AN EVALUATION OF THE RELATIONSHIP BETWEEN TAX CASH FLOWS AND THE KEY FACTORS DETERMINING THE QUANTUM OF INDIRECT TAXES IN THE OIL INDUSTRY:

A CASE STUDY OF MOBIL OIL KENYA LTD:

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A Management Research Project in Partial Fulfillment of the requirements for the award of the Master of Business and Administration Degree, Faculty of Commerce, University of Nairobi.

YEAR 2001

DECLARATION:

This research project is my original work and has not been presented for the award of a degree in any other university.

Signed .....Date 22nd November 2001

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

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ACKNOWLEDGEMENT:

The completion of this research paper would not have been a success without the invaluable contribution of other people. I wish to express my sincere gratitude to all the people that have contributed to the completion of this paper.

I would particularly wish to thank my supervisor Mr. Aduda for his guidance, patience and support throughout the entire research process.

I would also wish to express my thanks to my family for their moral and financial support throughout the course.

Finally, the support of my colleagues at work at both Mobil Oil Kenya Ltd and Kencell Communications Ltd can not go unmentioned and I wish all of them success in their various endeavours.

ABSTRACT:

One of the major factors facing the oil industry in Kenya is the high level of taxation of petroleum products, a factor that impacts significantly on the cash flows of the oil marketing companies. The potential impact is for taxes to increase the risk exposure (cash flow variability) of these companies. This study therefore endeavoured to establish whether there is a significant relationship between the variability of an oil companies tax related cash flows and changes in the three major factors that influence the quantum of indirect taxes payable; rates of taxes, the Kenya Shilling – US Dollar exchange rate and fuel prices.

The research methodology was based on the case study design and focused on the operations of Mobil Oil Kenya Ltd. Data was collected from both external and internal sources and the principal technique of analysis, multiple regression analysis, applied. This involved regressing the changes in the net present values of the projected cash flows of the various indirect taxes against changes in the values of tax rates, the Shilling- US Dollar exchange rate and fuel prices.

The major findings were that exchange rate movements and fuel price volatility significantly influenced the variability of VAT cash flows. Fuel price changes also impacted heavily on the risk exposure to value based import duty. Additionally, it was found that the effect of tax rates changes on the company's cash flows depended on the product on which it was imposed, with changes in the rates of indirect taxes of some products being critical in the management of risk exposure.

1.0 INTRODUCTION :

1.1 BACKGROUND TO THE STUDY:

Working capital management is one of the most important activities in corporate financial management. Weston and Copeland (1995) citing surveys carried out in the US state that the largest portion of financial manager's time is allocated to working capital management, which includes all the activities involved in administering the current assets and liabilities of an entity. In addition, current assets usually constitute a significant portion of the total assets of a business firm, particularly for firms engaged in merchandising or manufacturing.

The principal aspects of working capital management can be dichotomized as, first deciding on the quantum of financial resources to invest in current assets and secondly, deciding on the type of financing (short or long term) required to meet this investment. It therefore spans both financing and trading cycle activities.

According to Ross and Westerfield (1988), working capital decision-making is tied to cash flow analysis, the relevant cash flows being short-term (covering periods less than one year) in contrast to long term finance considerations, which cover periods over a year. Short-term finance decisions are therefore related to the cash flows associated with the operating activities of an entity, chiefly those associated with inventory and credit control and cash management as well as the manner in which these are financed.

One of the industries in Kenya with a significant portion of its resources invested in current assets is the oil industry, particularly the major multinational companies that import and market petroleum products. Firms that operate in this sector invest large amounts of capital in stock, which are then sold to customers, usually on credit terms.

In addition to the sheer scale of operations, another factor that complicates working capital decision- making is taxation. Together with the brewing and tobacco industries, the petroleum sector is among the most important channels for the collection of Government Revenue. In addition to paying Corporation Tax on their earnings, oil marketers collect and remit a number of indirect taxes which include VAT, duties, levies and other fees to the Kenya Revenue Authority.

The centrality of taxation in corporate financial decision making in these industries (particularly as it affects working capital decision making) cannot be overemphasized; an analysis of the Annual Report and Accounts of four listed companies (1995-1999); -Total Kenya Ltd, Kenya Oil Company Ltd, East Africa Breweries and British American Tobacco shows that the total indirect taxes accruing in each year of operations amount to between twenty and sixty percent of the total turnover and can be as high as KSH 12.5 Billion per company in a year .

This position is illustrated in the table below.

INDIRECT TAXES AS A PERCENTAGE OF TURNOVER :

COMPANY	1995	1996	1997	1998	1999
TOTAL	26%	20%	28%	30%	29%
KENOL	33%	33%	30%	40%	45%
BAT	58%	55%	51%	51%	52%
EABL	54%	54%	53%	50%	49%

**** *In absolute terms these indirect taxes are high and ranged from KSH. 1.8 Billion (Kenol) to KSH 12.4 Billion (EABL) in 1999 .*

(Source: Annual Report & Accounts (1995-1999) for the respective companies.)

Given that an indirect tax is first paid to the State before recovery from customers, indirect taxes are usually translated into the corporate balance sheet as working capital at one stage in the settlement / recovery cycle. This implies that where the indirect taxes form fifty percent of turnover, then approximately the same proportion of working capital movements, investments or financing can be attributed to taxation since there is a strong correlation between working capital and turnover.

With pressure on corporate executives to optimize resource use, finance managers require information on how to manage risks associated with indirect taxes both from a controlling (trading cycle) and treasury (financing cycle) perspective.

1.2: COSTS AND RISKS ASSOCIATED WITH INDIRECT TAXES :

According to Jorion and Khoury (1996), risk is the volatility of unexpected outcomes. It is the variation of actual outcomes from expected outcomes. The key risks in business management are business risks and financial risks. Business risks are risks pertaining to a product market in which a firm operates and arises due to innovation, technological changes or changes in marketing factors among others. The management of this type of risk is called industrial risk management.

Financial Risks on the other hand are risks which arise due to unexpected movements in financial variables, the existence and magnitude of these risks being dependent on the composition of assets and liabilities of a firm.

Indirect taxes contribute to corporate risk management as follows;

- **Commodity Price Risk :**

Commodity price risk is defined by Claessens and Duncan (1993) as being the variability in cash flows which arises as a result of fluctuations in product prices. The quantum of indirect taxes payable by an oil company is affected by movements in commodity prices since changes in the dollar value for the same quantity of fuel products results in higher taxes where the tax base is the monetary value of goods.

