the general state of business conditions.

Both of the features highlighted by Burns and Mitchell as key attributes of business cycles were less emphasized in postwar business-cycle models--particularly in empirical models where the focus was on the time-series properties of the cycle. Most subsequent econometric work on business cycles followed Tinbergen (1939) in using the linear difference equation as the instrument of analysis. This empirical work has generally focused on the time-series properties of just one or a few macroeconomic aggregates, ignoring the pervasive co movement stressed by Burns and Mitchell. Likewise, the linear structure imposed eliminated consideration of any nonlinearity of business cycles that would require separate analyses of expansions and contractions.

Recently, however, empirical research has revived consideration of each of the attributes highlighted by Burns and Mitchell. Notably, Stock and Watson (1989, 1991, and 1993) have used a dynamic factor model to capture co movement by obtaining a single common factor from a set of many macroeconomic series, and Hamilton (1989) has estimated a nonlinear model for real GNP with discrete regime switching between periods of expansion and contraction.

Climate Theories of the Cycle

The idea that the aggregate economy does not climb a steady trend but experiences occasional booms of activity and recessions is very old. Virtually every economist recognized the existence of strong fluctuations in the general level of economic activity - as exemplified in the debates on General Glut and the Marxian theory of crises. But the idea that it exhibits a *regular* cyclical pattern, that these fluctuations were recurrent in a precise periodic way, was only put forward late in the last century by William Stanley Jevons and Clement Juglar.

The first theorists provided mostly "exogenous cycle" theories: relating economic cycles to other exogenous cycles found in "nature" such as weather which, in turn, might be affected by astral phenomenon. These natural phenomena, they argued, affected tangible things such as harvests and/or intangibles such as people's moods, and that these in turn were creating the fluctuations that were observed. As these natural phenomena had a cyclical nature, so then we see a corresponding economic cycle.

Along these lines, William Stanley Jevons (1866, 1875, 1884) identified an economic cycle relating to sunspots - quite literally. Henry L. Moore had one based on weather cycles (1914) and another on the position of the planet Venus (1923). Johan Åkerman (1928, 1932) had a more ingenious one connecting longer business cycles to the magnified effects of a series of small, weather-driven seasonal cycles.

Overinvestment Theories of the Cycle - The Continental Tradition

Clement Juglar (1862) was among the first to call for an "economic" theory of the cycle. He himself found the business cycle to be related to the credit cycle. However, Juglar had no explanation of the credit cycle - he only posited that a relationship existed.

However, to simply associate the business cycle to another cycle does not explain how either come about. But with Say's Law in place, it was virtually impossible to have elastic credit and without that, the idea of a credit cycle may be lost. Among the first theorists to break Say's Law was Knut Wicksell - whose credit theory liberated investment from the shackles of savings. Although Wicksell's "cumulative process" has no natural turning points (it is put right by banks or government), he provided the key insight that was to guide further cycle theories.

Wicksell's insight of the "freedom" of investment enabled by credit was attained independently by Mikhail I. Tugan-Baranovsky (1894). He was also the first to come clear on the fact that he would take output fluctuations (more specifically, the fluctuation in the production of iron) as the indicator of the cycle. Thus, Tugan-Baranovsky provided the first theory of output fluctuations. Expansions, he argued, were derived from sudden and massive finance-induced spurts of investment (or, to use his terms, "free capital" or loanable funds were transformed into "fixed capital" or machinery, etc.). This led to a boost in the capital goods industry and, by a process akin to the later Keynesian multiplier, the economy as a whole followed.

The peak of the cycle and the beginning of the recession, he claimed, rise when the financing runs out but the capital-producing industries which have been built up are still running. With lower investment demand, these industries begin to falter and, by a reverse multiplier-like process, take the rest of the economy down with them. During this period, loanable funds are built up in banks again (the savings come from those on fixed incomes who gain during the accompanying deflation) and the economy gets ready for another expansion - which begins once the banking sector's nerve is drawn up and they begin to lend again.

Tugan-Baranovsky caused something of a stir among his fellow Marxians with this idea as it took away the secular trend to "crisis" in capitalism. But something was still missing: what really precipitates the sudden increases in bank credit? Arthur Spiethoff proposed this impulse to be exogenous - created by *technological* inventions or the discovery of new markets. These factors, which increase the profitability of industry, are what finally pulls the banks out of their slumber and initiate an explosive credit expansion. In Wicksellian terms, Spiethoff argues basically that from a position of equilibrium where the "natural" rate of interest equals the "money" rate, i.e. $r = i$, then technical change comes in to bring *up* the natural rate so that $r > i$, and thus set off the investment boom. The downturn begins for roughly the same reasons: the needs of these "new" industries are met; the rest follows as in Tugan-Baranovsky.

If this last point sounds suspiciously like Schumpeter's (1911) growth theory, there is a difference which Schumpeter spells out in his 1939 *Business Cycles*: namely, inventions and new markets are all pointless unless they are actually exploited by entrepreneurs and, in Schumpeter's theory, entrepreneurs move "like swarms". Thus, the "sudden" credit expansion arises because of the sudden movement en masse of the entrepreneurs to adopt a particular technique or exploit some uncertain opportunity. The downturn arises when the "supply" of entrepreneurs in any particular society or generation is used up.

Gustav Cassel (1918) took the Spiethoff treatise to a new level. Beginning on the same ground, Cassel argued the downturn arises because investment has outstripped savings during the boom. The ensuing rise in interest rates makes previously profitably-looking projects unprofitable. This is what leads entrepreneurs to stop investing and begins the downturn.

Dennis H. Robertson (1915) also followed Spiethoff's lead, but later (Robertson, 1926); he focused his concentration on money as a propagator and amplifier of the fluctuations generated by credit-expansions. Investors, he claimed, make investment decisions, but the implementation of these decisions take a long time and require huge bundles of capital which are accompanied by huge loans. This puts them in a precarious position and any mistakes will naturally have large repercussions. The amplification of the cycle arises partly because of this and partly because the monetary expansions, to accompany credit, lead to price rises which are an "illusory inducement to expansion" (Robertson, 1926: p.90). In other words, price variability may confuse an investor induce him to make errors. Fluctuations, Robertson famously claimed, may be natural and even good, but it's their amplification via the errors induced by the "fragility" of an investor and the confusing signals sent by a monetary system that make it inappropriate.

The Juglar-Tugan-Baranovsky-Spiethoff theory was followed up by two further strands. One is Friedrich A. Hayek's (1928, 1931) theory of the cycle, which *adopts* the same structural change approach to generate the cycle, but makes money (and not technical change) the impulse. The second strand was the "structural change" theories of growth, or "disproportional growth" theory pursued by the Kiel School (e.g. Adolph Lowe (1926, 1976), Emil Lederer (1931), Hans Neisser (1933, 1942)).

Under Consumption Theories

Just how old are under consumption theories of the cycle? Malthus (1820) and even Marx (1910) held that fluctuations in output could be caused by temporary deficiencies in the demand for goods ("general glut"), but they did not have it as a regular pattern (i.e. cyclical). Sismondi (1819) had argued some form of regularity, as indeed had Mill (1848), but there was really no sense of an "under consumption theory" of the *cycle* until the English economist John A. Hobson.

It is in his *Industrial System* (1910), that we find John Hobson's argument laid out. In a sense, it eschews all monetary and credit factors and relies instead on the idea of a propensity to consume out of income in a very Keynesian fashion. In expansions, Hobson argues, incomes rise and so too does consumption but by less than the full amount of change in income, implying that savings are being increased. These savings are then invested which leads to the increase in the capacity of industry and output. But as consumption has been trudging up more slowly than capacity output, we have insufficient consumption and thus excess supply of goods. Output subsequently collapses bringing incomes back down with it. But as incomes fall, then savings fall and the proportion of consumption in income increases. Eventually, Hobson claimed, consumption catches up with output, so then the recovery ensues.

Hobson eschewed monetary factors in his account, but the remarkable American duo, Willard Foster and William T.Catchings put it at the heart of their system (1923, 1925, 1928). Foster and Catchings' account relies on a careful division between stocks and flows with money as the medium in the "circuit of wealth". Savings, they claim, are both the blessing and the curse - a blessing because they permit investment and thus growth; a curse, because investment implies an increase in capacity output.

During the construction of an investment project, incomes are paid to workers in complete accordance with the rise in output, thus consumption increases accordingly. However, once an investment project is "finished" and output from that project begins to be produced, no more people are being paid from the "investment project". Consequently, output will rise without a concurrent rise in income and consumption. Consequently, there is overproduction.

What about credit filling in the gap? Admittedly, credit increases purchasing power, but credit is given to producers not consumers, which implies a further increase in capacity and thus output. Furthermore, even if consumers receive credit, these will not necessarily find their way into consumption or investment demand. Money, they claim, can be hoarded by consumers - these are "uninvested savings". That will do nothing but siphon off demand for goods even further.

The cyclical pattern emerges, Foster and Catchings claim, because during the downturn, as output collapses. But if no hoarding ensues, the collapse in output will be brought down to a point that the incomes paid out of (the lower) output will catch up with (the lower) consumption and thus a new flow equilibrium is found. But if any savings is being done by consumers, thus investment ensues and output grows and the recovery begins. A problem might arise if, in the downturn as prices and output fall, more money is hoarded by fearful consumers and this may exacerbate the downturn and/or prevent a recovery. Thus, unless that hoarding can be discouraged or short-circuited, there might not be a recovery.

Naturally, the most famous "under consumption" theory is that of J.M. Keynes himself as laid out in his *General Theory* (1936).

Shock-Based Theories of the Cycle

Equilibrium theory and business cycle theory seem, at the outset, incompatible. Equilibrium theory, after all, speaks of things tending to a certain "static" setting which, when achieved, repeats itself indefinitely. As a consequence, when speaking of cycles, we must be speaking of some aberration. Other than the handful of economists we have covered, most other neoclassical economists treated business cycles merely as "crises" which interrupt the normal activities of the economy.

"For, just as a lake is, at times, stirred to its very depths by a storm, so also the market is sometimes thrown into violent confusion by crises, which are sudden and general disturbances of equilibrium." (L. Walras, *Elements of Pure Economics* 1874: p.381)

However, there are two problems that are not adequately dealt with in the bulk of pre-Keynesian business cycle theory: firstly, why are these aberrations so lengthy (and, so, what propagates them) and, secondly, what causes these aberrations to begin with.

The issue of the "push" was the point of contention of early theory. As Haberler (1937) and Mitchell (1927) document, many imaginative exogenous "push" theories are indeed available: e.g. from sunspots (Jevons), animal spirited expectations (Pigou), institutional changes (Vogel), technological change (Tugan-Baranovsky, Spiethoff), or the financial sector (Hawtrey, Hansen).

Of what consequence is any of this? Why ascribe business cycles to a single, particular cause? One must note that, by doing so, one is in effect arguing that this non-economic cause must itself occur periodically. Therefore, it is also necessary to develop a "theory of sunspots" which is itself regular. Or a theory which explains the periodicity of expectations breakdown. Therefore, if one avoids explaining business cycles endogenously by appealing to outside influences, one is, at the same time, necessarily implying some endogenous cyclicalism of these outside causes. Unfortunately, most "push" theories rarely offer such a supporting theory (Schumpeter is a notable exception).

As the century advanced, the issue of "push" was gradually superseded by the issue of persistence. This was particularly important since it revealed an incompatibility between static equilibrium economics and business cycle theory. After all, whatever the cause, if there is indeed a "crisis", what makes it persist? Why do the regular stability forces fail to quickly bring the economy back into equilibrium?

Emil Lederer (1926) and Adolph Lowe (1926) argued that the study of cycles should transcend simple static equilibrium settings. Instead, they should be referred to in the context of dynamic aggregates where fluctuations are clearly identifiable. In essence, they argued, any study of business cycles has to be macroeconomic. This was the call Hayek and Keynes responded to. In spite of their efforts, equilibrium economics ignored the German arguments. As such, then, by the 1930s, it seemed as if business cycles were forever to be ignored by equilibrium economics.

This state of affairs was fundamentally altered when Ragnar Frisch (1933) and Eugen Slutsky (1937) presented their theory of stochastic cycles. There was no need in the Frisch-Slutsky approach to appeal to specific determinate causes. All that was argued is that many phenomena existed which could precipitate a real shock in the economy's equilibrium path. These shocks, Frisch and Slutsky argued, were common but entirely random and distributed normally (standard variance with a mean of zero). This implies, then, that most shocks were relatively small and approximately half of them were negative and another half positive. Large shocks, in either direction, however, were rare. However, should a particularly large negative shock appear, it is unlikely that it would be followed immediately by a similarly large positive shock. Consequently, they argued, that single, large negative shock would be sufficient to draw the average output away from equilibrium output for a sufficiently long time to be considered a downswing. Over time, of course, the influence of this single shock would be gradually whittled away as more positive shocks arise.

Of course, it is not necessary that a large shock happen for the average to move. As Slutsky, in particular, pointed out, there could be "clusters" of small negative shocks (i.e. 3, 4 or 5 successive small negative shocks without a positive shock in between) which would also move the economy below its average. Thus, whether by single large shocks or clusters of small shocks, the economy could experience a negative average which was sufficiently persistent to be classified as part of a cycle. Thus, business cycle theory re-entered neoclassical equilibrium theory as a theory of stochastic shocks. Instead of attempting to root out periodic causes of such shocks, the Frisch-Slutsky approach had to assume them as random variations from an equilibrium trend.

The question immediately posed was that of "time". How a large shock or cluster of shocks may move an average down is understandable, but what prevents a large negative stochastic shock from being instantaneously corrected by a policy-engineered large positive shock? Are the stability forces of equilibrium economics not strong or fast enough so that the effects of a large shock last longer? The answer is simply yes. As the economy is thrown off course and adjustments are immediately called upon in prices, output, employment or whatever, there might be differing lags in response from different sectors of the economy and consequently a failure to coordinate a countercyclical shock. These coordination failures may prolong the negative average. Institutional rigidities in wages, prices, interest rates and associated elements may also contribute to the prevention of a swift response.

The Frisch-Slutsky approach to business cycles, then, responds to the previous treatment of cycles by ignoring specific causes. Any strong random shock or cluster of small shocks in the same direction may, propagated by these rigidities and response failures, result in a far larger cyclical swing than the shocks themselves might warrant.

The Frisch-Slutsky theory of business cycles may not be very satisfying since they are no proper "cyclical" phenomenon as such but rather just moving patterns as a result of random events. They are all deviations from an underlying equilibrium. Consequently, most theorists who subscribe to this approach take empirical proof of business cycles proper with a large dose of scepticism

Monetary Theories of the Cycle

Money and Cycle Traditions

In business cycle theory, the Continental tradition has tended to be to emphasize that it is "real" phenomena -- technological change in particular -- that pushes the economy out of equilibrium and that it is the consequent unbalanced structure of the real economy that drives the cycle. It is important to note that, for the Continental tradition, it is a *horizontal* unbalancedness, i.e. disproportionalities across *sectors* of the economy at a point in time, that drive the cycle In contrast, the Anglo-American tradition is to focus on how "external" things like psychology or credit, can "unbalance" the economy and drive the cycle. But for Anglo-Americans the unabalancedness is *vertical*, i.e. difficulties in coordinating across *time*.

In both these theories, credit plays a role -- in particular, the starting point for all of them is Knut Wicksell's insight on the relationship between the "natural" rate of interest and the "money" rate of interest. But Wicksell's theory of the cumulative process was talking about *money* and *prices*; consequently, it was natural to turn explicit attention to the interrelationship between money, prices and the cycle. This was the main endeavour of Ralph G. Hawtrey and Friedrich A. von Hayek in the 1920s.

When grafting a monetary theory *into* a cycle theory, one must already have some sort of idea of how the cycle process works itself through. This is where the division between the Continental and Anglo-American traditions in cycle theory is useful way of dividing the monetary cycle theories as well. Hawtrey, a Cambridge economist, naturally adopted the Anglo-American approach for his underlying cycle, while Hayek, an Austrian economist at the L.S.E., took adopted the Continental approach. Consequently, for Hawtrey, the economy is a "single-sector" entity and the cycle is driven by vertical unbalancedness -- miscoordination across time (caused by money, of course). For Hayek, the economy is a "multi-sectoral" complex, and thus the cycle is driven by horizontal unbalancedness -- miscoordination across sectors (caused by money as well). Thus, Hawtrey is unconcerned with relative prices; money influences his "single-sector" economy by affecting the *absolute* price level. In contrast, for Hayek's multi-sector economy, it is how money affects *a relative price that is* the key to the cycle. Absolute prices, in Hayek's view, are irrelevant.