Fuel products have shown high volatility. The price of crude oil for instance has risen from 10 US Dollars in February 1999 to 34 US Dollars in September 2000 **(Source: Platts Oilgram Price Report).**

This feature is pervasive and is driven mainly by supply disturbances influenced by Organisation of Petroleum Exporting Countries (OPEC) quotas and the pervasive Middle East political crises.

While commodity price exposure leads to variability of tax payments /cash outflows, it is recognized that forecasting commodity price movements is difficult because of the mainly stochastic process of the fuel price series and while stochastic forecasts can be made, they may not be accurate. Claessens and Duncan(1993) , citing a World Bank study on commodity price forecasts ,note that the standard deviation of actual prices from forecast prices was about twenty five percent implying that commodity price fluctuations adversely affect enterprises as it results in unanticipated cash flows. Indirect taxes are therefore, in theory, a magnifying factor in commodity price risk.

- **Funding Risk :**

Funding Risk is the risk that the sum of cash and cash equivalents held by a company fail to cover cash outflow requirements. Tax payments however are stochastic, varying with a number of variables like changes in tax rates hence payments may differ significantly. On the other hand, a firm that over states tax payment outflows may enter into excessive money market commitments hence incur unnecessary interest costs. Additionally, the Customs and Excise Act (CAP 472), requires all persons in Kenya holding goods under bond (uncustomed goods) to execute guarantees with commercial banks to cover for any potential losses in Government revenue. This provision means firms are exposed to contingent liabilities, which may mature unexpectedly, for instance, when fuel consigned for export is diverted into the local market by unscrupulous customers. Since the Government would require immediate settlement of the guaranteed taxes, sudden cash outflow requirements may adversely affect a firm's operations. The

funding risk exposure of the company would therefore be the total amount of taxes guaranteed by an oil company at a given time.

- **Foreign Exchange Risk:**

Exchange rate risk is the exposure of a firm to movements in exchange rates. This exposure is amplified through indirect taxation since some taxes (VAT and Import Duty) are charged on *ad valorem* basis (that is on monetary value as opposed to quantity of the fuels) based on the dollar value of imported goods converted to Kenya shillings at a weekly rate provided by the Kenya Revenue Authority. This implies changes in the exchange rate affects the amount of indirect taxes paid and this increases the economic exposure of the firm, which is defined by Kallberg and Parkinson (1993) as the change in the present value of a firms cash flows due to adverse currency movements.

However, treasury managers have no empirical basis of quantifying the impact of exchange rates on the present value of the corporate cash flow stream, to the extent that these are attributable to indirect taxes.

- **Regulatory Risk:**

Every annual Finance Bill or Kenya subsidiary legislation makes changes on the rates of duties or other indirect taxes imposed on petroleum products. Treasury managers therefore need an objective way of predicting how changes in indirect tax rates influence the financing requirements of their firms due to variability in the amounts of future tax payments.

Additionally, regulatory changes increase basis risk, which is the variability of cash flows due to changes in the base (tax base) of the forecast. For example the Finance Bill for 1998 shows various changes in the tax base of products for instance change from quantity to value basis.

- **Internal Price Adjustment Risk:**

External variables affect pricing of oil products. Myers and Thompson (1993) in a study of a Costa Rican oil company called RECOPE, noted that lags between adjustment of domestic oil prices to international prices exposes firms to internal price risk which is the risk of selling products at a certain price when the fundamentals justifying that particular price have changed adversely. Taxes form a large portion of petroleum product prices (up to forty five percent), thus where an oil company enters into a fixed price contract with a buyer and there is an upward change in the tax rates the selling firm incurs unanticipated losses.

- **Reduced Demand:**

Fuel adulteration (mixing of high value fuels like Premium and Regular with lower value products like Kerosene) is chiefly driven by the fact that Kerosene has a very low tax component (KSh 6) as compared to Premium (KSh 23) and Regular (KSh 22). Without this indirect tax differential, it can be argued that the incentive for adulteration would be reduced or eliminated altogether. Therefore reduced demand due to this factor lowers sales volumes and net cash inflows. It also generates a need to incur significant surveillance costs to monitor illegal activities usually through product testing and marking.

It can therefore be argued that indirect taxes influence industrial and financial risk management within the oil firms. Crude oil prices, which invariably affects the quantum of tax payable is a product related variable that contributes to business risk. Financial risk is increased by an important variable the exchange rate (principally, the rate between the Kenya Shilling and the US Dollar since most fuel imports are denominated in US Dollars) and this occurs since the level of indirect tax liabilities/payments that are based

on the monetary value of fuel products are sensitive to the Kenya Shilling-US Dollar rate. The third major variable is the rate of taxes imposed by the Government. This determines the degree of funding risk or internal price adjustment risks. Additionally it determines the extent to which firms are exposed to losses due to fuel adulteration and in a zero tax regime the scale of this activity (adulteration) is likely to be minimized. The rate of taxes therefore poses a challenge to business risk management in the oil industry.

These variables increase risk principally because they lead to variability in corporate cash flows.

1.3 STATEMENT OF THE PROBLEM :

The fact that fuel prices, exchange rates and tax rates determine the quantum of indirect taxes payable implies that there is a relationship between changes in the values of these variables and the risk exposure (cash flow variability) faced by the oil firms.

Masuoka (1993), in a published paper on financial and commodity price risk management notes that it is useful to extract historical or future relationships between net cash flows and external risk factors in order to prove plausibility and predict influences of future movements of these variables on an entity's risk exposure. The central issue arising, therefore, is whether there is a plausible relationship between the cash flow variability of oil firms and the changes in the values of tax rates, exchange rates and oil prices

Thus the key research question in this study is 'is there a significant relationship between the changes in the values of tax rates, exchange rates and oil prices and the variability in the cash flow stream associated with each of the indirect taxes imposed on petroleum companies?'

1.4 OBJECTIVES OF THE STUDY:

The study aims at:

1. Identifying an appropriate measure of risk exposure to indirect taxes faced by an oil company and developing a model that would measure the relationship between cash flow variability and the values of the underlying variables (exchange rates, fuel prices and tax rates) for each tax type.
2. Testing the significance of the empirical relationship developed between the measure of risk exposure and changes in the values of the underlying variables and, on this basis, make recommendations on the appropriate corporate or industry strategies to directly or indirectly manage these exposures.

1.5 STATEMENT OF THE HYPOTHESIS :

The research hypothesis (H_1) stated is '**the variability of the cash flow stream of indirect taxes in an oil company is significantly influenced by changes in the values of exchange rates, tax rates and fuel prices'.**

The null hypothesis (H_0) stated is '**there is no relationship between the variability of the cash flow stream of indirect taxes in an oil company and changes in the values of exchange rates, tax rates and fuel prices'.**

1.6 IMPORTANCE OF THE STUDY:

The study would be useful to the following groups of people;

(1) Treasury Managers:

The study will assist treasury managers forecast future financing requirements for taxes hence improve cash flow management by providing information on the key variables influencing cash outflows / inflows related to these taxes.

(2) Tax advisers and Financial Consultants:

The study will assist tax advisers/financial consultants better understand the implications of taxes on the financial performance or position of oil companies. This would be useful for example in the appraisal of merger / acquisition transactions which have been common in the industry for example the acquisition of Mid-Oil Africa by Kobil, of Elf by Total and Agip by Shell and BP.

(3) Business Analysts:

The study will enable managers in the industry to better appraise the risk of major projects. This is because taxes form an important part in the formulation of pricing structures for fuel supply contracts.With the liberalization of the energy sector, new markets have emerged especially the Independent Power Producers like Tsavo Power , Iberafrica , Westmont and Aggreko which use high volumes of light or heavy diesel or kerosene to provide their output. Tendering for such multimillion contracts is risky because of lower margins (due to large volumes and competition) hence a clear understanding of how to manage the risk associated with indirect taxes will assist in such contract / tender evaluation exercises.

(4) Lobby Groups:

Lobby groups like the Petroleum Institute of East Africa or the Independent Petroleum Dealers Association will find the study useful in their assessment of the current or future tax structures and enable them to lobby against the legislative framework or offer training to their members in an informed manner.

(5) Regulatory Agencies:

Regulators like the Ministry of Energy and the Kenya Revenue Authority will obtain informed insights on the impact of the indirect tax regime on the oil industry and how this industry is further affected by the combination of macroeconomic factors with taxes.

(6) Marketing Managers:

The study will identify the products that contribute to the highest risk exposure to taxes.This is useful given the functionalisation of oil companies into product lines. For example Mobil is functionalised into Lubricant and Fuels businesses, while Total Oil aggressively markets cooking gas in comparison to Kenol-Kobil whch does not trade in the product at all. An evaluation of tax risks would therefore help oil company executives in product line decision-making.

2.0 LITERATURE REVIEW

2.1 THE TAX REGIME FOR OIL COMPANIES:

The oil industry collects and remits various indirect taxes that are imposed and regulated by different pieces of legislation.

The Customs and Excise Act (CAP 472) imposes Import and Excise duties and Suspended Duty. Import duty is a trade tax and is charged on all fuel and chemical products while Excise duty is a production tax and is charged on Premium, Regular and Diesel fuels and a number of chemicals. Suspended duty is a restrictive tax and is charged on the importation of *refined* petroleum products.

The Road Maintenance Levy Act (CAP 477) imposes Road Levy which is charged at a flat rate on Premium, Super and Diesel oils. This tax raises the finances that are used to fund developement projects undertaken by the Kenya Roads Board.

VAT is a broad based consumption tax and is charged on all fuels and chemicals not subject to Excise duty (except Kerosene which attracts only Import Duty and Petroleum Levy).

The final tax is Petroleum Development Levy, which is a nominal tax levied on all fuel products at various rates averaging about twelve cents a litre.

The above taxes are paid at various points in the goods movement process, as prescribed by the Customs and Excise (CAP 472) and Road Maintenance Levy (CAP 477) Acts. The manner of these payments effectively affects working capital management. From the various Acts, these payment methods can be summarised into four major types ,

- **The Tax Ledger System;**

In this method, an oil company opens an accounts for three tax types; Import, Excise and VAT at each customs bonded installation to which it makes periodic deposits. It then clears goods from the installation for home use or export which are recorded on customs entry Documents (the C63 form).

Every ten days (called Decade), an account is taken and the value of taxes consumed is debited to the appropriate account against credits (deposits) the oil marketer may have made. Surpluses are carried forward (never refunded) while deficits attract a three percent penalty. The implication is that treasury forecasts must be accurate to minimise surpluses while avoiding deficits.

- **The Credit System:**

In this method, taxes accruing in one decade are settled by the tenth day of the next decade. It applies to Road Maintenance Levy. This means the amount of tax accruing within the first ten days of a month are payable by the twentieth day, while that accruing between the eleventh and twentieth day are payable by the thirtieth day.

- **Refundable Deposit System:**

Suspended duty imposed on the import of refined product is payable on a refundable basis where an oil company is reimbursed by the Customs and Excise Department on providing proof of export (on importation of certain fuel products taxes would have been paid but these are recoverable from the Customs Department on subsequent re-exportation).

- **The Bond System:**

Oil companies have to provide guarantees to cover for potential loss of Government revenue arising from non-payment of taxes. Consequently they are required to execute bond guarantee covering taxes payable on all warehoused goods or goods in transit. On the event of Bond-in-Force violations like dumping of export goods, the companies have to pay all requisite taxes. The concomitant risk is that of paying a large amount of taxes at once resulting in funding risk as previously discussed.

In all the methods above, the oil companies pay the taxes in advance before recovering the same (by including in the pricing) from customers.This means they incur a cost, in present value terms, given the time value of money.

2.2 TAXATION AS A STRATEGIC FACTOR :

Governments rely on petroleum taxes to raise revenues to finance the fiscal budget. Ebrill et al (1999) and Shome (1995) in their respective IMF publications advocate policy directions to levy revenue-raising taxes (Customs and Excise taxes) primarily on petroleum, alcohol and tobacco products, a policy that appears enforced in a majority of countries.

In Kenya, all products marketed by oil companies are subject to at least one type of tax. For a country with fiscal imbalances, petroleum taxes are therefore a useful source of revenue.

For the oil company, taxes can be viewed (in the context of policy directions summarized by Ebrill and Shome) as a long-term consideration since an easement of these taxes can only be made where the Government has an alternative source of revenue.

2.3 FINANCIAL MODELLING:

Bryant J. (1982) defines financial modeling as an activity developed to help confront uncertainty by giving a better understanding of the financial aspects of the choices which are faced and to enable more effective planning for systems and organizations.

Basically, a financial model aids and informs managerial decision making, by permitting the detailed testing of choices and policies prior to any actual decision-making. It not only enhances manager's judgement concerning the decision at hand but also develops generalisable insights about organizations and systems for which planning is carried out.

The foundation of modeling according to this author is the representation of the relationships among financial variables, and between these variables and other measures of corporate activities. These relationships must be defined quite independently of the actual numbers involved.

A financial model has two elements; microstructure and macro-structure. Model microstructure depictions would show relationships between financial variables. These may be simple relationships (inverse, constant term, time shift, summation, change or discounting relationships) or logical (providing limits or defining conditions) or recursive relations (requiring simultaneous evaluation of variables).