Hawtrey's Pure Money Cycles

R.G. Hawtrey has perhaps the most famous "pure money" theory which he outlined in a barrage of articles and books (1913, 1926, 1928, 1933, 1937). His theory, as noted, is Wicksellian in many respects. But his chief characters are wholesalers and middlemen who rely unduly on bank credit and are thus highly sensitive to interest rates. Any slight injection of money which lowers the money rate of interest induces these middlemen to increase inventories. They do so by borrowing from banks increases and demanding increases in production from firms. But because increasing production takes time, the money supply of the economy is momentarily too large for the given amount of income (think of a Cambridge cash-balance theory). This "unspent margin" leads to higher demand for goods by consumers - but that extra demand will itself lower the inventories of these middlemen. Realizing their falling inventories, they will then call again upon firms to step up production and borrow money to do so. But again that leads to an excess supply of money, etc.

The turning points in the Hawtrey cycle arise when production (and thus income) finally catches up with the higher money supplies. They will catch up, Hawtrey tells us, because banks will begin to close off credit when they see their reserves being stretched too far. Then we jump into the recession: when banks stop lending to middlemen, these will reduce their demands on firms. Production will slow down and so will incomes - but with a lag again. The fall in money supply comes first and so consumers now have excess demand for money and will thus lower their demand for goods. That leads to inventory build up and a further demand by middlemen that productions reduce further. The downturn continues until the banks are flushed with money once again and need to lend out.

Hayek's Monetary Theory

Hawtrey's theory is interesting, but, as noted, is very "vertical". The cycle theory of Friedrich Hayek (1929, 1931) is concentrated on "horizontal" aspects and thus closer in spirit to the Continental tradition of Spiethoff and Cassel. Hayek's theory combines Wicksellian themes with the concept of changing factor proportions - namely, what he calls "lengthening" and "shortening" of the "period of production", Austrian concepts we may interpret loosely as "increasing" and "decreasing" the production of capital goods relative to consumer goods.

F.A.Hayek's theory of business cycles starts on a Wicksellian footing: a credit expansion at the trough because the accumulation of loanable funds has led the "natural" rate of interest to fall below the "real" rate of interest. An investment expansion ensues and thus capital goods are demanded.

However, the initial raise in the demand for capital goods, by itself, essentially means that the aggregate demand in an economy is greater than aggregate supply. Assuming the economy to be resource constrained, this implies that firms must decide whether to simply not respond to the higher capital demand and keep on producing the same consumer goods as before or else to respond and thus produce more capital goods and reduce the production of consumer goods. Hayek argued the latter would happen - and thus the proportion of capital to consumer goods would rise.

But when we keep aggregate supply fixed, that means consumer income is kept fixed - thus consumer demand for consumer goods has not dropped. But the supply of consumer goods has dropped. Thus, there will be what Hayek called "forced savings": consumers are forced to save simply because there are no more consumer goods to buy. This increase in savings, we must note, will fund the initial expansion in credit.

But then our story would end without fluctuations in output. Let us then follow Hayek and argue that aggregate supply is not completely fixed and that new resources are brought into use. Then capital goods *and* consumer goods production will both rise. This is a general expansion of output. But expansion of output in general means higher income and higher income in general and thus higher consumer demand. As a result, consumers demand more consumer goods and place pressure on the consumer goods industry to produce more.

This can continue until the full employment level is reached. Then the aggregate supply constraint we spoke of comes in force. Assuming proportions are not changing, the rising demand for consumer goods leads to rising prices in the consumer goods industry relative to capital goods. This is merely the expression of forced savings again. But what effect will this have? The rising prices of consumer goods make the consumer goods industry more profitable relative to the capital goods industry. They can thus begin to out compete the capital goods industry on the (now very tight) factor markets: i.e. consumer goods industries will start getting the labour and capital that the capital goods industry used to command. This bidding war leads to a rise in factor costs overall - rises in wages *and* rises in the money loan rate. This is the peak of the cycle.

What happens then? Hayek suggested the rising costs in the economy and the relatively poorer position of the capital goods industry will lead make them less profitable to begin with; furthermore, the rising loan rate will only lead to a decrease in investment and thus a decrease in demand for their products. In short, faced with lower profit and lower demand, the capital goods industry will shrink in size relative to the consumer goods industry. The downswing is on.

During the downswing, as the capital-goods industry shrinks, people who were employed by that sector will be laid off. That will lead to a decline in the demand for consumer goods, which now will lead to shrinkage in the consumer goods industry. But the shrinkage in the consumer goods industry means that now investment demand will drop even further (as consumer goods firms also demand capital). That will lead to a further shrinkage of capital goods production and so on. As a result of the general collapse in output and collapse in investment demand, loanable funds will again start piling up unused at the banks and there thus money (loan) rate will start falling. A point will come, argued Hayek, when the loan rate will collapse below the natural rate and investment picks up again. This way, the trough is reached and the capital goods industry begins producing again - and thus expansion arises.

The main points to note about Hayek's theory are these: if there was no banking system providing credit, there would be no cycle because everything would have to be in equilibrium. It is money (or, more precisely, the supply of credit by banks at a rate below the real rate of interest) which is dis equilibrating demand and supply for capital goods and consumer goods. During the expansion there is a "lengthening of the period of production", i.e. a rise in capital goods production relative to consumer goods, but both sectors are increasing output. During the contraction, there is a "shortening of the period of production", i.e. fall in the amount of capital goods produced relative to consumer goods, but both sectors are decreasing output. This "lengthening"/"shortening" during the expansion/contraction is what earned it the name of "Concertina Effect".

Most importantly, the turning point of the cycle is caused by consumers demand too much. Thus excess consumer demand is the direct cause of recessions (the indirect cause is the earlier overinvestment or, more precisely, the banking sector's cheap lending policies which started the whole thing.)

Hayek's ex-student (but now turned Keynesian), Nicholas Kaldor (1939) disagreed with his old master. He proposed that the proportion of capital goods to consumer goods should actually fall rather than rise during the expansion. According to Kaldor, at the trough, firms as a whole are operating with excess capacity. In other words, there is a fixed stock of capital, part of which is not being used (by which we mean, labour is not being applied). Consequently, as the upswing begins, it would be madness if the first thing entrepreneurs did was go build more machines and raise capacity even more. Rather, Kaldor argued, during the initial stages of the upswing, more labour will get hired, but no new capital will be demanded. Thus consumer demand rises first, and thus consumer industries' profitability rises - and thus loanable funds are allocated to these. Thus, consumer goods industries should rise in proportion to the capital goods industry during the expansion. When firms reach their existing capacity, Kaldor went on, then they will begin to demand capital. Only then will demand for capital goods rise.

In the downswing, Kaldor (1939) argued, the reverse happens: as the peak begins to disappear, entrepreneurs cannot "fire" machines in the short run in order to cut back output - rather, they will lay off workers. But that precipitates a collapse in consumer demand and thus that related industry. Thus, the relative size of the capital goods industry rises even though output as a whole falls.

Hayek absorbed these lessons from his old student and in subsequent work (Hayek, 1939, 1941), he reversed his earlier argument completely around. In essence, Hayek proposed that the expansion of credit (at the trough), will expand the demand for consumer goods. This, in turn, would raise profits in the consumer goods industries and their prices. As consumer goods prices rise, real wages fall - thereby increasing profits. As profits increase, it may seem reasonable for entrepreneurs to invest for greater production. However, this new investment will be directed towards methods of production which are labour-intensive given that real wages have collapsed. This latter part is what Hayek referred to as the "Ricardo Effect".

In essence, the first investment effect would raise demand for capital goods whereas the second "Ricardo effect" should decrease it. Since Hayek assumes that the Ricardo effect eventually outweighs the investment effect, investment demand falls and the capital goods industries collapse in relative size.

The argument for why the collapse in real wages outweighs the profit-driven investment is understandable. As consumer demand expands and profits keep on rising, investment demand for capital- widening (i.e. applying machinery in order to keep up with greater employment of labour) will increase. However, as the real wages keep falling, capital-widening investment will become less tenable so that capital-"shallowing" (i.e. more labour-intensive techniques) is called for. Note that if investment rises, profits rise further and, the greater the rise in profits, the greater the fall in wages. In time then, the falling wages will outweigh the extra profits from capital-widening and actually result in capital- lessening which, in turn, prompt a collapse in investment demand and hence, a recession.

Hayek's new theory, however, depended too much on changes of technique as the dampener of business cycles. In addition, note that, unlike Keynes, Hayek proposed that over consumption (thus higher prices and falling real wages) cause the upswing to slow down and eventually reverse itself. Excess demand causes recessions not excess supply.

Characteristically, Kaldor (1942) could not leave this alone. Why, he asked, did high profits imply lower investment? After all, in most theories, if the productivity of capital (read profits) rises above interest, investment should increase, "under no circumstances can total investment demand become smaller in consequence of a rise in the rate of profit" (Kaldor, 1942). Investment could ostensibly fall if, and only if, the rate of interest rises. If such happened, then we should not be surprised to see investment collapse. The Concertina effect, he noted: "as a phenomenon of the trade cycle is non-existent or insignificant while the supposition that a scarcity of savings causes booms to collapse is fallacious." (Kaldor, 1942)

Despite Hayek's (1942) attempted restatement of the Ricardo effect, the verdict of the age was clear. In both his 1931 attempt and in his 1939 rectification, he attempted to demonstrate that over consumption was the chief cause of depressions. However, Kaldor successfully picked away at his first theory and then showed that his Ricardo Effect was only possible under some very special circumstances and hence, highly unlikely. Kaldor, in effect, sustained the flag of under consumption and overproduction as the chief evildoers.

2.1

2.2

2.3

3 Methodology

Population of interest

The population of interest in this study includes firms quoted in the Nairobi stock Exchange over the past 20 years. This twenty year period was selected because it was long enough to indicate trends in working capital position.

Data Collection

The study will rely whole on secondary data. We will use the published results of the firms as well as the trends of select economic indicators as published by the central Bank over the period of the study. The averages of the working capitals of these firms over the period will be used and compared with the trends of economic indicators.

Variables of the study

The index of annual average coincident economic indicators will be used as the measure of economic activity. Moffat in his paper "How Markets Use Information to Set Prices" defines an economic indicator as simply any economic statistic, such as the unemployment rate, GDP, or the inflation rate, which indicate how well the economy is doing and how well the economy is going to do in the future

Inflation

Inflation is a sustained increase in the general price level. In other words prices are consistently rising. This is important for business to keep an eye on, as they need to assess what to do with their own prices. Their costs are likely to be rising and so their margins will be squeezed. However, they need to watch carefully what their competitors are doing as well as if they put prices up too much they may become uncompetitive. Inflation is also likely to lead to higher wage demands as workers want to ensure they can keep up with the cost of living. Inflation is measured by the Consumer Price Index (CPI)

Economic Growth (Gross Domestic Product GDP)

Economic growth means that the income level in the economy is rising. Economic growth is growth in the level of national income. There are various measures of national income, but the most commonly used one is gross domestic product (GDP). We measure growth as the percentage change in GDP. However, it is very important that we only take the percentage change in real GDP. This means the change in GDP after inflation has been taken into account. The GDP measure is important to firms since the demand for their good or service is likely to depend on the income levels of consumers.

Unemployment

Unemployment is determined by counting the people who are not currently working, but who are willing to work. This is an important indicator for business because it shows how 'tight' the labour market is. If unemployment is very low, then the labour market can be described as 'tight' as there are few people to fill any vacant jobs. This means that businesses may find it increasingly difficult to fill vacancies and may even have to offer higher wages to attract people to come to work for them.

Working capital

Working capital is current assets minus current liabilities. Working capital measures how much in liquid assets a company has available to build its business. The number can be positive or negative, depending on how much debt the company is carrying. In general, companies that have a lot of working capital will be more successful since they can expand and improve their operations. Companies with negative working capital may lack the funds necessary for growth. It is also called net current assets or current capital. In our study we will use the working capital ratio in order to standardize our statistics. The dependent variable will therefore be working capital ratio.

Model of the study

It is expected that the Change in working capital will be determined by the combined changes in the various economic indicators.

For the study the following model will be used

$$WC_{i\ /Total\ assets} = \alpha + \beta_1 E_1 + \beta_2 E_2 + \beta_3 E_3 + \varepsilon_i$$

Where WC_i the working capital ratio of firm i

α is Working capital constant

β_i coefficients of economic indicators

E_i economic indicators

ε_i = the error term

Multicollinearity between the independent variables will not be explored as this does not form part of the objectives of the study. Instead variables will be held constant and the particular one under test varied to determine how its variation affects the working capital.

Data Analysis

Financial ratios will be used to evaluate changes in working capital position. Ratios are especially useful as indicators of trends in financial position rather than as indicators of absolute financial condition at a point in time; therefore, they will be considered as an appropriate technique to use in this study. Two aspects of working capital position will be examined in this study. One was the liquidity of the firms as represented by the current ratio and the quick ratio. Second, working capital will be examined by measuring the total investment of the firm in working capital as represented by the inventory to total asset and current asset to total asset ratios. In several related articles in the early 1980s, researchers found that financial managers reported that they did not consider ratios very important in managing corporate liquidity (Johnson, Campbell, and Savoie 1983; Johnson, Campbell, and Wittenbach 1980). These same studies indicated that managers considered ratios more important as their firms became less liquid. Another study by Johnson, Campbell, and

Wittenbach (1982) reported that the primary tool used by responding financial managers to solve liquidity problems was to decrease inventory levels. A recent study by Burns and Walker (1991) found that the current ratio ranked highest among respondents as a tool for monitoring working capital over time. While the above studies did create some concern about the use of ratios as a measure of liquidity, these ratios continue to be widely accepted as liquidity measures. The current ratio, quick ratio, inventory to total asset ratio, and current asset to total asset ratio were computed for each of the fifty small firms for each year from 1980 through 1991. An average of each ratio for each of the years will then be calculated. Using the annual coincident economic indicators as independent variables and the average annual financial ratios as dependent variables, the correlation coefficient between the two variables will be calculated to determine the relationship between changes in working capital position and changes in the level of economic activity. The t-test will be used to measure significance. The level of significance will be taken at 5%. It is anticipated that the current and quick ratios would vary inversely with the coincident indicators while the inventory to total asset and current asset to total asset ratios would vary directly with coincident indicators. The Statistical Package for the Social Sciences (SPSS) will be used in analysis of data.

4 Data Analysis and Findings

Introduction

The objective in this study was to examine the relationship between working capital and major economic indicators. The data used and the related variables are in appendix one. The economic indicators include wages; Gross Domestic Product in current market prices (GDPcmp); Gross Domestic Product in constant market prices 1982 (CGDPcomp); Real GDP growth rates (GDPg). All these are for the period 1987 to 2003. The other economic indicators were inflation (Infla) and lending rates (LR).

The independent variable was a standardized working capital ratio i.e. working capital to total assets (WC/TA) ratio for each company individually and for the whole market i.e. the average WC/TA ratio for all the firms listed at NSE. Three market WC/TA ratios were calculated i.e. for all the companies; for industrials and commercials and for financial institutions only.

The assumption in this study is that the amount of working capital available for firms depends on economic conditions that exist at a point of time.

Descriptive Statistics

In Appendix 2 and 3 are presented the summary statistics of individual companies' working capital to total assets ratios. The highest WC/TA ratio for CFC bank tells us that 80.7 percent of total assets in this firm is working capital and that at the NSE on average 12.7% of the total assets is working capital. It is clear that over the period of the study firms like Unga, Kenya National Mills (now delisted), KPLC and Express operated without working capital i.e. working capital was negative.

In appendix 3, we present an additional statistic, co-efficient of variation (Coev) to enable us compare variability across firms and we observe that fourteen firms have

Coev of 1.8 and above, suggesting high variability in this ratio. This high variability needs to be explained and is the basis of this study.

In table 1, the sector with the highest working capital to total assets ratio over the period of this study is industrial i.e. 16.7 percent of total assets is working capital, while only commercial sector have the least i.e. only 6.6 percent of total assets are working capital. The industrial sector had the highest variability in this ratio.

CFC bank has unusual working capital to total assets ratio. This is because in the past, which is part of this study, this firm was not purely a commercial bank. The same applies to City Trust. If these two firms are removed from the financial sector, the working capital in the sector becomes 5.2 percent of total assets and consequently the lowest for the whole market. This is expected given that the banks might not require much working capital as such.

Individual Company Analysis – Regression Results.