In this study the model microstructure would principally be based on simple relationships. These are for computing the discounted amount of taxes.

Model macrostructure focuses on ensuring the entire system functions efficiently. This is achieved by dividing the whole model into self-contained elements.

A key principle in financial model development according to Bryant J. (1991) is that 'real world imperfections must be numbered among the basic postulates in any model worthy of attention'. This means that models should not simply be modifications to neoclassical theories in finance but be pragmatic to specific situations.

2.4 THE AGENCY THEORY :

Jensen and Meckling (1976) define an agency relationship as 'a contract under which one or more persons (the principals) engage another person (the agent) to perform some service on their behalf which involves some decision – making authority to the agent'.

The agency theory is a concept that seeks to explain relative behaviour of value maximizing principals and agents. This theory argues that neither the principal nor agent at zero cost will ensure that the agent makes optimal decisions/ actions in relation to the principal's interest. It implies that positive monitoring and bonding costs will be incurred by both parties. More importantly it implies that the variation between the agents decision and decisions maximizing the welfare of the principal leads to a monetary cost (residual loss).

The firm is viewed as consisting of various contractual relationships that reflect the pure agency relationship. These are evident between suppliers, customers, creditors and other parties. In consequence, the firm is seen as an artificial construct without an individual identity thereby disqualifying such references as 'corporate goals' or 'objectives'.

This theory is useful to the current study in various ways. The risks of indirect taxes collection potentially reduce the wealth of shareholders. This implies shareholders would expect their agents (managers) to take certain actions that would minimize the

residual loss/ maximize their wealth. They would expect managers to take action to prevent penalties on delinquent (overdue) taxes, failure to account for taxes properly, and to exploit fully all the tax planning opportunities. In addition value-maximizing behavior expected include ensuring shareholder wealth is not reduced through such activities as fuel dumping. By extension managers would be expected to manage other internal / external variables that may lower the present value of the firms cash flows.

It can therefore be deduced that information availed to managers on how to manage the negative consequence of tax payments can aid managerial actions to reduce shareholders residual loss. This is because the measure of shareholder wealth is the present value of entity cash flows but indirect tax cash flows potentially reduce the present value of corporate cash flows.

2.5 THE ASSET – LIABILITY MANAGEMENT THEORY:

Masuoka (1993) defines an asset as any factor that generates inflows of cash and a liability as any factor that results in out flow of cash. Asset-liability management is therefore defined as the management of the asset and liability structure in order to minimize adverse changes in future net cash flows arising from an entity's transactions.

Cope J.M. (1972) explains that indirect taxes have three effects on business; on the costs of operations, on finance and on the demand for products. The impact of finance is on delay between payment of tax and recovery in the sale price to ultimate customers. Given that indirect taxes involve an outflow of payments [after accruing liabilities) and inflow through recoveries, tax management in finance can be viewed in the asset liability context.

According to Masuoka (1993), the main purpose of asset- liability management is to incorporate risk explicitly in the planning process and to enable decision makers

control risk exposure. This is achieved by accurately quantifying a country or individual firms sensitivity to changes in the values of the relevant variables. At a micro-economic level, applications include quantifying the impact of interest rates, exchange rates and commodity prices on an entity's cash flows.

Asset –liability management requires the identification of an objective function, (normally a measure of an entity's performance) and the identification and measurement of the sensitivity of performance to unanticipated movements in prices. Appropriate strategies may then be implemented to manage the exposures.

The methods to measure the risk exposure, as proposed by Masuoka (1993), are

(a) The historical approach

(b) The projections approach

The historical method measures risk exposure as the amount of change in actual cash flows per unit change in the value of the risk factor. This relationship can de derived statistically through multivariate regression.

The projections approach is an advancement of the historical method and is dependent on forecasting cash flows based on estimates of prices and factor movements. The statistical measures of changes in cash flows with respect to variation in prices of risk factors then represent the exposures.

In this study the projections approach was adopted since the evaluation was of the present value of future indirect tax cash flows.

The key relevance of the asset liability management theory to this study is first, the emphasis on the identification of an objective function for an entity and, secondly, the useful guidelines for sensitivity evaluation. The objective, based on Jensen and

Meckling's Agency Theory would be the maximization of the present value of the firm's cash flows.

2.6 THE PRESENT VALUE CONCEPT:

Cope J.M. (1972) explains the impact of indirect taxes on entity finance. This arises because of the deferral period between tax outflows and tax recoveries. The cost of this to a firm would be the difference between the discounted future amount A_t and the present amount A_0 and it represents an opportunity cost of time. The discounted future amount would be equivalent to the discounted amount of tax recovered while the present amount would represent the nominal amount of tax paid at time zero.

This concept is consistent with the agency theory since it evaluates the impact of net cash flows on shareholder wealth, where the net present value of a cash flow stream represents the net gain or decline in shareholder wealth.

The Net Present value concept has been applied widely in finance particularly in Capital Budgeting decisions. It is also applicable to working capital decision making for instance credit policy evaluation.

An application closely related to the deferral situation in taxation would be one in credit policy evaluation. Sartoris and Hill (1981) developed a model that uses the NPV concept to provide a credit policy evaluation framework. This model computed the cost of credit as the deferral cost from the time of initial outflows (payments to suppliers) in the cash cycle to the time of cash collection from customers. Since indirect taxes effectively become collectibles from customers after payment the cost of deferral described by Cole can be similarly measured on a present value framework.

2.7 EMPIRICAL STUDIES:

Claessens and Coleman (1993) conducted a study in Papua New Guinea in which they applied a quantitative approach in extracting the relationships between the cash flows of the various Government Commercial Agencies and movements in macroeconomic variables.

The context of the study was in recognition of the impact of instability of commodity prices, exchange rates and interest rates on the country's macro economy, particularly on revenues and external debt management. The Government, private investors and Government agencies dealing in mining or agricultural commodities were all exposed to these movements.

The study aimed at developing hedging strategies to minimize the risk exposures facing each entity. A key part of the study entailed deriving empirical relationships between cash flows and commodity price risks.

The particular analyses germane to this study, were, the analysis of the relationship between tax revenues and commodity price changes. Two of these studies (one at a macro-level and the other at a micro-level) are discussed below.

(a) **The Macro Economic Study:**

The macro economic study derived statistical relationship between the sensitivity of Papua New Guinea's total tax revenues to variations in commodity prices.