In this section we present the results of regression analysis. The dependent variable is working capital to total assets ratio and the economic indicators are the explanatory variables

In table 2 are t- statistics results classified as significant (S) and insignificant (i). The cut of p-value is 0.10. These are for individual companies. The t – statistics help us in determining the relative importance of each variable in the model. (As a guide regarding useful predictors look for t-values well below – 2 or above +2.

Table 2 – t statistics results

Company	Wages	GDPComp	GDPcon	GDPg	LR	Infla
ARM	NS	NS	NS	NS	NS	S
BAMB	S	S	NS	NS	S	NS
BAT	S	S	S	NS	NS	NS

BAUMAN	NS	NS	NS	NS	NS	NS
BBK	NS	S	S	NS	NS	NS
BBond	S	NS	NS	NS	NS	NS
BOC	S	S	S	S	NS	S
Cargen	NS	NS	NS	NS	NS	NS
CARB	S	S	S	NS	S	NS
CBERG	S	NS	NS	NS	NS	NS
CFC	S	S	S	NS	S	NS
CMC	NS	NS	NS	NS	NS	NS
City Tr	NS	NS	NS	NS	NS	NS
DTB	NS	NS	NS	NS	NS	NS
DuNLoP	NS	NS	NS	S	S	NS
Eagads	NS	NS	NS	NS	NS	NS
EArSR	S	NS	NS	NS	NS	NS
EACAB	S	S	S	S	S	NS
EAPORT	S	S	S	S	NS	NS
EAPack	S	S	S	S	NS	NS
EXPRESS	S	NS	NS	S	NS	NS
FIRE	NS	NS	NS	NS	NS	NS
GWK	S	NS	NS	NS	NS	NS
HFCK	NS	NS	NS	S	NS	NS
ICDC	NS	NS	NS	NS	NS	NS
Jub	NS	NS	NS	NS	NS	NS
Kakuzi	NS	NS	NS	NS	NS	NS
Kapcho	NS	NS	S	NS	NS	NS
KCB	S	S	S	S	S	NS
Kenol	S	S	S	NS	S	NS
KenAir	NS	NS	NS	NS	NS	NS
KPLC	NS	NS	NS	NS	NS	NS
Kn mill	NS	NS	NS	NS	NS	NS
Lim	S	NS	NS	NS	S	S
Marsh	S	S	S	NS	S	S
Lonhro	NS	NS	NS	S	S	NS
NBK	NS	NS	NS	NS	S	NS
NIC	S	S	S	S	S	S
NMG	NS	NS	NS	NS	NS	NS
Rea	S	S	S	NS	S	S

Sasini	S	S	S	NS	NS	S
SCHB	S	S	S	NS	S	S
SNG	NS	NS	NS	NS	NS	NS
Total	NS	NS	NS	NS	NS	NS
TPS	(Too few cases)					
UCHUMI	S	NS	NS	NS	NS	NS
UNGA	S	S	S	NS	S	NS
No. of Significant t – Ratio	**23(50%)**	**17(37%)**	**17(37%)**	**10(22%)**	**15(33%)**	**8(17%)**
No. of Not Significant t - Ratios	**23(50%)**	**29(63%)**	**29(63%)**	**36(78%)**	**31(67%)**	**38(83%)**
Total	**46**	**46**	**46**	**46**	**46**	**46**

The results vary from company to company. Wages, GDP and lending rates seem to explain variations in working capital in a number of companies. The most surprising result is that inflation seems not to be having a high explanatory power. In a number of companies, the wages co-efficient is positive suggesting that as wages increase, additional a working capital is wired.

The lending rate co-efficient is negative for most of the companies, a possible interpretation is that the demand for working capital decreases as lending rates increase.

The co-efficient for GDP, whenever its t is statistically significant, is negative for a number of companies. This suggests that the demand for working capital reduces when the most of the transactions are settled in cash and instantaneously and there is no need for additional working capital.

Market Analysis – Regression Results.

The first step was to get the market average of the working capital to total assets for the market as a whole, then for the market without financials; and finally for financials only. The results are summarised on table 4.

Since statistical test used in this study assume normal distribution, it was necessary checking the distribution of the data. A skewness statistic value greater than one indicates a distribution that differs significantly from normal distribution. In this study, the skewness statistic for all varieties of working capital to total assets (WC/TA) for the market is less than one – i.e. the distribution does not differ significantly from a normal symmetric distribution – (See table 5). The WC/TA ratio for the market, excluding the correlation between WC/TA ratio for the market (Mkt) as a whole is positively significantly correlated (93.6%) to WC/TA ratio that exclude financial institutions (MktLFI). This suggest that the WC/TA for financial has less impact on the market as a whole. There is low correlation between financials and other sectors. From this analysis it is necessary running three regressions each with the following WC/TA ratios; Mkt, i.e. for market as a whole; MKtLFI, i.e. for the market but excluding financials, and for financial only MktFI as dependent variables.

The regression equation of the (Mkt) average of WC/TA for the market as a whole is:

```
The regression equation is
Mkt = 0.0830 +0.000000 Wages -0.000000 GDPcmp -0.000000 GDPcon - 0.00503
GDPg
          + 0.00554 LR -0.000926 Infla

Predictor           Coef       SE Coef          T        P
Constant         0.08297       0.01853       4.48    0.002
Wages         0.00000048    0.00000019       2.47    0.039
GDPcmp       -0.00000024    0.00000009      -2.60    0.031
GDPcon       -0.00000016    0.00000007      -2.21    0.058
GDPg           -0.005030      0.002868      -1.75    0.118
LR              0.005536      0.001034       5.35    0.001
Infla         -0.0009265     0.0005396      -1.72    0.124

S = 0.008735    R-Sq = 91.0%        R-Sq(adj) = 84.2%
Analysis of Variance

Source            DF          SS           MS          F        P
Regression         6   0.0061477    0.0010246      13.43    0.001
Residual Error     8   0.0006104    0.0000763
Total             14   0.0067581
```

The r-square (adjusted) is 84.2 percent. Larger values for r-square indicate stronger relationship – because it indicates the proportion of variation in the dependent variable explained by regression model. The model therefore fits the data well.

The results of the analysis of variance show a F– value of 13.43 with a P - value of 0.001. This significance F – statistic is small (smaller than 0.05) indicating that the economic activity variables do a good job in explaining the variation in working capital (WC/TA). Furthermore, The regression model show large sum of squares (0.0061) than the residual sum of squares (0.0006), indicating that the model accounts for most of the variation in WC/TA ratio or in working capital.

Looking at t – statistics, lending rate (5.35) as an individual variable, explain variations in WC. The other economic indicators with impact on working capital include wages (t:2.47; p:0.039). GDpcmp (t:-2.60; p:0.031) and GDPcon (t:-2.21; p:0.058).

The regression equation of the WC/TA (MktLFI) excluding financials is as follows:

```
The regression equation is
MktLFI = 0.106 +0.000001 Wages -0.000000 GDPcmp -0.000000 GDPcon - 0.00673
GDPg
           + 0.00638 LR -0.000790 Infla

Predictor         Coef       SE Coef          T        P
Constant       0.10618       0.02500       4.25    0.003
Wages       0.00000071    0.00000026       2.74    0.025
GDPcmp     -0.00000034    0.00000012      -2.81    0.023
GDPcon     -0.00000024    0.00000010      -2.50    0.037
GDPg         -0.006735      0.003870      -1.74    0.120
LR            0.006378      0.001396       4.57    0.002
Infla       -0.0007899     0.0007281      -1.08    0.310

S = 0.01179     R-Sq = 87.6%     R-Sq(adj) = 78.3%

Analysis of Variance

Source            DF          SS          MS       F       P
Regression         6   0.0078346   0.0013058    9.40   0.003
Residual Error     8   0.0011112   0.0001389
Total             14   0.0089458
```

The variables with significant t – statistics are wages (t:2.74; p:0.025); GDPCmp (t: 2.81, p:023); GDPcon (t:2.50; p:0.037; and LR, lending rate (t:4.57; p:0.002). This model is a good fit for explaining variations in working capital of non-financial firms listed at the NSE.

The regression model relating economic indicators to variations in WC of firms listed under financials is as below:

```
The regression equation is
MktFI = 0.0125 -0.000000 Wages +0.000000 GDPcmp +0.000000 GDPcon + 0.00158
GDPg
           + 0.00227 LR - 0.00122 Infla

Predictor         Coef       SE Coef          T        P
Constant       0.01245       0.05278       0.24    0.819
Wages      -0.00000033    0.00000055      -0.60    0.568
GDPcmp      0.00000013    0.00000026       0.49    0.637
```

GDPcon	0.00000012	0.00000020	0.59	0.571
GDPg	0.001580	0.008168	0.19	0.851
LR	0.002266	0.002946	0.77	0.464
Infla	-0.001216	0.001537	-0.79	0.451

S = 0.02488   R-Sq = 64.4%   R-Sq(adj) = 37.7%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	6	0.0089592	0.0014932	2.41	0.124
Residual Error	8	0.0049508	0.0006189		
Total	14	0.0139100			

The entire statistic tells us that economic variable fail to explain changes in working capital in these firms i.e in financials. At this stage, the conclusion then is that other variable, other than the economic indicators employed in this study could explain the variation in working capital of firms listed under financials.

5 Summary Discussions and Conclusions

Introduction

The liquidity position of the fifty small firms included in this study, as measured by the current and quick ratios, increased slightly during economic expansion and decreased during economic slowdowns. However the liquidity positions reacted differently to different economic indicators

Relationships between working capital and economic indicators

Inflation

The study showed that for the most firms inflation was not significant. A massive 83% of the firms did not find inflation significant. This means that the Working capital decisions are indifferent to the fluctuations of inflation. This is a surprising deviation from the expectation according to paper by lamberson (1991) and may be attributed to the erratic movement of levels of inflation.

Lending rates

Lending rates indeed did affect the amount of working capital for the firms and this further showed that during times of economic contraction more funds were available to the economy and hence working capital positions of firms improved. This supported some studies that were cited earlier in this study (Lamberson 1991)

Wages

Another indicator was that when wages increased meaning a rise in employment opportunities showing improved economic activity, working capital also increased during such periods

GDP

GDP was another significant indicator which responded positively according to expectation with a significant effect on the working capital position f firms

Recommendation

The study could not give conclusive results as far as financials were concerned and this was expected since the working capital of financials is very different from the other firms. It would be interesting to find out how financials manage their working capital and if at all their finance managers lay any emphasis on the same.

Limitations of the Study

This study was carried out based on secondary data available from the cental bank of Kenya. It assumed that the financial reports were accurate and that all disclosures were made by the finance managers and accountants. In the study it was assumed that the finance managers actually understand the importance of working capital strategy and therefore have a sound one. This may not be true in some cases

Suggestions for Further Research

More work needs to be done in the area of what affects the working capital of financial institutions. Probably other variables other than the ones studied here could explain the variation in working capital of firms listed under financials. Further research may also be needed in understanding whether finance managers of large firms in Kenya indeed employee any sort of strategy in working capital management

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7 Appendix

Appendix 1

Regression Analysis: ARM versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is

ARM = - 0.529 +0.000001 Wages +0.000000 GDPcmp - 0.0123 GDPg - 0.00167 LR
+ 0.0268 Infla

8 cases used 7 cases contain missing values

Predictor	Coef	SE Coef	T	P
Constant	-0.5288	0.1048	-5.04	0.037
Wages	0.00000093	0.00000016	5.78	0.029
GDPcmp	0.00000024	0.00000004	5.50	0.032
GDPg	-0.012321	0.006858	-1.80	0.214
LR	-0.001672	0.002972	-0.56	0.630
Infla	0.026850	0.002710	9.91	0.010

S = 0.01137 R-Sq = 99.6% R-Sq(adj) = 98.6%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.066029	0.013206	102.21	0.010
Residual Error	2	0.000258	0.000129		
Total	7	0.066288			

Source	DF	Seq SS
Wages	1	0.049133
GDPcmp	1	0.000924
GDPg	1	0.002551
LR	1	0.000743
Infla	1	0.012679

Unusual Observations

Obs	Wages	ARM	Fit	SE Fit	Residual	St Resid
1	39955	*	-0.17441	0.06123	*	* X
2	45249	*	-0.09833	0.05658	*	* X
3	50475	*	0.06169	0.05335	*	* X
4	59109	*	0.29235	0.05772	*	* X
5	71430	*	0.78317	0.09003	*	* X
6	96375	*	0.40607	0.05214	*	* X
7	117664	*	-0.36683	0.02588	*	* X
15	443114	0.11772	0.11800	0.01136	-0.00028	-0.80 X

X denotes an observation whose X value gives it large influence.

Regression Analysis: Bambu versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is

Bambu = - 0.0524 +0.000000 Wages -0.000000 GDPcmp + 0.00421 GDPg + 0.00830
LR
+ 0.00126 Infla

Predictor	Coef	SE Coef	T	P

Constant	-0.05237	0.03971	-1.32	0.220
Wages	0.00000008	0.00000007	1.20	0.262
GDPcmp	-0.00000010	0.00000005	-2.01	0.075
GDPg	0.004212	0.006333	0.67	0.523
LR	0.008298	0.001434	5.79	0.000
Infla	0.001261	0.001073	1.18	0.270

S = 0.02326   R-Sq = 92.0%   R-Sq(adj) = 87.6%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.056086	0.011217	20.74	0.000
Residual Error	9	0.004868	0.000541		
Total	14	0.060954			

Source	DF	Seq SS
Wages	1	0.017513
GDPcmp	1	0.000658
GDPg	1	0.000886
LR	1	0.036282
Infla	1	0.000747

Unusual Observations

Obs	Wages	Bambu	Fit	SE Fit	Residual	St Resid
3	50475	0.16019	0.11835	0.01253	0.04185	2.14R

R denotes an observation with a large standardized residual

Regression Analysis: BAT versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
BAT = - 0.0408 +0.000000 Wages +0.000000 GDPcmp - 0.0126 GDPg + 0.00756 LR
- 0.00353 Infla

Predictor	Coef	SE Coef	T	P
Constant	-0.04079	0.06451	-0.63	0.543
Wages	0.00000029	0.00000011	2.55	0.031
GDPcmp	0.00000001	0.00000008	0.11	0.914
GDPg	-0.01256	0.01029	-1.22	0.253
LR	0.007562	0.002329	3.25	0.010
Infla	-0.003532	0.001743	-2.03	0.073

S = 0.03778   R-Sq = 85.5%   R-Sq(adj) = 77.4%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.075603	0.015121	10.59	0.001
Residual Error	9	0.012849	0.001428		
Total	14	0.088452			

Source	DF	Seq SS
Wages	1	0.031934
GDPcmp	1	0.026897
GDPg	1	0.001715
LR	1	0.009194
Infla	1	0.005862

Unusual Observations

Obs	Wages	BAT	Fit	SE Fit	Residual	St Resid
11	224994	0.26386	0.16909	0.01493	0.09477	2.73R
15	443114	0.12662	0.11884	0.03759	0.00779	2.05R

R denotes an observation with a large standardized residual

Regression Analysis: Baum versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
Baum = 0.406 +0.000001 Wages -0.000001 GDPcmp - 0.0158 GDPg + 0.00321 LR
- 0.00236 Infla

12 cases used 3 cases contain missing values

Predictor	Coef	SE Coef	T	P
Constant	0.40550	0.04693	8.64	0.000
Wages	0.00000057	0.00000092	0.62	0.559
GDPcmp	-0.00000060	0.00000037	-1.64	0.153
GDPg	-0.015775	0.008894	-1.77	0.126
LR	0.003207	0.003361	0.95	0.377
Infla	-0.002356	0.001661	-1.42	0.206

S = 0.02557 R-Sq = 91.3% R-Sq(adj) = 84.1%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.0412749	0.0082550	12.62	0.004
Residual Error	6	0.0039241	0.0006540		
Total	11	0.0451990			

Source	DF	Seq SS
Wages	1	0.0359690
GDPcmp	1	0.0031480
GDPg	1	0.0008063
LR	1	0.0000367
Infla	1	0.0013148

Unusual Observations

Obs	Wages	Baum	Fit	SE Fit	Residual	St Resid
13	320087	*	0.09413	0.04257	*	* X
14	374576	*	0.09187	0.06007	*	* X
15	443114	*	0.56520	0.38930	*	* X

X denotes an observation whose X value gives it large influence.

Regression Analysis: BBK versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
BBK = 0.0518 +0.000000 Wages +0.000000 GDPcmp - 0.00369 GDPg + 0.00060 LR
- 0.00162 Infla

Predictor	Coef	SE Coef	T	P
Constant	0.05180	0.02911	1.78	0.109
Wages	0.00000007	0.00000005	1.46	0.177
GDPcmp	0.00000002	0.00000004	0.62	0.553
GDPg	-0.003690	0.004643	-0.79	0.447
LR	0.000602	0.001051	0.57	0.581
Infla	-0.0016248	0.0007867	-2.07	0.069

S = 0.01705 R-Sq = 83.1% R-Sq(adj) = 73.7%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.0128588	0.0025718	8.84	0.003
Residual Error	9	0.0026169	0.0002908		
Total	14	0.0154757			

Source	DF	Seq SS
Wages	1	0.0078528
GDPcmp	1	0.0031738
GDPg	1	0.0003767
LR	1	0.0002151
Infla	1	0.0012404

Unusual Observations

Obs	Wages	BBK	Fit	SE Fit	Residual	St Resid
14	374576	0.07533	0.10769	0.01094	-0.03236	-2.47R

R denotes an observation with a large standardized residual

Regression Analysis: Bbond versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
Bbond = 0.0830 +0.000000 Wages +0.000000 GDPcmp + 0.00088 GDPg - 0.00464 LR
+0.000581 Infla

Predictor	Coef	SE Coef	T	P
Constant	0.08299	0.03206	2.59	0.029
Wages	0.00000025	0.00000006	4.43	0.002
GDPcmp	0.00000001	0.00000004	0.26	0.799
GDPg	0.000877	0.005113	0.17	0.868
LR	-0.004643	0.001158	-4.01	0.003
Infla	0.0005813	0.0008663	0.67	0.519

S = 0.01878 R-Sq = 91.5% R-Sq(adj) = 86.8%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.0341529	0.0068306	19.37	0.000
Residual Error	9	0.0031735	0.0003526		
Total	14	0.0373263			

Source	DF	Seq SS
Wages	1	0.0233865
GDPcmp	1	0.0025522
GDPg	1	0.0007933
LR	1	0.0072621
Infla	1	0.0001588

Unusual Observations

Obs	Wages	Bbond	Fit	SE Fit	Residual	St Resid
9	152678	-0.04809	-0.00478	0.00734	-0.04331	-2.51R

R denotes an observation with a large standardized residual

Regression Analysis: BOC versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
BOC = 0.249 +0.000000 Wages -0.000000 GDPcmp - 0.0348 GDPg + 0.00551 LR
- 0.00580 Infla

Predictor	Coef	SE Coef	T	P
Constant	0.24908	0.04944	5.04	0.001
Wages	0.00000042	0.00000009	4.89	0.001
GDPcmp	-0.00000011	0.00000006	-1.81	0.103
GDPg	-0.034755	0.007885	-4.41	0.002
LR	0.005513	0.001785	3.09	0.013
Infla	-0.005801	0.001336	-4.34	0.002

S = 0.02896   R-Sq = 94.0%   R-Sq(adj) = 90.6%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.117319	0.023464	27.98	0.000
Residual Error	9	0.007547	0.000839		
Total	14	0.124866			

Source	DF	Seq SS
Wages	1	0.086963
GDPcmp	1	0.012237
GDPg	1	0.002040
LR	1	0.000267
Infla	1	0.015811

Unusual Observations

Obs	Wages	BOC	Fit	SE Fit	Residual	St Resid
15	443114	0.34903	0.34257	0.02881	0.00646	2.22R

R denotes an observation with a large standardized residual

Regression Analysis: CarGen versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
CarGen = 0.0601 +0.000000 Wages -0.000000 GDPcmp + 0.0242 GDPg - 0.00445 LR
+ 0.00413 Infla

Predictor	Coef	SE Coef	T	P
Constant	0.06013	0.06606	0.91	0.386
Wages	0.00000001	0.00000011	0.13	0.899
GDPcmp	-0.00000006	0.00000008	-0.74	0.479
GDPg	0.02418	0.01054	2.30	0.047
LR	-0.004451	0.002385	-1.87	0.095
Infla	0.004135	0.001785	2.32	0.046

S = 0.03869   R-Sq = 83.8%   R-Sq(adj) = 74.7%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.069448	0.013890	9.28	0.002
Residual Error	9	0.013474	0.001497		
Total	14	0.082922			

Source	DF	Seq SS
Wages	1	0.016267
GDPcmp	1	0.043948
GDPg	1	0.000702
LR	1	0.000498
Infla	1	0.008032

Regression Analysis: CARB versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
CARB = 0.035 +0.000000 Wages +0.000000 GDPcmp - 0.0336 GDPg + 0.0115 LR
- 0.00510 Infla

14 cases used 1 cases contain missing values

Predictor	Coef	SE Coef	T	P
Constant	0.0354	0.2287	0.15	0.881
Wages	0.00000032	0.00000041	0.76	0.468
GDPcmp	0.00000007	0.00000029	0.25	0.810
GDPg	-0.03362	0.04013	-0.84	0.427
LR	0.011520	0.009442	1.22	0.257
Infla	-0.005103	0.006204	-0.82	0.435

S = 0.1301 R-Sq = 53.7% R-Sq(adj) = 24.8%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.15731	0.03146	1.86	0.208
Residual Error	8	0.13544	0.01693		
Total	13	0.29275			

Source	DF	Seq SS
Wages	1	0.04214
GDPcmp	1	0.08988
GDPg	1	0.00002
LR	1	0.01382
Infla	1	0.01145

Unusual Observations

Obs	Wages	CARB	Fit	SE Fit	Residual	St Resid
14	374576	0.1512	0.4128	0.0835	-0.2616	-2.62R
15	443114	0.2257	0.1947	0.1295	0.0310	2.37R

R denotes an observation with a large standardized residual

Regression Analysis: Cberg versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
Cberg = - 0.149 +0.000001 Wages +0.000000 GDPcmp - 0.0125 GDPg + 0.00639 LR
+ 0.00428 Infla

13 cases used 2 cases contain missing values

Predictor	Coef	SE Coef	T	P
Constant	-0.1493	0.1288	-1.16	0.284
Wages	0.00000073	0.00000026	2.74	0.029
GDPcmp	0.00000008	0.00000017	0.46	0.662
GDPg	-0.01248	0.02843	-0.44	0.674
LR	0.006389	0.007128	0.90	0.400
Infla	0.004280	0.003583	1.19	0.271

S = 0.06526 R-Sq = 68.1% R-Sq(adj) = 45.3%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.063705	0.012741	2.99	0.093
Residual Error	7	0.029817	0.004260		
Total	12	0.093521			

Source	DF	Seq SS
Wages	1	0.019819
GDPcmp	1	0.002388
GDPg	1	0.006163
LR	1	0.029256
Infla	1	0.006079

Unusual Observations

Obs	Wages	Cberg	Fit	SE Fit	Residual	St Resid

1	39955	*	0.0027	0.1135	*	* X
2	45249	*	0.0341	0.0984	*	* X
3	50475	0.0095	0.0944	0.0518	-0.0848	-2.14R
4	59109	0.2704	0.1751	0.0505	0.0953	2.30R
15	443114	0.2649	0.2742	0.0649	-0.0093	-1.45 X

R denotes an observation with a large standardized residual
X denotes an observation whose X value gives it large influence.

Regression Analysis: CFC versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
CFC = 0.867 -0.000000 Wages -0.000000 GDPcmp + 0.0144 GDPg - 0.00382 LR + 0.00391 Infla

Predictor	Coef	SE Coef	T	P
Constant	0.8669	0.1005	8.63	0.000
Wages	-0.00000006	0.00000017	-0.35	0.731
GDPcmp	-0.00000008	0.00000013	-0.66	0.523
GDPg	0.01435	0.01603	0.90	0.394
LR	-0.003821	0.003629	-1.05	0.320
Infla	0.003908	0.002716	1.44	0.184

S = 0.05887 R-Sq = 70.1% R-Sq(adj) = 53.5%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.073028	0.014606	4.22	0.030
Residual Error	9	0.031186	0.003465		
Total	14	0.104214			

Source	DF	Seq SS
Wages	1	0.025449
GDPcmp	1	0.039651
GDPg	1	0.000576
LR	1	0.000174
Infla	1	0.007177

Unusual Observations

Obs	Wages	CFC	Fit	SE Fit	Residual	St Resid
14	374576	0.8048	0.7061	0.0378	0.0987	2.19R
15	443114	0.8431	0.8569	0.0586	-0.0138	-2.32R

R denotes an observation with a large standardized residual

Regression Analysis: CMC versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
CMC = 0.197 +0.000000 Wages -0.000000 GDPcmp + 0.0023 GDPg - 0.00164 LR + 0.00177 Infla

Predictor	Coef	SE Coef	T	P
Constant	0.19705	0.07656	2.57	0.030
Wages	0.00000016	0.00000013	1.20	0.260
GDPcmp	-0.00000001	0.00000010	-0.14	0.889
GDPg	0.00229	0.01221	0.19	0.855
LR	-0.001641	0.002764	-0.59	0.567
Infla	0.001772	0.002069	0.86	0.414

S = 0.04484 R-Sq = 29.6% R-Sq(adj) = 0.0%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.007609	0.001522	0.76	0.602
Residual Error	9	0.018099	0.002011		
Total	14	0.025709			

Source	DF	Seq SS
Wages	1	0.001387
GDPcmp	1	0.003461
GDPg	1	0.001269
LR	1	0.000017
Infla	1	0.001475

Regression Analysis: CityTr versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
CityTr = 0.229 -0.000001 Wages -0.000000 GDPcmp + 0.0594 GDPg + 0.0150 LR
- 0.00732 Infla

14 cases used 1 cases contain missing values

Predictor	Coef	SE Coef	T	P
Constant	0.2287	0.3376	0.68	0.517
Wages	-0.00000110	0.00000061	-1.80	0.109
GDPcmp	-0.00000008	0.00000043	-0.19	0.854
GDPg	0.05942	0.05926	1.00	0.345
LR	0.01497	0.01394	1.07	0.314
Infla	-0.007323	0.009161	-0.80	0.447

S = 0.1921   R-Sq = 72.1%   R-Sq(adj) = 54.7%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.76452	0.15290	4.14	0.037
Residual Error	8	0.29532	0.03692		
Total	13	1.05984			

Source	DF	Seq SS
Wages	1	0.35480
GDPcmp	1	0.00595
GDPg	1	0.36031
LR	1	0.01987
Infla	1	0.02359

Unusual Observations

Obs	Wages	CityTr	Fit	SE Fit	Residual	St Resid
9	152678	0.8676	0.5037	0.0759	0.3640	2.06R

R denotes an observation with a large standardized residual

Regression Analysis: DTB versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
DTB = 0.0570 +0.000000 Wages +0.000000 GDPcmp + 0.00207 GDPg - 0.00321 LR
+ 0.00040 Infla

Predictor	Coef	SE Coef	T	P
Constant	0.05701	0.04360	1.31	0.223
Wages	0.00000010	0.00000008	1.33	0.217
GDPcmp	0.00000013	0.00000005	2.38	0.041

```
GDPg          0.002068      0.006954          0.30    0.773
LR           -0.003213      0.001574         -2.04    0.072
Infla         0.000396      0.001178          0.34    0.745

S = 0.02554      R-Sq = 82.1%      R-Sq(adj) = 72.1%

Analysis of Variance

Source           DF          SS           MS        F        P
Regression        5   0.0268610    0.0053722     8.24    0.004
Residual Error    9   0.0058701    0.0006522
Total            14   0.0327311

Source     DF     Seq SS
Wages       1   0.0180425
GDPcmp      1   0.0051412
GDPg        1   0.0001129
LR          1   0.0034907
Infla       1   0.0000736

Unusual Observations
Obs     Wages       DTB        Fit      SE Fit    Residual    St Resid
 12    262577   0.17059    0.11775    0.01260     0.05284       2.38R

R denotes an observation with a large standardized residual
```

Regression Analysis: Dunlop versus Wages, GDPcmp, GDPg, LR, Infla

```
The regression equation is
Dunlop = - 0.107 +0.000001 Wages -0.000000 GDPcmp - 0.0384 GDPg + 0.0273 LR
          - 0.00510 Infla

Predictor          Coef      SE Coef          T        P
Constant        -0.1066       0.1155      -0.92    0.380
Wages        0.00000052   0.00000020       2.59    0.029
GDPcmp      -0.00000028   0.00000014      -1.95    0.084
GDPg           -0.03842      0.01842      -2.09    0.067
LR             0.027307     0.004170       6.55    0.000
Infla         -0.005103     0.003121      -1.64    0.136

S = 0.06765      R-Sq = 87.0%      R-Sq(adj) = 79.7%

Analysis of Variance

Source           DF          SS           MS        F        P
Regression        5    0.274750     0.054950    12.01    0.001
Residual Error    9    0.041191     0.004577
Total            14    0.315941

Source     DF     Seq SS
Wages       1   0.001000
GDPcmp      1   0.037475
GDPg        1   0.000060
LR          1   0.223981
Infla       1   0.012235

Unusual Observations
Obs     Wages     Dunlop       Fit    SE Fit    Residual    St Resid
  1     39955    -0.0120    0.0879    0.0469     -0.0998      -2.05R

R denotes an observation with a large standardized residual
```

Regression Analysis: Eagads versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
Eagads = 0.198 +0.000000 Wages +0.000000 GDPcmp - 0.00038 GDPg - 0.00241 LR
+ 0.00164 Infla

Predictor	Coef	SE Coef	T	P
Constant	0.19848	0.05032	3.94	0.003
Wages	0.00000014	0.00000009	1.65	0.134
GDPcmp	0.00000007	0.00000006	1.16	0.276
GDPg	-0.000379	0.008025	-0.05	0.963
LR	-0.002414	0.001817	-1.33	0.217
Infla	0.001640	0.001360	1.21	0.259

S = 0.02947   R-Sq = 62.4%   R-Sq(adj) = 41.5%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.0129585	0.0025917	2.98	0.073
Residual Error	9	0.0078175	0.0008686		
Total	14	0.0207760			

Source	DF	Seq SS
Wages	1	0.0082235
GDPcmp	1	0.0003200
GDPg	1	0.0026632
LR	1	0.0004888
Infla	1	0.0012630

Unusual Observations

Obs	Wages	Eagads	Fit	SE Fit	Residual	St Resid
6	96375	0.15311	0.20453	0.01950	-0.05142	-2.33R

R denotes an observation with a large standardized residual

Regression Analysis: EABL versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
EABL = - 0.116 +0.000001 Wages -0.000000 GDPcmp + 0.0024 GDPg + 0.00278 LR
- 0.00079 Infla

14 cases used 1 cases contain missing values

Predictor	Coef	SE Coef	T	P
Constant	-0.11602	0.06942	-1.67	0.133
Wages	0.00000068	0.00000013	5.43	0.001
GDPcmp	-0.00000004	0.00000009	-0.48	0.643
GDPg	0.00243	0.01218	0.20	0.847
LR	0.002776	0.002866	0.97	0.361
Infla	-0.000795	0.001883	-0.42	0.684

S = 0.03950   R-Sq = 86.9%   R-Sq(adj) = 78.6%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.082496	0.016499	10.57	0.002
Residual Error	8	0.012483	0.001560		
Total	13	0.094978			

Source	DF	Seq SS
Wages	1	-0.078324
GDPcmp	1	0.000019
GDPg	1	0.002594
LR	1	0.001280

Infla	1	0.000278

Unusual Observations

Obs	Wages	EABL	Fit	SE Fit	Residual	St Resid
11	224994	-0.0074	0.0682	0.0157	-0.0756	-2.08R

R denotes an observation with a large standardized residual

Regression Analysis: EACAB versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
EACAB = 0.416 +0.000000 Wages -0.000000 GDPcmp - 0.0128 GDPg + 0.00882 LR
- 0.00120 Infla

Predictor	Coef	SE Coef	T	P
Constant	0.41626	0.08626	4.83	0.001
Wages	0.00000001	0.00000015	0.09	0.933
GDPcmp	-0.00000009	0.00000011	-0.86	0.413
GDPg	-0.01279	0.01376	-0.93	0.377
LR	0.008817	0.003114	2.83	0.020
Infla	-0.001203	0.002331	-0.52	0.618

S = 0.05052 R-Sq = 60.6% R-Sq(adj) = 38.6%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.035265	0.007053	2.76	0.088
Residual Error	9	0.022974	0.002553		
Total	14	0.058239			