This sensitivity was derived using the regression expression:

$$TR_t = \alpha + \beta Pt_1 + \gamma Pt_2 + \ldots\ldots\ldots\ldots \text{ERROR}$$

Where TR_t = Percentage change in tax revenues in period t

Pt_1 = Percentage change in relevant factor (gold / copper prices).

α = Intercept.

β and γ were sensitivities of tax to the various commodity price changes.

Using historical data (1976-88), the study founded the elasticity of tax revenues with respect to copper price at 0.25 (with a t – statistic of 3.3. and an R_2 of 0.56), while the elasticity with respect to gold prices was 0.18, but which was not statistically significant.

Although the study by Claessens and Coleman (1993) adopted the historical approach, the statistical tool used –regression- is useful for this research in so far as it provides the methodology for extracting relationships between the underlying variables and the risk exposure.

2. **The Micro Level Study:**

The Papua New Guinea Government, as a matter of policy, took a stake in all mining or agricultural projects and the taxes and dividends earned from this shareholding were paid into a single fund called the Mineral Resources Stabilization Fund (MRSF).

However the cash flows payable into the MRSF from these operations were exposed to commodity price, foreign exchange and interest rate (due to borrowings) on these projects.

Claessens and Coleman (1993) undertook a study to demonstrate the impact of future movements in the risk factors on the profitability and tax revenues of individual mining operations from the owners (Government and foreign investors) perspective.

They carried out sensitivity scenarios that showed the elasticity of the present value of cash remittances (dividends) to foreign investors and the present value of gross receipts (taxes and royalties) to the Mineral Resources Stabilization Fund over the forecast duration period of a project.

The analysis was achieved by regressing the present value of the dividend / tax revenue stream on gold prices. The estimated cash flows were then plotted against possible values of the Gold Price and a comparison of the sensitivity of tax receipts and dividends made. The study found the regressed value of the sensitivity of the NPV of tax receipts at 2 and that of dividend at 0.75 to commodity price changes, showing a higher sensitivity of tax cash flows to commodity price changes.

The above study can also be appraised using Masuoka's Asset Liability Management approach. First, this method adopted the projections approach since it used forecasts of future values of the risk variables (gold prices) to predict their impact on the NPV of taxes/dividends or royalties receivable. The measure of risk exposure was variability in the NPV of these revenues implying the adoption of the maximization of the NPV of cash flows as the key objective, which is consistent with the objectives of a firm (in this case the MRSF or foreign investors).This study appears most relevant to the study at hand because of the consistency in the underlying objectives of the entity and the emphasis on the evaluation of future values of risk variables on the NPV of cash flows . By applying the general approach adopted by the researchers in this study on indirect taxes, questions that can answered could include 'how would the NPV (to the extent attributable to indirect taxes) of an oil companies future net cash flows be influenced by a given change in the exchange rate or change in the cost of crude oil?'

This is achievable, using the projections method, by estimating future values of exchange rates or fuel prices.

2.8 THE APPLIED MODEL:

2.8.1 FRAMEWORK OF ANALYSIS:

The agency and asset liability management theories provide the foundational theories for this study by providing the guidelines and answers as to what the objectives of risk exposure would be -that is the maximization of the NPV of the firms cash flows.

When analysed further, however, another problem which McInnes and Carlton (1982) identified in the study of financial model building in eighteen American companies still exists; that is the difficulty of relating finance theory to the practical application of financial model building. In this study, this problem relates to the actual application of the aforementioned theories and approaches to the empirical modeling of the unique cash flow patterns of the various taxes to compute the risk exposure taking into account the need for pragmatism espoused by Bryant J (1981).

From a time value perspective, the fact that indirect taxes paid at a given time are only recovered in the future means that the oil companies face a loss in present value terms which can be called a deferral cost.

One of the models in working capital management that have applied the concept of the time value of money is the Sartoris – Hill credit policy model which evaluates the deferral cost from the initial point of movement of funds out of an entity to the time of recovery from customers (the cash flow time line).

The robustness of the model, according to Weston and Copeland (1995), is the fact that the model incorporates all the trading cycle activities within the cash flow time line and its focus is on cash flows rather than accounting measures. Further, the model integrates all aspects of working capital towards maximizing firm value.

The Sartoris – Hill Model can be expressed as;

NPV = PV of collections from customers - PV of payments to suppliers

$$NPV = \frac{PQ(1-b)}{(1+k)^t} - C_oQ_o$$

Where;

NPV =Net Present Value of a credit Policy Decision for one days operations

P = Price per Unit of Product

C = Cost per unit product

Q = Daily Sales

b = bad debt loss rate

t = Average recovery period (from Time of payment for goods to time of recovery from customers).

k = Daily Interest Rate

The expression $\left(\frac{PQ(1-b)}{1+k}\right)$ measures the present value of recoveries which amount to (PQ (1-b)) at the end of the cash flow time line while the expression CoQo is the amount of outflows at time zero.

Based on this model, it is therefore possible, with adaptations, to compute the cost of deferral between tax recoveries and tax payments since indirect taxes are payable at specific points in the operating cycle and recovered only when customers make settlements.

The specific adaptations to the S-H Model included remodeling the expressions to take into account the multi product situation in an oil firm since each product or product group has a unique tax profile. Secondly the Sartoris-Hill model was reconstructed to

include macro-economic variables (risk factors) since tax cash flows are a function of these variables. It was adapted to reflect the payments system applicable to each tax type.

Finally in place of evaluating the NPV of a single day operation, a one-year decision horizon was deemed appropriate with cash flows assumed to occur at month end. This time scale was judged to be appropriate because variables on a one-year horizon can be forecast more reasonably than daily rates. However variables greater than one year are difficult to forecast, for instance crude prices.

The NPV of the lag in tax recoveries was therefore be expressed as:

NPV = Discounted value of recovered tax - Discounted value of tax payments

[inflows] [outflows]

This can be compared to the Sartoris-Hill expression:

NPV = PV of collections from customers - Present Value of Payments to suppliers.

2.8.2 MODEL EQUATION:

The model equation was therefore expressed to evaluate the differentials in NPV between tax recoveries and payments.

Difference in present value of an amount of tax paid to the Government at a given date but recovered at a deferred date.

PV of Recoveries = PVIF of a deferred annuity stream where deferral
[Inflows] period is equal to indirect tax recovery period X
Nominal Amount of Tax.

PV of Payments = PVIF of an ordinary annuity stream x
[outflows] Nominal Tax Amount

Net cost = Differential between these annuity streams

= Nominal Tax Amount x [PVIDA – PVIFA]

Where PVIFA = Present value interest factor of an ordinary annuity

PVIFDA =PV interest factor of Deferred Annuity

(where deferral period = Indirect Tax Recovery Period)

$$NPV = \frac{At_m}{12} [PVIFDA - PVIFA)$$

where $\frac{At_m}{12}$ = Monthly Tax outflows.