Source	DF	Seq SS
Wages	1	0.005719
GDPcmp	1	0.003096
GDPg	1	0.000109
LR	1	0.025660
Infla	1	0.000680

Regression Analysis: EAPort versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
EAPort = 0.447 -0.000000 Wages -0.000000 GDPcmp - 0.0054 GDPg - 0.0126 LR
+ 0.00750 Infla

14 cases used 1 cases contain missing values

Predictor	Coef	SE Coef	T	P
Constant	0.44671	0.09476	4.71	0.002
Wages	-0.00000037	0.00000017	-2.18	0.061
GDPcmp	-0.00000000	0.00000012	-0.03	0.980
GDPg	-0.00540	0.01663	-0.32	0.754
LR	-0.012649	0.003913	-3.23	0.012
Infla	0.007497	0.002571	2.92	0.019

S = 0.05392 R-Sq = 89.9% R-Sq(adj) = 83.6%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.207872	0.041574	14.30	0.001
Residual Error	8	0.023262	0.002908		

Total	13	0.231134

Source	DF	Seq SS
Wages	1	0.044176
GDPcmp	1	0.049391
GDPg	1	0.080253
LR	1	0.009330
Infla	1	0.024723

Unusual Observations

Obs	Wages	EAPort	Fit	SE Fit	Residual	St Resid
4	59109	0.4367	0.3648	0.0414	0.0719	2.08R
15	443114	0.1568	0.1687	0.0537	-0.0120	-2.21R

R denotes an observation with a large standardized residual

Regression Analysis: EAPack versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
EAPack = 0.098 -0.000000 Wages -0.000000 GDPcmp - 0.0041 GDPg + 0.00724 LR
- 0.00418 Infla

12 cases used 3 cases contain missing values

Predictor	Coef	SE Coef	T	P
Constant	0.0982	0.1741	0.56	0.593
Wages	-0.00000040	0.00000034	-1.19	0.278
GDPcmp	-0.00000000	0.00000017	-0.01	0.996
GDPg	-0.00411	0.02857	-0.14	0.890
LR	0.007244	0.008495	0.85	0.427
Infla	-0.004184	0.003347	-1.25	0.258

S = 0.05864   R-Sq = 76.9%   R-Sq(adj) = 57.7%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.068878	0.013776	4.01	0.061
Residual Error	6	0.020635	0.003439		
Total	11	0.089513			

Source	DF	Seq SS
Wages	1	0.033849
GDPcmp	1	0.012182
GDPg	1	0.017463
LR	1	0.000011
Infla	1	0.005374

Unusual Observations

Obs	Wages	EAPack	Fit	SE Fit	Residual	St Resid
1	39955	*	0.1312	0.1469	*	* X
2	45249	*	0.1323	0.1284	*	* X
3	50475	*	0.1254	0.0765	*	* X
15	443114	-0.0219	-0.0351	0.0584	0.0131	2.27RX

R denotes an observation with a large standardized residual
X denotes an observation whose X value gives it large influence.

Regression Analysis: Express versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
Express = - 0.0168 -0.000001 Wages +0.000000 GDPcmp + 0.0293 GDPg - 0.00227
LR

+ 0.00042 Infla

Predictor	Coef	SE Coef	T	P
Constant	-0.01685	0.08036	-0.21	0.839
Wages	-0.00000070	0.00000014	-5.03	0.001
GDPcmp	0.00000007	0.00000010	0.67	0.518
GDPg	0.02927	0.01282	2.28	0.048
LR	-0.002269	0.002901	-0.78	0.454
Infla	0.000416	0.002171	0.19	0.852

S = 0.04707   R-Sq = 87.8%   R-Sq(adj) = 81.0%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.142931	0.028586	12.90	0.001
Residual Error	9	0.019939	0.002215		
Total	14	0.162869			

Source	DF	Seq SS
Wages	1	0.116317
GDPcmp	1	0.000977
GDPg	1	0.023998
LR	1	0.001557
Infla	1	0.000081

Regression Analysis: Fires versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
Fires = 0.095 +0.000000 Wages +0.000000 GDPcmp + 0.0352 GDPg - 0.00218 LR
+ 0.00537 Infla

11 cases used 4 cases contain missing values

Predictor	Coef	SE Coef	T	P
Constant	0.0947	0.1880	0.50	0.636
Wages	0.00000035	0.00000028	1.22	0.276
GDPcmp	0.00000015	0.00000011	1.35	0.234
GDPg	0.03523	0.01950	1.81	0.131
LR	-0.002185	0.005623	-0.39	0.714
Infla	0.005366	0.002255	2.38	0.063

S = 0.03605   R-Sq = 65.5%   R-Sq(adj) = 31.0%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.012338	0.002468	1.90	0.249
Residual Error	5	0.006496	0.001299		
Total	10	0.018834			

Source	DF	Seq SS
Wages	1	0.001184
GDPcmp	1	0.002958
GDPg	1	0.000070
LR	1	0.000772
Infla	1	0.007353

Unusual Observations

Obs	Wages	Fires	Fit	SE Fit	Residual	St Resid
1	39955	*	0.3348	0.1031	*	* X
2	45249	*	0.3319	0.0916	*	* X
3	50475	*	0.2634	0.0786	*	* X

4	59109	*	0.2271	0.0749	*	* X
15	443114	0.3834	0.3876	0.0359	-0.0043	-1.50 X

X denotes an observation whose X value gives it large influence.

Regression Analysis: GWK versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
GWK = - 0.0296 +0.000000 Wages +0.000000 GDPcmp + 0.0121 GDPg - 0.00346 LR
+ 0.00351 Infla

14 cases used 1 cases contain missing values

Predictor	Coef	SE Coef	T	P
Constant	-0.02958	0.05430	-0.54	0.601
Wages	0.00000027	0.00000010	2.71	0.026
GDPcmp	0.00000010	0.00000007	1.39	0.202
GDPg	0.012134	0.009530	1.27	0.239
LR	-0.003460	0.002242	-1.54	0.161
Infla	0.003512	0.001473	2.38	0.044

S = 0.03090 R-Sq = 70.0% R-Sq(adj) = 51.2%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.0177913	0.0035583	3.73	0.049
Residual Error	8	0.0076370	0.0009546		
Total	13	0.0254282			

Source	DF	Seq SS
Wages	1	0.0108795
GDPcmp	1	0.0004397
GDPg	1	0.0010438
LR	1	0.0000018
Infla	1	0.0054265

Unusual Observations

Obs	Wages	GWK	Fit	SE Fit	Residual	St Resid
6	96375	0.09771	0.05142	0.02050	0.04629	2.00R

R denotes an observation with a large standardized residual

Regression Analysis: HFCK versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
HFCK = 0.0832 +0.000000 Wages -0.000000 GDPcmp - 0.0138 GDPg +0.000858 LR
-0.000016 Infla

Predictor	Coef	SE Coef	T	P
Constant	0.08321	0.02684	3.10	0.013
Wages	0.00000003	0.00000005	0.72	0.491
GDPcmp	-0.00000008	0.00000003	-2.39	0.040
GDPg	-0.013800	0.004281	-3.22	0.010
LR	0.0008577	0.0009691	0.89	0.399
Infla	-0.0000163	0.0007253	-0.02	0.983

S = 0.01572 R-Sq = 77.4% R-Sq(adj) = 64.9%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.0076348	0.0015270	6.18	0.009

```
Residual Error   9  0.0022247  0.0002472
Total           14  0.0098594

Source     DF     Seq SS
Wages       1  0.0001012
GDPcmp      1  0.0011160
GDPg        1  0.0061197
LR          1  0.0002977
Infla       1  0.0000001

Unusual Observations
Obs   Wages     HFCK      Fit   SE Fit  Residual  St Resid
  3   50475  0.09467  0.06297  0.00847   0.03169     2.39R

R denotes an observation with a large standardized residual
```

Regression Analysis: ICDC versus Wages, GDPcmp, GDPg, LR, Infla

```
The regression equation is
ICDC = 0.0397 -0.000000 Wages -0.000000 GDPcmp - 0.0025 GDPg - 0.00094 LR
       + 0.00032 Infla

Predictor         Coef     SE Coef      T      P
Constant       0.03969     0.07435   0.53  0.606
Wages      -0.00000000  0.00000013  -0.03  0.975
GDPcmp     -0.00000002  0.00000009  -0.20  0.848
GDPg          -0.00248     0.01186  -0.21  0.839
LR           -0.000940    0.002684  -0.35  0.734
Infla         0.000318    0.002009   0.16  0.878

S = 0.04355   R-Sq = 8.7%   R-Sq(adj) = 0.0%

Analysis of Variance

Source          DF        SS        MS     F      P
Regression       5  0.001631  0.000326  0.17  0.967
Residual Error   9  0.017068  0.001896
Total           14  0.018699

Source     DF    Seq SS
Wages       1  0.000038
GDPcmp      1  0.000658
GDPg        1  0.000694
LR          1  0.000194
Infla       1  0.000048

Unusual Observations
Obs   Wages     ICDC     Fit  SE Fit  Residual  St Resid
 13  320087  -0.0728  0.0028  0.0267   -0.0756    -2.20R

R denotes an observation with a large standardized residual
```

Regression Analysis: Jub versus Wages, GDPcmp, GDPg, LR, Infla

```
The regression equation is
Jub = - 0.0774 +0.000000 Wages +0.000000 GDPcmp + 0.0214 GDPg - 0.00168 LR
      + 0.00111 Infla

12 cases used 3 cases contain missing values

Predictor        Coef     SE Coef      T      P
Constant     -0.07736     0.06007  -1.29  0.245
Wages      0.00000017  0.00000012   1.42  0.205
```

GDPcmp	0.00000009	0.00000006	1.53	0.177
GDPg	0.021360	0.009857	2.17	0.073
LR	-0.001677	0.002931	-0.57	0.588
Infla	0.001113	0.001155	0.96	0.372

S = 0.02023   R-Sq = 84.4%   R-Sq(adj) = 71.5%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.0133175	0.0026635	6.51	0.021
Residual Error	6	0.0024564	0.0004094		
Total	11	0.0157739			

Source	DF	Seq SS
Wages	1	0.0072179
GDPcmp	1	0.0002974
GDPg	1	0.0054104
LR	1	0.0000112
Infla	1	0.0003806

Unusual Observations

Obs	Wages	Jub	Fit	SE Fit	Residual	St Resid
1	39955	*	0.03051	0.05069	*	* X
2	45249	*	0.02287	0.04430	*	* X
3	50475	*	-0.02824	0.02638	*	* X
15	443114	0.05411	0.05412	0.02014	-0.00001	-0.00 X

X denotes an observation whose X value gives it large influence.

Regression Analysis: Kakuz versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
Kakuz = 0.226 -0.000001 Wages -0.000000 GDPcmp + 0.0077 GDPg - 0.00324 LR
+ 0.00117 Infla

Predictor	Coef	SE Coef	T	P
Constant	0.22612	0.06830	3.31	0.009
Wages	-0.00000071	0.00000012	-5.96	0.000
GDPcmp	-0.00000001	0.00000009	-0.07	0.948
GDPg	0.00767	0.01089	0.70	0.499
LR	-0.003243	0.002466	-1.31	0.221
Infla	0.001172	0.001846	0.64	0.541

S = 0.04001   R-Sq = 90.2%   R-Sq(adj) = 84.8%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.133278	0.026656	16.65	0.000
Residual Error	9	0.014404	0.001600		
Total	14	0.147682			

Source	DF	Seq SS
Wages	1	0.125206
GDPcmp	1	0.005220
GDPg	1	0.000016
LR	1	0.002190
Infla	1	0.000645

Unusual Observations

Obs	Wages	Kakuz	Fit	SE Fit	Residual	St Resid
2	45249	0.1147	0.1828	0.0241	-0.0681	-2.13R

R denotes an observation with a large standardized residual

Regression Analysis: Kapcho versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
Kapcho = - 0.0236 +0.000000 Wages -0.000000 GDPcmp - 0.0136 GDPg + 0.00842 LR
- 0.00185 Infla

Predictor	Coef	SE Coef	T	P
Constant	-0.02356	0.04171	-0.56	0.586
Wages	0.00000021	0.00000007	2.92	0.017
GDPcmp	-0.00000006	0.00000005	-1.18	0.268
GDPg	-0.013569	0.006653	-2.04	0.072
LR	0.008416	0.001506	5.59	0.000
Infla	-0.001850	0.001127	-1.64	0.135

S = 0.02443 R-Sq = 86.0% R-Sq(adj) = 78.1%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.0328689	0.0065738	11.01	0.001
Residual Error	9	0.0053727	0.0005970		
Total	14	0.0382416			

Source	DF	Seq SS
Wages	1	0.0033008
GDPcmp	1	0.0080065
GDPg	1	0.0000016
LR	1	0.0199511
Infla	1	0.0016088

Regression Analysis: KCB versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
KCB = - 0.0097 -0.000000 Wages -0.000000 GDPcmp - 0.00301 GDPg + 0.00401 LR
- 0.00205 Infla

Predictor	Coef	SE Coef	T	P
Constant	-0.00968	0.04248	-0.23	0.825
Wages	-0.00000003	0.00000007	-0.41	0.690
GDPcmp	-0.00000000	0.00000005	-0.04	0.969
GDPg	-0.003005	0.006776	-0.44	0.668
LR	0.004014	0.001534	2.62	0.028
Infla	-0.002050	0.001148	-1.79	0.108

S = 0.02488 R-Sq = 68.8% R-Sq(adj) = 51.5%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.0122923	0.0024585	3.97	0.035
Residual Error	9	0.0055726	0.0006192		
Total	14	0.0178649			

Source	DF	Seq SS
Wages	1	0.0000034
GDPcmp	1	0.0057101
GDPg	1	0.0023016
LR	1	0.0023024
Infla	1	0.0019748

Unusual Observations

Obs	Wages	KCB	Fit	SE Fit	Residual	St Resid
14	374576	-0.00449	0.04573	0.01597	-0.05022	-2.63R
15	443114	0.00881	0.00209	0.02476	0.00672	2.68R

R denotes an observation with a large standardized residual

Regression Analysis: Kenol versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
Kenol = - 0.260 +0.000001 Wages -0.000000 GDPcmp - 0.0280 GDPg + 0.0229 LR
- 0.00795 Infla

Predictor	Coef	SE Coef	T	P
Constant	-0.2600	0.1000	-2.60	0.029
Wages	0.00000052	0.00000017	3.01	0.015
GDPcmp	-0.00000018	0.00000013	-1.44	0.184
GDPg	-0.02804	0.01595	-1.76	0.113
LR	0.022897	0.003611	6.34	0.000
Infla	-0.007951	0.002702	-2.94	0.016

S = 0.05858 R-Sq = 89.2% R-Sq(adj) = 83.1%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.253988	0.050798	14.80	0.000
Residual Error	9	0.030884	0.003432		
Total	14	0.284872			

Source	DF	Seq SS
Wages	1	0.033189
GDPcmp	1	0.064072
GDPg	1	0.014218
LR	1	0.112803
Infla	1	0.029706

Unusual Observations

Obs	Wages	Kenol	Fit	SE Fit	Residual	St Resid
11	224994	0.3092	0.1685	0.0232	0.1408	2.62R
15	443114	0.1162	0.1032	0.0583	0.0130	2.20R

R denotes an observation with a large standardized residual

Regression Analysis: KenAir versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
KenAir = 1.15 -0.000002 Wages -0.000000 GDPcmp - 0.0395 GDPg - 0.0176 LR
- 0.00273 Infla

10 cases used 5 cases contain missing values

Predictor	Coef	SE Coef	T	P
Constant	1.1495	0.2845	4.04	0.016
Wages	-0.00000181	0.00000044	-4.09	0.015
GDPcmp	-0.00000015	0.00000012	-1.22	0.289
GDPg	-0.03949	0.02095	-1.89	0.132
LR	-0.017580	0.008595	-2.05	0.110
Infla	-0.002733	0.003198	-0.85	0.441

S = 0.03869 R-Sq = 90.3% R-Sq(adj) = 78.2%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.055865	0.011173	7.47	0.037
Residual Error	4	0.005987	0.001497		
Total	9	0.061852			

Source	DF	Seq SS
Wages	1	0.028629
GDPcmp	1	0.002484
GDPg	1	0.002753
LR	1	0.020906
Infla	1	0.001093

Unusual Observations

Obs	Wages	KenAir	Fit	SE Fit	Residual	St Resid
1	39955	*	0.5258	0.1609	*	* X
2	45249	*	0.4996	0.1481	*	* X
3	50475	*	0.5785	0.1427	*	* X
4	59109	*	0.5895	0.1390	*	* X
5	71430	*	0.3044	0.1018	*	* X
15	443114	-0.0447	-0.0461	0.0386	0.0014	0.47 X

X denotes an observation whose X value gives it large influence.

Regression Analysis: KPLC versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
KPLC = - 0.033 -0.000000 Wages -0.000000 GDPcmp - 0.0153 GDPg + 0.00639 LR
- 0.00285 Infla

Predictor	Coef	SE Coef	T	P
Constant	-0.0333	0.1225	-0.27	0.792
Wages	-0.00000004	0.00000021	-0.18	0.864
GDPcmp	-0.00000017	0.00000015	-1.11	0.297
GDPg	-0.01526	0.01954	-0.78	0.455
LR	0.006392	0.004423	1.45	0.182
Infla	-0.002846	0.003311	-0.86	0.412

S = 0.07176 R-Sq = 25.7% R-Sq(adj) = 0.0%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.016065	0.003213	0.62	0.686
Residual Error	9	0.046346	0.005150		
Total	14	0.062412			

Source	DF	Seq SS
Wages	1	0.005141
GDPcmp	1	0.000152
GDPg	1	0.000016
LR	1	0.006950
Infla	1	0.003806

Unusual Observations

Obs	Wages	KPLC	Fit	SE Fit	Residual	St Resid
13	320087	-0.2467	-0.1030	0.0439	-0.1437	-2.53R
14	374576	0.0421	-0.1048	0.0460	0.1468	2.67R

R denotes an observation with a large standardized residual

Regression Analysis: Knmill versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
Knmill = - 0.221 +0.000000 Wages -0.000000 GDPcmp + 0.0016 GDPg + 0.00987 LR
- 0.00204 Infla

12 cases used 3 cases contain missing values

Predictor	Coef	SE Coef	T	P
Constant	-0.2207	0.1174	-1.88	0.109
Wages	0.00000020	0.00000193	0.10	0.922
GDPcmp	-0.00000014	0.00000085	-0.17	0.872
GDPg	0.00163	0.02431	0.07	0.949
LR	0.009873	0.009075	1.09	0.318
Infla	-0.002037	0.004247	-0.48	0.648

S = 0.06455 R-Sq = 58.1% R-Sq(adj) = 23.2%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.034712	0.006942	1.67	0.275
Residual Error	6	0.025004	0.004167		
Total	11	0.059716			

Source	DF	Seq SS
Wages	1	0.000745
GDPcmp	1	0.020153
GDPg	1	0.006608
LR	1	0.006246
Infla	1	0.000959

Unusual Observations

Obs	Wages	Knmill	Fit	SE Fit	Residual	St Resid
14	374576	*	-0.1070	0.0861	*	* X
15	443114	*	-0.0328	0.8201	*	* X

X denotes an observation whose X value gives it large influence.

Regression Analysis: Lim versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
Lim = - 0.124 +0.000001 Wages +0.000000 GDPcmp + 0.00353 GDPg + 0.00416 LR
- 0.00212 Infla

Predictor	Coef	SE Coef	T	P
Constant	-0.12420	0.04491	-2.77	0.022
Wages	0.00000105	0.00000008	13.41	0.000
GDPcmp	0.00000016	0.00000006	2.85	0.019
GDPg	0.003527	0.007163	0.49	0.634
LR	0.004163	0.001622	2.57	0.030
Infla	-0.002124	0.001214	-1.75	0.114

S = 0.02631 R-Sq = 98.5% R-Sq(adj) = 97.7%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.408948	0.081790	118.20	0.000
Residual Error	9	0.006228	0.000692		
Total	14	0.415176			

Source	DF	Seq SS
Wages	1	0.352330
GDPcmp	1	0.044048
GDPg	1	0.007971

LR	1	0.002480
Infla	1	0.002119

Regression Analysis: Marsh versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
Marsh = - 0.315 -0.000000 Wages -0.000000 GDPcmp + 0.0110 GDPg + 0.0210 LR
- 0.00321 Infla

14 cases used 1 cases contain missing values

Predictor	Coef	SE Coef	T	P
Constant	-0.3151	0.1222	-2.58	0.033
Wages	-0.00000019	0.00000022	-0.85	0.418
GDPcmp	-0.00000024	0.00000016	-1.55	0.159
GDPg	0.01096	0.02144	0.51	0.623
LR	0.020994	0.005045	4.16	0.003
Infla	-0.003213	0.003315	-0.97	0.361

S = 0.06952   R-Sq = 89.5%   R-Sq(adj) = 83.0%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.330010	0.066002	13.66	0.001
Residual Error	8	0.038663	0.004833		
Total	13	0.368673			

Source	DF	Seq SS
Wages	1	0.143684
GDPcmp	1	0.000035
GDPg	1	0.080227
LR	1	0.101522
Infla	1	0.004542

Regression Analysis: Lonhro versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
Lonhro = 0.361 -0.000002 Wages -0.000001 GDPcmp - 0.0692 GDPg + 0.0206 LR
- 0.00865 Infla

10 cases used 5 cases contain missing values

Predictor	Coef	SE Coef	T	P
Constant	0.3615	0.1005	3.60	0.023
Wages	-0.00000184	0.00000400	-0.46	0.669
GDPcmp	-0.00000077	0.00000120	-0.64	0.556
GDPg	-0.06920	0.01995	-3.47	0.026
LR	0.020560	0.007890	2.61	0.060
Infla	-0.008651	0.003886	-2.23	0.090

S = 0.05460   R-Sq = 90.7%   R-Sq(adj) = 79.1%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.116513	0.023303	7.82	0.034
Residual Error	4	0.011927	0.002982		
Total	9	0.128440			

Source	DF	Seq SS
Wages	1	0.063063
GDPcmp	1	0.008674
GDPg	1	0.024229
LR	1	0.005769
Infla	1	0.014779

Unusual Observations

Obs	Wages	Lonhro	Fit	SE Fit	Residual	St Resid
11	224994	*	-0.2910	0.1327	*	* X
12	262577	*	-0.3268	0.2132	*	* X
13	320087	*	-0.6317	0.3507	*	* X
14	374576	*	-0.7373	0.4655	*	* X
15	443114	*	-0.5452	1.6760	*	* X

X denotes an observation whose X value gives it large influence.

Regression Analysis: NBK versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
NBK = - 0.0546 -0.000000 Wages -0.000000 GDPcmp - 0.00729 GDPg + 0.00880 LR
- 0.00249 Infla

Predictor	Coef	SE Coef	T	P
Constant	-0.05456	0.04138	-1.32	0.220
Wages	-0.00000000	0.00000007	-0.04	0.966
GDPcmp	-0.00000011	0.00000005	-2.20	0.056
GDPg	-0.007287	0.006600	-1.10	0.298
LR	0.008804	0.001494	5.89	0.000
Infla	-0.002494	0.001118	-2.23	0.053

S = 0.02424 R-Sq = 85.8% R-Sq(adj) = 77.9%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.0318823	0.0063765	10.85	0.001
Residual Error	9	0.0052881	0.0005876		
Total	14	0.0371704			

Source	DF	Seq SS
Wages	1	0.0051552
GDPcmp	1	0.0017970
GDPg	1	0.0028284
LR	1	0.0191792
Infla	1	0.0029225

Unusual Observations

Obs	Wages	NBK	Fit	SE Fit	Residual	St Resid
10	187974	0.14903	0.09699	0.01140	0.05204	2.43R

R denotes an observation with a large standardized residual

Regression Analysis: NIC versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
NIC = 0.0212 +0.000000 Wages +0.000000 GDPcmp + 0.00165 GDPg - 0.00011 LR
- 0.00055 Infla

Predictor	Coef	SE Coef	T	P
Constant	0.02124	0.05051	0.42	0.684
Wages	0.00000032	0.00000009	3.61	0.006

```
GDPcmp  0.00000013  0.00000006      2.07   0.069
GDPg    0.001655    0.008056        0.21   0.842
LR     -0.000106    0.001824       -0.06   0.955
Infla  -0.000552    0.001365       -0.40   0.695

S = 0.02958     R-Sq = 89.8%     R-Sq(adj) = 84.1%

Analysis of Variance

Source          DF        SS          MS       F       P
Regression       5   0.069372    0.013874   15.85   0.000
Residual Error   9   0.007877    0.000875
Total           14   0.077250

Source     DF     Seq SS
Wages       1   0.054254
GDPcmp      1   0.014335
GDPg        1   0.000512
LR          1   0.000129
Infla       1   0.000143

Unusual Observations
Obs   Wages      NIC       Fit    SE Fit   Residual   St Resid
 14  374576  0.21304   0.26345   0.01898   -0.05041     -2.22R
 15  443114  0.18168   0.17455   0.02943    0.00712      2.39R

R denotes an observation with a large standardized residual
```

Regression Analysis: NMG versus Wages, GDPcmp, GDPg, LR, Infla

```
The regression equation is
NMG = - 0.193 +0.000000 Wages +0.000000 GDPcmp + 0.0200 GDPg + 0.00482 LR
          + 0.00142 Infla

Predictor        Coef     SE Coef       T       P
Constant     -0.19292     0.06561   -2.94   0.016
Wages      0.00000048  0.00000011    4.19   0.002
GDPcmp     0.00000011  0.00000008    1.29   0.228
GDPg          0.01997     0.01046    1.91   0.089
LR           0.004816    0.002369    2.03   0.073
Infla        0.001421    0.001773    0.80   0.444

S = 0.03843     R-Sq = 82.5%     R-Sq(adj) = 72.8%
Analysis of Variance

Source          DF        SS          MS       F       P
Regression       5   0.062650    0.012530    8.49   0.003
Residual Error   9   0.013290    0.001477
Total           14   0.075940

Source     DF     Seq SS
Wages       1   0.028364
GDPcmp      1   0.007390
GDPg        1   0.011069
LR          1   0.014880
Infla       1   0.000948
```

Regression Analysis: Rea versus Wages, GDPcmp, GDPg, LR, Infla

```
The regression equation is
```

Rea = - 0.569 +0.000001 Wages +0.000000 GDPcmp + 0.0360 GDPg + 0.0072 LR
+ 0.00472 Infla

9 cases used 6 cases contain missing values

Predictor	Coef	SE Coef	T	P
Constant	-0.5687	0.4087	-1.39	0.258
Wages	0.00000083	0.00000068	1.22	0.309
GDPcmp	0.00000019	0.00000020	0.93	0.421
GDPg	0.03600	0.03206	1.12	0.343
LR	0.00724	0.01360	0.53	0.631
Infla	0.004723	0.009825	0.48	0.664

S = 0.05470 R-Sq = 58.8% R-Sq(adj) = 0.0%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.012836	0.002567	0.86	0.590
Residual Error	3	0.008977	0.002992		
Total	8	0.021813			

Source	DF	Seq SS
Wages	1	0.003245
GDPcmp	1	0.000003
GDPg	1	0.004662
LR	1	0.004234
Infla	1	0.000692

Unusual Observations

Obs	Wages	Rea	Fit	SE Fit	Residual	St Resid
1	39955	*	-0.1461	0.2719	*	* X
2	45249	*	-0.1335	0.2603	*	* X
3	50475	*	-0.2010	0.2562	*	* X
4	59109	*	-0.2186	0.2671	*	* X
5	71430	*	-0.0030	0.3363	*	* X
6	96375	*	0.0911	0.1788	*	* X
15	443114	0.0620	0.0660	0.0546	-0.0041	-1.68 X

X denotes an observation whose X value gives it large influence.

Regression Analysis: Sasini versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
Sasini = 0.204 -0.000000 Wages -0.000000 GDPcmp + 0.00338 GDPg - 0.00492 LR
+ 0.00787 Infla

Predictor	Coef	SE Coef	T	P
Constant	0.20375	0.06253	3.26	0.010
Wages	-0.00000015	0.00000011	-1.34	0.213
GDPcmp	-0.00000000	0.00000008	-0.06	0.951
GDPg	0.003376	0.009972	0.34	0.743
LR	-0.004920	0.002258	-2.18	0.057
Infla	0.007873	0.001690	4.66	0.001

S = 0.03662 R-Sq = 92.4% R-Sq(adj) = 88.2%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.146584	0.029317	21.86	0.000
Residual Error	9	0.012072	0.001341		
Total	14	0.158655			

Source DF Seq SS

Wages	1	0.051645
GDPcmp	1	0.029240
GDPg	1	0.035665
LR	1	0.000910
Infla	1	0.029125

Unusual Observations

Obs	Wages	Sasini	Fit	SE Fit	Residual	St Resid
5	71430	0.35161	0.40296	0.02916	-0.05135	-2.32R
6	96375	0.34243	0.26512	0.02423	0.07731	2.82R
15	443114	0.15104	0.15913	0.03644	-0.00809	-2.19R

R denotes an observation with a large standardized residual

Regression Analysis: SCHB versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
SCHB = 0.0442 +0.000000 Wages -0.000000 GDPcmp - 0.00406 GDPg +0.000395 LR
-0.000681 Infla

Predictor	Coef	SE Coef	T	P
Constant	0.04419	0.02587	1.71	0.122
Wages	0.00000006	0.00000004	1.27	0.235
GDPcmp	-0.00000000	0.00000003	-0.11	0.918
GDPg	-0.004060	0.004126	-0.98	0.351
LR	0.0003947	0.0009340	0.42	0.682
Infla	-0.0006813	0.0006990	-0.97	0.355

S = 0.01515 R-Sq = 57.0% R-Sq(adj) = 33.1%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.0027369	0.0005474	2.38	0.122
Residual Error	9	0.0020661	0.0002296		
Total	14	0.0048031			

Source	DF	Seq SS
Wages	1	0.0021101
GDPcmp	1	0.0003593
GDPg	1	0.0000388
LR	1	0.0000105
Infla	1	0.0002181

Unusual Observations

Obs	Wages	SCHB	Fit	SE Fit	Residual	St Resid
11	224994	0.08879	0.05539	0.00599	0.03339	2.40R
15	443114	0.05964	0.05641	0.01507	0.00323	2.12R

R denotes an observation with a large standardized residual

Regression Analysis: SNG versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
SNG = 0.030 -0.000000 Wages -0.000000 GDPcmp + 0.0074 GDPg + 0.00793 LR
- 0.00046 Infla

Predictor	Coef	SE Coef	T	P
Constant	0.0298	0.1433	0.21	0.840
Wages	-0.00000036	0.00000025	-1.46	0.179
GDPcmp	-0.00000031	0.00000018	-1.75	0.114
GDPg	0.00742	0.02285	0.32	0.753
LR	0.007933	0.005173	1.53	0.160

Infla	-0.000456	0.003872	-0.12	0.909

S = 0.08393   R-Sq = 79.7%   R-Sq(adj) = 68.4%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.248181	0.049636	7.05	0.006
Residual Error	9	0.063392	0.007044		
Total	14	0.311572			

Source	DF	Seq SS
Wages	1	0.174660
GDPcmp	1	0.041731
GDPg	1	0.007814
LR	1	0.023879
Infla	1	0.000098

Unusual Observations

Obs	Wages	SNG	Fit	SE Fit	Residual	St Resid
13	320087	-0.3521	-0.2003	0.0514	-0.1518	-2.29R
14	374576	-0.1148	-0.2597	0.0538	0.1449	2.25R

R denotes an observation with a large standardized residual

Regression Analysis: Total versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
Total = 0.0298 +0.000000 Wages -0.000000 GDPcmp - 0.0075 GDPg + 0.00351 LR
- 0.00068 Infla

Predictor	Coef	SE Coef	T	P
Constant	0.02980	0.07195	0.41	0.688
Wages	0.00000036	0.00000013	2.86	0.019
GDPcmp	-0.00000019	0.00000009	-2.09	0.066
GDPg	-0.00751	0.01147	-0.65	0.529
LR	0.003510	0.002598	1.35	0.210
Infla	-0.000681	0.001944	-0.35	0.734

S = 0.04214   R-Sq = 55.5%   R-Sq(adj) = 30.8%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.019949	0.003990	2.25	0.138
Residual Error	9	0.015983	0.001776		
Total	14	0.035932			

Source	DF	Seq SS
Wages	1	0.004721
GDPcmp	1	0.011174
GDPg	1	0.000188
LR	1	0.003648
Infla	1	0.000218

Unusual Observations

Obs	Wages	Total	Fit	SE Fit	Residual	St Resid
14	374576	0.1237	0.0429	0.0270	0.0808	2.50R

R denotes an observation with a large standardized residual

Regression Analysis: TPS versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
TPS = - 0.829 -0.000002 Wages +0.000002 GDPcmp + 0.0301 GDPg - 0.00014 LR
+ 0.00124 Infla

7 cases used 8 cases contain missing values

Predictor	Coef	SE Coef	T	P
Constant	-0.8292	0.3691	-2.25	0.267
Wages	-0.00000222	0.00000100	-2.23	0.269
GDPcmp	0.00000171	0.00000070	2.45	0.247
GDPg	0.03014	0.01727	1.75	0.331
LR	-0.000143	0.005067	-0.03	0.982
Infla	0.001236	0.004660	0.27	0.835

S = 0.01936   R-Sq = 91.7%   R-Sq(adj) = 50.1%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.0041323	0.0008265	2.20	0.470
Residual Error	1	0.0003750	0.0003750		
Total	6	0.0045073			

Source	DF	Seq SS
Wages	1	0.0018180
GDPcmp	1	0.0010250
GDPg	1	0.0012621
LR	1	0.0000009
Infla	1	0.0000264

Unusual Observations

Obs	Wages	TPS	Fit	SE Fit	Residual	St Resid
1	39955	*	-0.46852	0.19962	*	* X
2	45249	*	-0.45166	0.18952	*	* X
3	50475	*	-0.49188	0.20210	*	* X
4	59109	*	-0.50034	0.20866	*	* X
5	71430	*	-0.35407	0.19478	*	* X
6	96375	*	-0.24421	0.11677	*	* X
7	117664	*	-0.16318	0.06582	*	* X
15	443114	*	-1.52207	0.62350	*	* X

X denotes an observation whose X value gives it large influence.