This was simplified as follows:

$NPV = At_m (PVIFA) (PVIFd - I)$

Where d = Present Value Interest Factors of ordinary Annuity for the Deferral Period.

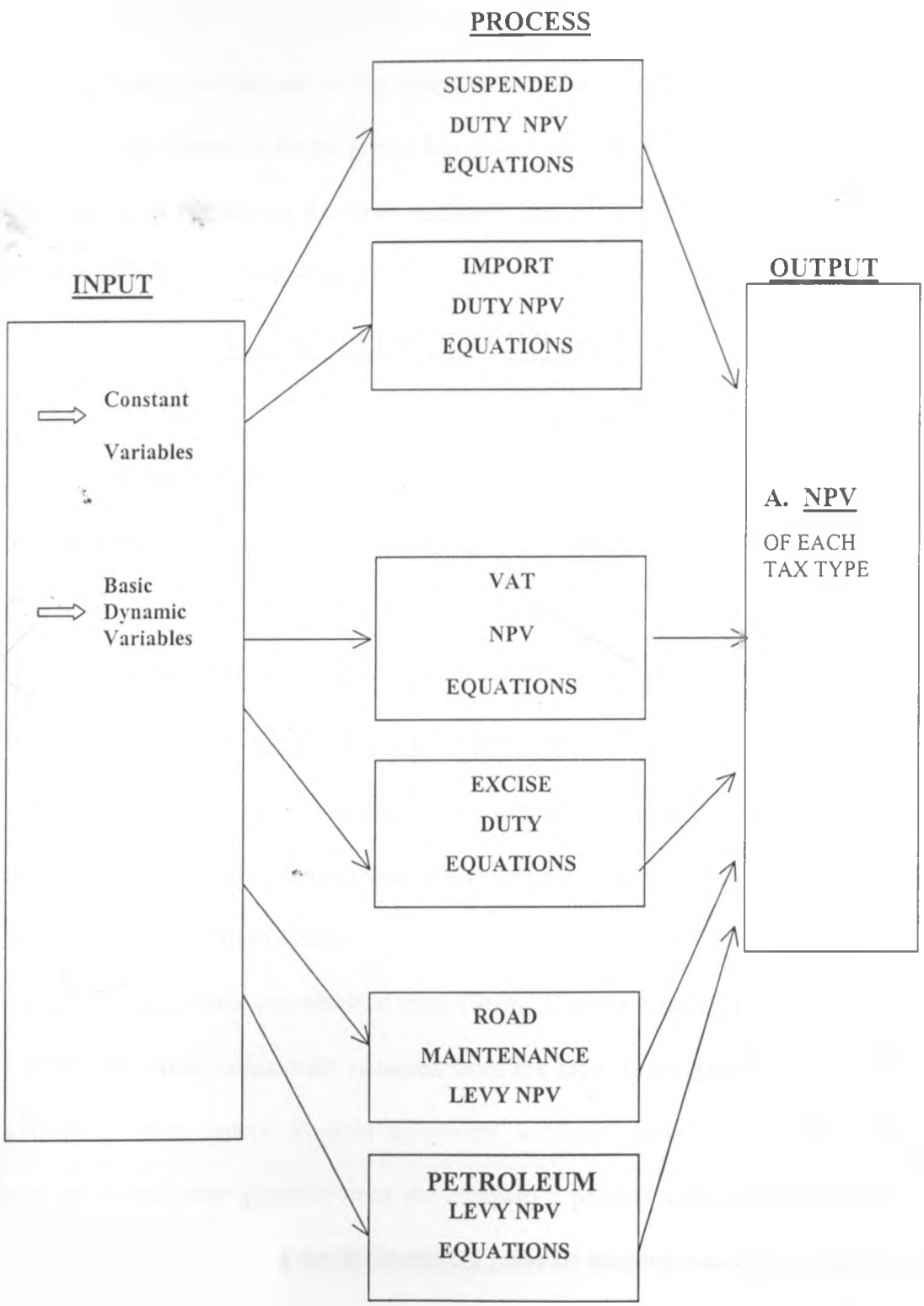
This NPV was therefore applied to each tax type. The variations incorporating external variables basically affect the amount of tax (A_T) while managerial variables would only be limited to influencing the tax recovery period.

For practical purposes, the following assumptions would be required;

1. Single year Forecast Period with cash flows occurring at month end.
2. Discount factor is the company's cost of capital.
3. Generation of Tax liabilities and the settlement/ Recovery of the same occurs uniformly throughout the year.
4. There are 360 days in a year.
5. The company's product mix is expected to be the same in the forecast year.

2.8.3 MODEL MACROSTRUCTURE:

This can be viewed in an Input-Process- Output form as follows:



3 RESEARCH METHODOLOGY:

3.1 POPULATION:

The population of interest in this study comprised all the oil marketing companies registered as large Taxpayers by the Kenya Revenue Authority. The list of the companies was obtained from the Kenya Revenue Authority and these companies include these include Mobil Oil, Kenya Shell, Caltex,Total, Agip.

3.2 SAMPLING TECHNIQUE:

Mobil Oil Kenya Ltd. was selected as the case study. The selection of the company was on the basis of easy accessibility of data to the researcher and also by the fact that the scale of operations of the company was representative of the other major operators since its market share is about fifteen percent of the total market (by volume) controlled by the six companies comprising the population of the study.

3.3 DATA COLLECTION:

Data collection focused on obtaining the variables for input into the model. The key constant variable, Cost of Capital was obtained from the parent companies discount rate for investments in Africa (20%).

Exchange Rate Data was obtained from Central Bank of Kenya forex mean rates. Fuel / Crude Oil Price values were obtained from the Dow Jones Energy Report and Platt's Oilgram Price report. Product movement volumes/quantities, on which tax payments are based, were obtained from the company's product volumes reports. Tax rates were based on the Finance Act 2000 and the previous Finance Acts and Subsidiary Legislation.

3.4 TECHNIQUES OF ANALYSIS:

Multiple Regression analysis was used to analyze the data. This was done by regressing the percentage changes in the present value of projected cash flows for each indirect tax type against percentage changes in the values of exchange rates, fuel prices and tax rates. This was performed in respect of VAT, Import and Excise Duties and Road Maintenance Levy.