Regression Analysis: Uchu versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
Uchu = 0.576 -0.000002 Wages -0.000000 GDPcmp - 0.0327 GDPg + 0.00533 LR
- 0.00527 Infla

12 cases used 3 cases contain missing values

Predictor	Coef	SE Coef	T	P
Constant	0.5765	0.1146	5.03	0.002
Wages	-0.00000200	0.00000022	-9.04	0.000
GDPcmp	-0.00000021	0.00000011	-1.96	0.098
GDPg	-0.03267	0.01880	-1.74	0.133
LR	0.005330	0.005592	0.95	0.377
Infla	-0.005267	0.002203	-2.39	0.054

S = 0.03860   R-Sq = 98.7%   R-Sq(adj) = 97.7%

Analysis of Variance-

Source	DF	SS	MS	F	P
Regression	5	0.70024	0.14005	93.99	0.000

Source	DF	SS	MS
Residual Error	6	0.00894	0.00149
Total	11	0.70918	

Source	DF	Seq SS
Wages	1	0.68960
GDPcmp	1	0.00020
GDPg	1	0.00020
LR	1	0.00172
Infla	1	0.00851

Unusual Observations

Obs	Wages	Uchu	Fit	SE Fit	Residual	St Resid
1	39955	*	0.3274	0.0967	*	* X
2	45249	*	0.3238	0.0845	*	* X
3	50475	*	0.3760	0.0503	*	* X
10	187974	0.1813	0.1211	0.0246	0.0602	2.02R
15	443114	-0.4066	-0.4078	0.0384	0.0012	0.32 X

R denotes an observation with a large standardized residual
X denotes an observation whose X value gives it large influence.

Regression Analysis: Unga versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
Unga = - 0.276 +0.000000 Wages -0.000000 GDPcmp - 0.0029 GDPg + 0.00903 LR
+ 0.00058 Infla

Predictor	Coef	SE Coef	T	P
Constant	-0.27597	0.09397	-2.94	0.017
Wages	0.00000040	0.00000016	2.44	0.037
GDPcmp	-0.00000007	0.00000012	-0.57	0.586
GDPg	-0.00287	0.01499	-0.19	0.852
LR	0.009031	0.003393	2.66	0.026
Infla	0.000580	0.002539	0.23	0.824

S = 0.05504   R-Sq = 61.1%   R-Sq(adj) = 39.4%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.042781	0.008556	2.82	0.084
Residual Error	9	0.027268	0.003030		
Total	14	0.070048			

Source	DF	Seq SS
Wages	1	0.003543
GDPcmp	1	0.001329
GDPg	1	0.000048
LR	1	0.037703
Infla	1	0.000158

Unusual Observations

Obs	Wages	Unga	Fit	SE Fit	Residual	St Resid
15	443114	0.0012	0.0126	0.0548	-0.0114	-2.06R

R denotes an observation with a large standardized residual

Regression Analysis: Market versus Wages, GDPcmp, GDPg, LR, Infla

The regression equation is
Market = 0.0586 +0.000000 Wages -0.000000 GDPcmp - 0.00148 GDPg + 0.00358 LR
-0.000132 Infla

Predictor	Coef	SE Coef	T	P
Constant	0.05862	0.01786	3.28	0.009
Wages	0.00000005	0.00000003	1.72	0.119
GDPcmp	-0.00000004	0.00000002	-1.77	0.110
GDPg	-0.001483	0.002848	-0.52	0.615
LR	0.0035804	0.0006447	5.55	0.000
Infla	-0.0001320	0.0004825	-0.27	0.791

S = 0.01046 R-Sq = 85.4% R-Sq(adj) = 77.3%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	0.0057738	0.0011548	10.56	0.001
Residual Error	9	0.0009844	0.0001094		
Total	14	0.0067581			

Source	DF	Seq SS
Wages	1	0.0005738
GDPcmp	1	0.0000678
GDPg	1	0.0000874
LR	1	0.0050366
Infla	1	0.0000082

Unusual Observations

Obs	Wages	Market	Fit	SE Fit	Residual	St Resid
7	117664	0.15998	0.14285	0.00607	0.01712	2.01R
10	187974	0.12457	0.14352	0.00492	-0.01896	-2.05R

R denotes an observation with a large standardized residual

Appendix 2

Working Capital to Total Assets Ratios

Comp	2003	2002	2001	2000	1999	1998	1997	1996	1995	1994	1993	1992	1991	1990	1989
ARM	0.11772	0.075611	0.083124	0.054735	-0.08556	-0.08568	-0.00513	-0.14874							
Bamburi	0.104826	0.069447	0.057126	0.074768	0.056375	0.137167	0.187078	0.213523	0.176979	0.278605	0.215833	0.121044	0.160191	0.117955	0.10179
BAT	0.126623	0.168331	0.157466	0.173539	0.263861	0.203763	0.162158	0.164625	0.151037	0.0985	0.075793	0.036887	0.012127	0.0059	-0.00401
Bauman				0.152233	0.120638	0.124974	0.158978	0.204937	0.227101	0.197581	0.24537	0.316158	0.260846	0.268138	0.282203
BBK	0.07204	0.075331	0.100941	0.121687	0.10131	0.078139	0.071281	0.066138	0.054158	0.030427	0.006866	0.023921	0.028661	0.029891	0.037829
Bbond	0.136618	0.10719	0.072187	0.073832	0.052665	0.012106	-0.04809	-0.01936	-0.01734	-0.01611	-0.01789	0.020481	0.018203	0.022662	0.033481
BOC	0.349031	0.335598	0.317917	0.370081	0.358699	0.341962	0.287905	0.221179	0.199505	0.177713	0.127351	0.207325	0.185319	0.10422	0.122673
Car and Gen	0.102547	-0.02074	-0.03747	-0.05421	-0.0569	-0.10637	9.05E-05	0.005679	0.075663	0.073731	0.105681	0.083154	0.039932	0.111126	0.158995
CARB	0.22565	0.151212	0.498478	0.435219	0.495122	0.443893	0.403243	0.290202	0.243422	0.169556	0.253449	0.156092	0.086209	0.06597	
Cberg	0.264855	0.369384	0.292999	0.242033	0.214149	0.184267	0.182068	0.198747	0.173926	0.30001	0.299889	0.270361	0.009545		
CFC	0.843148	0.804797	0.716131	0.713161	0.650845	0.66044	0.760796	0.803841	0.849295	0.852332	0.896797	0.891068	0.88733	0.889095	0.882259
CMC	0.263072	0.280013	0.221887	0.135339	0.121872	0.232401	0.197659	0.192271	0.176637	0.187007	0.233699	0.246024	0.211376	0.215155	0.20036
CityTrust	0.0269	0.099103	0.122859	0.165722	0.155419	0.155129	0.867636	0.876827	0.629362	0.513373	0.180626	0.284234	0.391096	0.56797	
DTB	0.084948	0.127228	0.14196	0.170593	0.118813	0.082789	0.054785	0.017769	0.044995	0.036183	0.028657	0.01831	0.030044	0.056384	0.04751
Dunlop	0.298637	0.292598	0.30991	0.365513	0.382197	0.406386	0.43829	0.562339	0.531807	0.51952	0.452369	0.327318	0.242443	0.160994	-0.01199
Eagads	0.255606	0.292473	0.261814	0.244505	0.20065	0.252465	0.226962	0.201002	0.175648	0.153114	0.265116	0.224577	0.184038	0.210495	0.201215
EABL	0.21312	0.167826	0.16152	0.066239	-0.00737	0.040682	0.075929	0.049474	0.046005	0.023037	-0.06082	-0.01548	-0.0474	-0.0552	
EACAB	0.473345	0.504579	0.551733	0.525056	0.443853	0.545965	0.559859	0.627939	0.634679	0.61906	0.587542	0.587205	0.544968	0.505596	0.421952
EAPort	0.156773	0.146761	0.10893	0.092576	0.064472	0.029274	0.001084	0.066495	0.036469	0.202631	0.345791	0.436685	0.294099	0.292415	
EAPack	-0.02194	-0.01166	0.112342	0.131435	0.21306	0.199947	0.241173	0.265349	0.181865	0.134495	0.117513	0.09173			
Express	-0.25873	-0.24189	-0.21975	-0.1906	-0.17842	-0.0392	-0.03739	-0.04183	-0.03444	-0.0957	-0.04944	-0.15262	-0.00856	0.047245	0.096896
Fires	0.383359	0.364438	0.357313	0.335983	0.286463	0.274701	0.261855	0.366948	0.320953	0.377071	0.363375				
GWK	0.117245	0.118169	0.111529	0.063423	0.038534	0.069343	-0.01105	-0.00183	-0.00139	0.097714	0.051101	0.027162	0.034174	0.055391	
HFCK	0.059693	0.04762	0.021652	0.036402	0.021575	0.024074	0.042248	0.026116	0.013985	0.049662	0.0747	0.084831	0.094669	0.023233	0.007281
ICDC	0.015199	0.063693	-0.07283	0.000796	0.044621	-0.02333	-0.01459	-0.00382	-0.03911	0.050369	-0.01209	0.020388	0.033075	0.036055	0.00314
Jubilee	0.05411	0.054714	0.058468	-0.02273	0.003779	0.029955	0.024929	0.007262	0.039351	0.001525	-0.02782	-0.06421			
Kakuzi	-0.1041	-0.08893	-0.04941	-0.02267	0.010232	-0.02346	0.027056	0.058607	0.09906	0.143904	0.103267	0.168359	0.150697	0.114696	0.250009
Kapchorua	0.124501	0.108046	0.149687	0.171191	0.156314	0.164298	0.192716	0.181313	0.174735	0.151126	0.160907	0.110246	0.058869	0.040009	0.028546
KCB	0.00881	-0.00449	0.062129	0.074394	0.077534	0.093964	0.100204	0.085314	0.066347	0.039623	0.025939	0.002997	0.011119	0.024838	0.019215
Kenol	0.11619	0.075255	0.120872	0.198361	0.309218	0.283497	0.272125	0.263567	0.214135	0.227685	0.046165	-0.00953	-0.07045	-0.08264	-0.10503
KenAir	-0.04468	-0.05009	0.046513	0.157605	0.199869	0.119813	0.0852	0.093289	0.159534	0.086589					
KPLC	-0.06037	0.042077	-0.24671	-0.09589	-0.0425	-0.01856	-0.01672	0.019914	-0.00702	-0.01157	-0.0166	-0.00721	-0.03467	-0.07533	-0.03559

Knmill			-0.06739	-0.07554	-0.12445	-0.07708	0.079695	0.042482	0.082454	-0.00515	-0.02987	-0.05969	-0.13274	-0.09288	
Limuru	0.400341	0.489208	0.442988	0.353368	0.351058	0.259414	0.214843	0.230465	0.22248	0.168212	0.014421	0.015995	0.022795	0.005112	-0.01049
Marshall	-0.15697	-0.1767	-0.16584	-0.15973	-0.13056	0.112844	0.130846	0.147111	0.281762	0.336536	0.035871	-0.01678	-0.02253	0.005595	
Lonhro						-0.09003	-0.01203	0.032071	0.077913	0.16833	0.181521	0.245508	0.294933	0.075051	0.040139
NBK	0.005765	-0.00195	-0.00956	0.024555	0.002438	0.149025	0.111584	0.114308	0.100592	0.103683	0.06519	0.029197	0.026311	0.023034	0.019299
NIC	0.181678	0.213039	0.235246	0.233692	0.218264	0.195158	0.15395	0.114065	0.09537	0.078298	0.072211	0.021719	0.056066	0.061845	0.066059
NMG	0.163897	0.216417	0.158174	0.148441	0.073052	0.180431	0.174088	0.154604	0.147239	0.165997	0.097204	-0.06018	0.060897	0.061192	0.021161
Rea	0.061975	0.098403	0.058198	0.036769	-0.06468	-0.03107	0.035691	0.078335	0.014406						
Sasini	0.151042	0.101363	0.095056	0.104348	0.091469	0.077627	0.090661	0.076023	0.073669	0.342432	0.35161	0.318608	0.26971	0.24766	0.234518
SCHB	0.059639	0.049088	0.053104	0.061303	0.088786	0.064877	0.046005	0.028426	0.033028	0.030924	0.031607	0.033551	0.02206	0.028466	0.030382
SNGroup	-0.04632	-0.11482	-0.35212	-0.18889	-0.10642	-0.00244	0.112045	0.096399	0.065937	0.158497	0.117458	0.105747	0.023243	0.138235	0.17767
Total	0.181183	0.123678	-0.02324	0.012449	0.04148	0.022438	0.038222	0.067535	0.095722	0.055815	0.090239	0.067708	0.058318	0.026207	0.011336
TPS		0.008323	-0.00633	-0.0482	-0.01195	-0.01275	-0.01759	-0.07155							
Uchumi	-0.40656	-0.3376	-0.18642	-0.03963	0.031956	0.181334	0.123649	0.185593	0.2551	0.242294	0.280404	0.387969			
Unga	0.001153	0.004705	0.013798	-0.02827	-0.0658	-0.06987	-0.04345	0.088241	0.055999	0.087342	0.014876	-0.0197	-0.06346	-0.13776	-0.1491
Market	0.118641	0.11811	0.107488	0.117282	0.11274	0.124568	0.148693	0.155302	0.159978	0.172772	0.148881	0.13279	0.113424	0.110369	0.102571

7.1

Working Capital to Total Assets Ratio 1989 to 2003
(Ranked on the basis of Means)

Comp	Sect	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	Std. Error	Kurtosis	Std. Error	CoeV
CFC	F	15	0.651	0.897	0.807	0.086	-0.709	0.580	-0.905	1.121	0.107
EACAB	I	15	0.422	0.635	0.542	0.064	-0.326	0.580	-0.597	1.121	0.119
CityTr	F	14	0.027	0.877	0.360	0.286	0.783	0.597	-0.678	1.154	0.794
Dunlop	I	15	-0.012	0.562	0.352	0.150	-0.855	0.580	1.192	1.121	0.427
Fires	I	11	0.262	0.383	0.336	0.043	-0.727	0.661	-1.066	1.279	0.129
CARB	I	14	0.066	0.498	0.280	0.150	0.208	0.597	-1.395	1.154	0.536
BOC	I	15	0.104	0.370	0.247	0.094	-0.102	0.580	-1.600	1.121	0.382
Cberg	I	13	0.010	0.369	0.231	0.088	-1.094	0.616	2.556	1.191	0.382
Eagads	A	15	0.153	0.292	0.223	0.039	-0.031	0.580	-0.638	1.121	0.173
Bauman	C	12	0.121	0.316	0.213	0.064	-0.062	0.637	-1.168	1.232	0.301
Limuru	A	15	-0.010	0.489	0.212	0.172	0.064	0.580	-1.351	1.121	0.812
CMC	C	15	0.122	0.280	0.208	0.043	-0.431	0.580	0.225	1.121	0.206
Sasini	A	15	0.074	0.352	0.175	0.106	0.628	0.580	-1.383	1.121	0.608
EAPort	I	14	0.001	0.437	0.162	0.133	0.774	0.597	-0.424	1.154	0.821
Bambu	I	15	0.056	0.279	0.138	0.066	0.600	0.580	-0.318	1.121	0.478