The equation is expressed in general form as follows

$$\partial V_j = \propto + \beta\partial_x + \gamma\partial_f + \delta_1\partial T_1 + \ldots + \delta_i\partial T_i$$

Where $\propto$ = a constant

∂V_j = Change in the PV of cash flows of a given tax type

β = Coefficient for Exchange Rate

∂x = Percentage change in exchange rates

γ = Coefficient for crude oil prices

∂f = Percentage change in crude oil prices

∂_i = Coefficient for a given tax rate

∂T_i = Percentage change in tax rate for a given product

For each tax type, an expected present value, was first computed based on expected values of exchange rates and fuel prices and the actual tax rates at the time of the study (The expected values of exchange rates and fuel prices were forecast using simple regression based on past data). Ten simulations were then run for each tax type and the new figures for the PV regressed against the dynamic variables. The values of the dynamic variables were selected from a random table of percentage values.

The regression analysis was in two levels. In the first level the usefulness of the regression equations in predicting the assessed value of the dependent variable (PV of cash indirect tax cash flows) was tested using the F Statistic. According to Lapil L (1990), the F Statistic was useful in determining whether the established relationship among

independent variables and the dependent variable have occurred by chance. (There would only be a relationship if the observed F values were greater than the F critical values).

The second level of the analysis focused on evaluating whether the slope coefficient of each dynamic variable was useful in determining the assessed value of the present value of the indirect tax cash flow stream. This was achieved by carrying out a t-test in which the absolute value of t (slope coefficient divided by the respective standard error) was compared to the t critical values. This aimed at, for example, determining whether the exchange rate factor is a useful variable in predicting the present value of import duty cash flows.(A significant relationship was only indicated where the observed t values were greater than the critical t values).

For both the analyses (F and t Statistic), an Alpha value of .05, indicating the probability of erroneously concluding that there is a significant relationship, was selected. The choice for this level was guided by the fact the research focuses on obtaining insights of the effect of the underlying variables on tax cash flows rather than an exact measure that would have been indicated by a higher level of significance.

The regression was performed using Microsoft Excel Software. The specific function used is the Linest Function, a statistical function that runs regression on a data series up to a maximum of sixteen variables. This function computes all relevant variables for regression analysis including standard errors, F values, degrees of freedom and the coefficient of determination.

4 DATA ANALYSIS AND FINDINGS:

4.1 INTRODUCTION:

Mobil Oil Kenya Ltd is an affiliate company of the Exxon Mobil Corporation, the worlds premier oil company and controls about fifteen percent of the market share controlled by the major multinationals. It is registered as a large Taxpayer by the Kenya Revenue Authority and contributes about Kenya Shillings Four Billion in taxes to the Government per year. From the case study of the entity's operations, the projected NPV of indirect tax cash flows was found to be negative and amounted to Kshs. 127 Million as the expected value.

This NPV is the aggregate of the discounted cash flows of the seven tax types and is tabulated below.

TABLE OF NPV OF INDIRECT TAX CASH FLOWS :

Rank	Tax Type	NPV IN Thousands of KSh.	Percentage of Total
		'000	%
1.	Excise Duty	- 41,251	32.50
2.	VAT	-40,812	32.10
3.	Import Duty-*Specific*	- 27,252	21.50
4.	Road M. Levy	- 14,251	11.20
5.	Import Duty – *Advalorem*	- 2,222	1.70
6.	Suspended Duty	- 842	.70
7	Petroleum D. Levy	- 374	30
	TOTAL	-127,004	100.00

From the above table it is apparent that only four tax types VAT, Excise and Import Duties and Road Maintenance Levy have a major impact on company cash flows as discussed below.

A. MODEL FOR THE PRESENT VALUE OF VAT RELATED CASH FLOWS:

Mobil Oil Kenya Ltd pays VAT on imported products to the Customs and Excise Department and this is only recovered from customers at the time they make payments for products delivered to them. The only products subject to VAT are Heavy Diesel, Fuel Oil –125, Fuel Oil – 180, Cooking Gas, Industrial Chemicals and Lubricants.

The Model Expression for the PV of product VAT cash flows on regressing percentage changes in NPV to percentage changes in the underlying variables was found to be;

$$\partial V_{vat} = -.1064\partial x - .25230\partial f - .0176\partial T_{hd} - .0109\partial T_{fo1} - .9404\partial T_{fo2} - .01152\partial T_g - .0109\partial T_c - .0226\partial T_l + E$$

Where;

The coefficients show the corresponding percentage change in the NPV of VAT related cash flows when the value of a particular independent variable changes by one percent.

∂V_{vat} = Percentage change in NPV of VAT on fuel products

∂x = Percentage change in Exchange Rate.

∂f = Percentage change in fuel product prices

∂T_{hd} = Percentage change in VAT rate for Heavy Diesel

∂T_{fo1} = Percentage change in VAT rate for Fuel Oil -125

∂T_{fo2} = Percentage change in VAT rate for Fuel Oil -180

∂T_g = Percentage change in VAT rate for VAT rate on LPG

∂T_c = Percentage change in VAT rate for Chemicals

$\tilde{\sigma}T_l$= Percentage change in VAT rate for Lubricants

E = Error Term

(The derivation of the above coefficients using the Linest Function in Microsoft Excel is shown in Appendix VI).

The above regression equation was found to be useful in predicting the percentage change in the PV of VAT cash flows with an observed F value of 567.17 against a critical F value of 19.38 at a significance level of 5 percent.

In terms of the usefulness of the slope coefficient of each variable in estimating the value of this PV, only the exchange rate, fuel price and VAT rate on Fuel Oil-180 were found to be statistically significant, with the respective t statistic values being greater than the critical t value of 2.920 at a significance level of 5 percent.

The t statistic values of each variable are as tabulated below:

VARIABLE	**t Statistic**	**> 2.920**	**SIGNIFICANCE**
Forex Rate	9.40	Yes	Significant
Fuel Price	7.21	Yes	Significant
VAT Rate –Heavy Diesel	1.19	No	Not Significant
VAT Rate – Fuel Oil -125	0.44	No	Not Significant
VAT Rate – Fuel Oil 180	40.77	Yes	Significant
VAT Rate – LPG	0.68	No	Not Significant
VAT Rate – Chemicals	0.41	No	Not Significant
VAT Rate – Lubricants	0.65	No	Not Significant

Based on this model, it appears that the VAT rate on fuel oil is the most important variable in the management of VAT. This is explained by the fact that the company is a major supplier of the product to independent power producers (Westmont & Iberafrica)

hence Fuel Oil forms a high monetary base for charging the tax, relative to other products. Changes in Fuel Prices are the second major variable while the exchange also had a major influence.