EAPack	I	12	-0.022	0.265	0.138	0.090	-0.542	0.637	-0.257	1.232	0.654
NIC	F	15	0.022	0.235	0.133	0.074	0.125	0.580	-1.657	1.121	0.558
Kapcho	A	15	0.029	0.193	0.132	0.052	-0.968	0.580	-0.242	1.121	0.397
Kenol	I	15	-0.105	0.309	0.124	0.143	-0.355	0.580	-1.312	1.121	1.151
BAT	I	15	-0.004	0.264	0.120	0.079	-0.194	0.580	-0.759	1.121	0.664
NMG	C	15	-0.060	0.216	0.118	0.074	-1.068	0.580	0.883	1.121	0.627
Lonhro	C	10	-0.090	0.295	0.101	0.119	0.164	0.687	-0.650	1.334	1.179
KenAir	C	10	-0.050	0.200	0.085	0.083	-0.589	0.687	-0.385	1.334	0.971
DTB	F	15	0.018	0.171	0.071	0.048	0.832	0.580	-0.465	1.121	0.684
BBK	F	15	0.007	0.122	0.060	0.033	0.222	0.580	-0.811	1.121	0.555
Uchumi	C	12	-0.407	0.388	0.060	0.254	-0.777	0.637	-0.506	1.232	4.243
Total	I	15	-0.023	0.181	0.058	0.051	0.904	0.580	1.365	1.121	0.874
Kakuzi	A	15	-0.104	0.250	0.056	0.103	0.098	0.580	-0.765	1.121	1.840
GWK	A	14	-0.011	0.118	0.055	0.044	0.075	0.597	-1.123	1.154	0.805
NBK	F	15	-0.010	0.149	0.051	0.052	0.618	0.580	-1.122	1.121	1.012
EABL	I	14	-0.061	0.213	0.047	0.085	0.619	0.597	-0.411	1.154	1.820
KCB	F	15	-0.004	0.100	0.046	0.036	0.118	0.580	-1.582	1.121	0.779
SCHB	F	15	0.022	0.089	0.044	0.019	1.043	0.580	0.717	1.121	0.420
HFCK	F	15	0.007	0.095	0.042	0.027	0.763	0.580	-0.420	1.121	0.634
CarGen	C	15	-0.106	0.159	0.032	0.077	-0.173	0.580	-1.000	1.121	2.400
Rea	A	9	-0.065	0.098	0.032	0.052	-0.816	0.717	0.063	1.400	1.632
Bbond	A	15	-0.048	0.137	0.029	0.052	0.640	0.580	-0.136	1.121	1.799
Marsh	C	14	-0.177	0.337	0.016	0.168	0.556	0.597	-0.659	1.154	10.646
Jubilee	F	12	-0.064	0.058	0.013	0.038	-0.660	0.637	-0.120	1.232	2.852
SNGroup	C	15	-0.352	0.178	0.012	0.149	-1.169	0.580	1.013	1.121	12.146
ICDC	F	15	-0.073	0.064	0.007	0.037	-0.470	0.580	0.122	1.121	5.397
ARM	A	8	-0.149	0.118	0.001	0.097	-0.392	0.752	-1.520	1.481	127.980
Unga	I	15	-0.149	0.088	-0.021	0.071	-0.208	0.580	-0.309	1.121	-3.408
TPS	C	7	-0.072	0.008	-0.023	0.027	-1.069	0.794	0.451	1.587	-1.199
Knmill	I	12	-0.133	0.082	-0.038	0.074	0.597	0.637	-0.829	1.232	-1.921
KPLC	I	15	-0.247	0.042	-0.040	0.067	-2.237	0.580	6.652	1.121	-1.651
Express	C	15	-0.259	0.097	-0.094	0.108	-0.026	0.580	-0.978	1.121	-1.152

Working Capital to Total Assets Ratio 1989 to 2003
(Ranked on the basis of Coefficient of Variation around Mean)

Comp	Sect	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	Std. Error	Kurtosis	Std. Error	CoeV

ARM	A	8	-0.149	0.118	0.001	0.097	-0.392	0.752	-1.520	1.481	127.980
SNGroup	C	15	-0.352	0.178	0.012	0.149	-1.169	0.580	1.013	1.121	12.146
Marsh	C	14	-0.177	0.337	0.016	0.168	0.556	0.597	-0.659	1.154	10.646
ICDC	F	15	-0.073	0.064	0.007	0.037	-0.470	0.580	0.122	1.121	5.397
Uchumi	C	12	-0.407	0.388	0.060	0.254	-0.777	0.637	-0.506	1.232	4.243
Jubilee	F	12	-0.064	0.058	0.013	0.038	-0.660	0.637	-0.120	1.232	2.852
CarGen	C	15	-0.106	0.159	0.032	0.077	-0.173	0.580	-1.000	1.121	2.400
Kakuzi	A	15	-0.104	0.250	0.056	0.103	0.098	0.580	-0.765	1.121	1.840
EABL	I	14	-0.061	0.213	0.047	0.085	0.619	0.597	-0.411	1.154	1.820
Bbond	A	15	-0.048	0.137	0.029	0.052	0.640	0.580	-0.136	1.121	1.799
Rea	A	9	-0.065	0.098	0.032	0.052	-0.816	0.717	0.063	1.400	1.632
Lonhro	C	10	-0.090	0.295	0.101	0.119	0.164	0.687	-0.650	1.334	1.179
Kenol	I	15	-0.105	0.309	0.124	0.143	-0.355	0.580	-1.312	1.121	1.151
NBK	F	15	-0.010	0.149	0.051	0.052	0.618	0.580	-1.122	1.121	1.012
KenAir	C	10	-0.050	0.200	0.085	0.083	-0.589	0.687	-0.385	1.334	0.971
Total	I	15	-0.023	0.181	0.058	0.051	0.904	0.580	1.365	1.121	0.874
EAPort	I	14	0.001	0.437	0.162	0.133	0.774	0.597	-0.424	1.154	0.821
Limuru	A	15	-0.010	0.489	0.212	0.172	0.064	0.580	-1.351	1.121	0.812
GWK	A	14	-0.011	0.118	0.055	0.044	0.075	0.597	-1.123	1.154	0.805
CityTr	F	14	0.027	0.877	0.360	0.286	0.783	0.597	-0.678	1.154	0.794
KCB	F	15	-0.004	0.100	0.046	0.036	0.118	0.580	-1.582	1.121	0.779
DTB	F	15	0.018	0.171	0.071	0.048	0.832	0.580	-0.465	1.121	0.684
BAT	I	15	-0.004	0.264	0.120	0.079	-0.194	0.580	-0.759	1.121	0.664
EAPack	I	12	-0.022	0.265	0.138	0.090	-0.542	0.637	-0.257	1.232	0.654
HFCK	F	15	0.007	0.095	0.042	0.027	0.763	0.580	-0.420	1.121	0.634
NMG	C	15	-0.060	0.216	0.118	0.074	-1.068	0.580	0.883	1.121	0.627
Sasini	A	15	0.074	0.352	0.175	0.106	-0.628	0.580	-1.383	1.121	0.608
NIC	F	15	0.022	0.235	0.133	0.074	0.125	0.580	-1.657	1.121	0.558
BBK	F	15	0.007	0.122	0.060	0.033	0.222	0.580	-0.811	1.121	0.555
CARB	I	14	0.066	0.498	0.280	0.150	0.208	0.597	-1.395	1.154	0.536
Bambu	I	15	0.056	0.279	0.138	0.066	0.600	0.580	-0.318	1.121	0.478
Dunlop	I	15	-0.012	0.562	0.352	0.150	-0.855	0.580	1.192	1.121	0.427
SCHB	F	15	0.022	0.089	0.044	0.019	1.043	0.580	0.717	1.121	0.420
Kapcho	A	15	0.029	0.193	0.132	0.052	-0.968	0.580	-0.242	1.121	0.397
Cberg	I	13	0.010	0.369	0.231	0.088	-1.094	0.616	2.556	1.191	0.382
BOC	I	15	0.104	0.370	0.247	0.094	-0.102	0.580	-1.600	1.121	0.382
Bauman	C	12	0.121	0.316	0.213	0.064	-0.062	0.637	-1.168	1.232	0.301
CMC	C	15	0.122	0.280	0.208	0.043	-0.431	0.580	0.225	1.121	0.206
Eagads	A	15	0.153	0.292	0.223	0.039	-0.031	0.580	-0.638	1.121	0.173

Fires	I	11	0.262	0.383	0.336	0.043	-0.727	0.661	-1.066	1.279	0.129
EACAB	I	15	0.422	0.635	0.542	0.064	-0.326	0.580	-0.597	1.121	0.119
CFC	F	15	0.651	0.897	0.807	0.086	-0.709	0.580	-0.905	1.121	0.107
Express	C	15	-0.259	0.097	-0.094	0.108	-0.026	0.580	-0.978	1.121	-1.152
TPS	C	7	-0.072	0.008	-0.023	0.027	-1.069	0.794	0.451	1.587	-1.199
KPLC	I	15	-0.247	0.042	-0.040	0.067	-2.237	0.580	6.652	1.121	-1.651
Knmill	I	12	-0.133	0.082	-0.038	0.074	0.597	0.637	-0.829	1.232	-1.921
Unga	I	15	-0.149	0.088	-0.021	0.071	-0.208	0.580	-0.309	1.121	-3.408

Working Capital to Total Assets Ratio 1989 to 2003
(Ranked on the basis of Sector and Mean)

Comp	Sect	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	Std. Error	Kurtosis	Std. Error	CoeV
Eagads	A	15	0.153	0.292	0.223	0.039	-0.031	0.580	-0.638	1.121	0.173
Limuru	A	15	-0.010	0.489	0.212	0.172	0.064	0.580	-1.351	1.121	0.812
Sasini	A	15	0.074	0.352	0.175	0.106	0.628	0.580	-1.383	1.121	0.608
Kapcho	A	15	0.029	0.193	0.132	0.052	-0.968	0.580	-0.242	1.121	0.397
Kakuzi	A	15	-0.104	0.250	0.056	0.103	0.098	0.580	-0.765	1.121	1.840
GWK	A	14	-0.011	0.118	0.055	0.044	0.075	0.597	-1.123	1.154	0.805
Rea	A	9	-0.065	0.098	0.032	0.052	-0.816	0.717	0.063	1.400	1.632
Bbond	A	15	-0.048	0.137	0.029	0.052	0.640	0.580	-0.136	1.121	1.799
ARM	A	8	-0.149	0.118	0.001	0.097	-0.392	0.752	-1.520	1.481	127.980
Bauman	C	12	0.121	0.316	0.213	0.064	-0.062	0.637	-1.168	1.232	0.301
CMC	C	15	0.122	0.280	0.208	0.043	-0.431	0.580	0.225	1.121	0.206
NMG	C	15	-0.060	0.216	0.118	0.074	-1.068	0.580	0.883	1.121	0.627
Lonhro	C	10	-0.090	0.295	0.101	0.119	0.164	0.687	-0.650	1.334	1.179
KenAir	C	10	-0.050	0.200	0.085	0.083	-0.589	0.687	-0.385	1.334	0.971
Uchumi	C	12	-0.407	0.388	0.060	0.254	-0.777	0.637	-0.506	1.232	4.243
CarGen	C	15	-0.106	0.159	0.032	0.077	-0.173	0.580	-1.000	1.121	2.400
Marsh	C	14	-0.177	0.337	0.016	0.168	0.556	0.597	-0.659	1.154	10.646
SNGroup	C	15	-0.352	0.178	0.012	0.149	-1.169	0.580	1.013	1.121	12.146
TPS	C	7	-0.072	0.008	-0.023	0.027	-1.069	0.794	0.451	1.587	-1.199
Express	C	15	-0.259	0.097	-0.094	0.108	-0.026	0.580	-0.978	1.121	-1.152
CFC	F	15	0.651	0.897	0.807	0.086	-0.709	0.580	-0.905	1.121	0.107
CityTr	F	14	0.027	0.877	0.360	0.286	0.783	0.597	-0.678	1.154	0.794
NIC	F	15	0.022	0.235	0.133	0.074	0.125	0.580	-1.657	1.121	0.558

DTB	*F*	15	0.018	0.171	0.071	0.048	0.832	0.580	-0.465	1.121	0.684
BBK	F	15	0.007	0.122	0.060	0.033	0.222	0.580	-0.811	1.121	0.555
NBK	F	15	-0.010	0.149	0.051	0.052	0.618	0.580	-1.122	1.121	1.012
KCB	F	15	-0.004	0.100	0.046	0.036	0.118	0.580	-1.582	1.121	0.779
SCHB	F	15	0.022	0.089	0.044	0.019	1.043	0.580	0.717	1.121	0.420
HFCK	F	15	0.007	0.095	0.042	0.027	0.763	0.580	-0.420	1.121	0.634
Jubilee	F	12	-0.064	0.058	0.013	0.038	-0.660	0.637	-0.120	1.232	2.852
ICDC	F	15	-0.073	0.064	0.007	0.037	-0.470	0.580	0.122	1.121	5.397
EACAB	I	15	0.422	0.635	0.542	0.064	-0.326	0.580	-0.597	1.121	0.119
Dunlop	I	15	-0.012	0.562	0.352	0.150	-0.855	0.580	1.192	1.121	0.427
Fires	I	11	0.262	0.383	0.336	0.043	-0.727	0.661	-1.066	1.279	0.129
CARB	I	14	0.066	0.498	0.280	0.150	0.208	0.597	-1.395	1.154	0.536
BOC	I	15	0.104	0.370	0.247	0.094	-0.102	0.580	-1.600	1.121	0.382
Cberg	I	13	0.010	0.369	0.231	0.088	-1.094	0.616	2.556	1.191	0.382
EAPort	I	14	0.001	0.437	0.162	0.133	0.774	0.597	-0.424	1.154	0.821
Bambu	I	15	0.056	0.279	0.138	0.066	0.600	0.580	-0.318	1.121	0.478
EAPack	I	12	-0.022	0.265	0.138	0.090	-0.542	0.637	-0.257	1.232	0.654
Kenol	I	15	-0.105	0.309	0.124	0.143	-0.355	0.580	-1.312	1.121	1.151
BAT	I	15	-0.004	0.264	0.120	0.079	-0.194	0.580	-0.759	1.121	0.664
Total	I	15	-0.023	0.181	0.058	0.051	0.904	0.580	1.365	1.121	0.874
EABL	I	14	-0.061	0.213	0.047	0.085	0.619	0.597	-0.411	1.154	1.820
Unga	I	15	-0.149	0.088	-0.021	0.071	-0.208	0.580	-0.309	1.121	-3.408
Knmill	I	12	-0.133	0.082	-0.038	0.074	0.597	0.637	-0.829	1.232	-1.921
KPLC	I	15	-0.247	0.042	-0.040	0.067	-2.237	0.580	6.652	1.121	-1.651

Appendix 3

Correlations: Wages, GDPcmp, GDPcon, GDPg, LR, Infla

	Wages	GDPcmp	GDPcon	GDPg	LR
GDPcmp	0.508 0.053				
GDPcon	0.603 0.017	-0.356 0.193			
GDPg	-0.267 0.336	-0.413 0.126	0.117 0.678		
LR	-0.381 0.161	0.174 0.536	-0.430 0.110	0.115 0.683	
Infla	-0.542 0.037	-0.527 0.043	-0.111 0.693	-0.233 0.404	0.286 0.302

Cell Contents: Pearson correlation
P-Value

Correlations: Market, Wages, GDPcmp, GDPcon, GDPg, LR, Infla

	Market	Wages	GDPcmp	GDPcon	GDPg	LR
Wages	-0.291 0.292					
GDPcmp	-0.062 0.827	0.508 0.053				
GDPcon	-0.141 0.617	0.603 0.017	-0.356 0.193			
GDPg	0.149 0.596	-0.267 0.336	-0.413 0.126	0.117 0.678		
LR	0.866 0.000	-0.381 0.161	0.174 0.536	-0.430 0.110	0.115 0.683	
Infla	0.364 0.182	-0.542 0.037	-0.527 0.043	-0.111 0.693	-0.233 0.404	0.286 0.302

Cell Contents: Pearson correlation
P-Value