B. MODEL FOR THE PRESENT VALUE OF EXCISE DUTY CASH FLOWS:

Excise Duty tax is charged based on product volumes hence the exchange rate and fuel prices would not be relevant variables. The relevant variables were therefore the tax rates on the eligible products namely Super, Premium and Automotive Diesel Oil and Chemicals.

The Model Expression for the PV of Excise Duty cash flows on regressing percentage changes in NPV to percentage changes in the tax rates of the four products was found to be;

$$\partial V_e = -.4224\partial T_s - .2374\partial T_r - .3391\partial T_d - .0011\partial T_c + E$$

Where;

The coefficients show the corresponding percentage change in the NPV of Excise Duty related cash flows when the value of a particular independent variable changes by one percent.

∂V_e = Percentage change in NPV of VAT on fuel products

∂T_s = Percentage change in Excise Duty rate for Super

∂T_r = Percentage change in Excise Duty rate for Regular

∂T_d = Percentage change in Excise Duty rate for Diesel Oil

∂T_c = Percentage change in Excise Duty rate for Chemicals.

E = Error Term

(The derivation of the above coefficients using the Linest Function in Microsoft Excel is shown in Appendix VII).

The above regression equation was found to be useful in predicting the percentage change in the PV of VAT cash flows with an observed F value of 97,697,257.67 against a critical F value of 4.53 at a significance level of 5 percent.

In terms of the usefulness of the slope coefficient of each variable in estimating the value of this PV, all the four variables were found to be statistically significant, with the respective t statistic values being greater than the critical t value of 1. at a significance level of 5 percent.

The t statistic values of each variable are as tabulated below:

VARIABLE	t Statistic	> 1.943	SIGNIFICANCE
Excise Duty Rate –Super	4,494.39	Yes	Significant
Excise Duty Rate –Regular	2,685.25	Yes	Significant
Excise Duty Rate –Diesel	4,248.03	Yes	Significant
Excise Duty Rate –Chemicals	21.36	Yes	Significant

Based on this model, the two key variables influencing exposure to excise duty are the rates on Super Fuel and Diesel oil. The influence of Super oil is explained by the high volumes of the product and the high tax rate (KSH 14.945 per litre). Although Diesel oil had a lower tax rate (KSH 7.301 per litre) it has the largest volume of sales amongst the products liable to Excise Duty (94 Million litres).While Regular fuel has a high rate of tax at 14.555 per litre, the impact on PV is lower because of lower product volumes (33 Million litres).

C. MODEL FOR THE PRESENT VALUE OF *SPECIFIC* IMPORT DUTY CASHFLOWS:

Import Duty paid by Mobil Oil Kenya Ltd. is of two types; *specific*, which is charged based on product volumes, and *Ad Valorem* which is based on the monetary value of goods. Specific import duty is therefore levied akin to Excise Duty hence the exchange rate and fuel prices would not be relevant variables. The relevant variables were therefore the tax rates of the eight relevant products.

The Model Expression for the PV of specific Import Duty cash flows, developed by regressing percentage changes in NPV against percentage changes in the tax rates of eight products, was found to be;

$$V_{Is}=-.0948\partial T_s -.0531\partial T_r -.17412\partial T_d -.3686\partial T_k -.0136\partial T_{hd} -.0164\partial T_{fo1} - .2645\partial_{fo2} - 0156\partial_{.g} + E$$

Where;

The coefficients show the corresponding percentage change in the NPV of Import Duty (Specific) related cash flows when the value of a particular independent variable changes by one percent.

∂V_{Is} = Percentage change in NPV of Specific Import Duty on fuel products

∂T_s = Percentage change in Import Duty rate for Super

∂T_r = Percentage change in Import Duty rate for Regular

∂T_d = Percentage change in Import Duty rate for Diesel

∂T_s = Percentage change in Import Duty rate for Kerosene

∂T_{hd} = Percentage change in Import Duty rate for Heavy Diesel

∂T_{fo1} = Percentage change in Import Duty rate for Fuel Oil -125

∂T_{fo2} = Percentage change in Import Duty rate for Fuel Oil - 180

∂T_g = Percentage change in Import Duty rate for LPG

E = Error Term

(The derivation of the above coefficients using the Linest Function in Microsoft Excel is shown in Appendix VIII).

The above regression equation was found to be useful in predicting the percentage change in the PV of Specific Import Duty cash flows with an observed F value of 140,831.78 against a critical F value of 19.37 at a significance level of 5 percent

In terms of the usefulness of the slope coefficient of each variable in estimating the value of this PV all the eight variables were found to be statistically significant, with the respective t statistic values being greater than the critical t value of 2.920 at a significance level of 5 percent.

The t statistic values of each variable are as tabulated below:

VARIABLE	t Statistic	> 2.920	SIGNIFICANCE
Import Duty Rate – Premium	55.84	Yes	Significant
Import Duty Rate – Regular	30.08	Yes	Significant
Import Duty Rate – Diesel Oil	35.63	Yes	Significant
Import Duty Rate – Kerosene	218.63	Yes	Significant
Import Duty Rate – Heavy Diesel	10.41	Yes	Significant
Import Duty Rate – Fuel Oil 125	22.90	Yes	Significant
Import Duty Rate – Fuel Oil 180	46.52	Yes	Significant
Import Duty Rate – LPG	11.84	Yes	Significant

Based on this model, the key variables influencing exposure to specific import duty are the rates on Kerosene, Fuel Oil and Automotive Diesel Oil, which in the latter two cases is explained by the high product quantities and in the case of Kerosene by the high tax rate of KSH (5.80) which is the highest rate of tax for any product.

D. MODEL FOR THE PRESENT VALUE OF *AD VALOREM* IMPORT DUTY CASH FLOWS:

Mobil Oil Kenya Ltd also pays *Ad Valorem* Import Duty on imported products to the Customs and Excise Department. This is levied on the monetary value of two product types; Industrial Chemicals and Lubricants hence the exchange rate and fuel prices would be relevant variables alongside tax rates.

The Model Expression for the PV of *Ad Valorem* Import Duty cash flows, derived by regressing percentage changes in NPV against percentage changes in the exchange rates, fuel prices and tax rates of the two products, was found to be;

$$\partial V_{Iav} = - .0431\partial x - 0.3329\partial_f - .0274\partial T_c - .9762\partial T_l + E$$

Where;

The coefficients show the corresponding percentage change in the NPV of Import Duty *(Ad Valorem)* related cash flows when the value of a particular independent variable changes by one percent.

∂V_{Iav} = Percentage change in NPV of *Ad Valorem* Import Duty

∂x = Percentage change in Exchange Rate

∂_f = Percentage change in Fuel Prices

∂T_c = Percentage change in Import Duty rate for Chemicals

∂T_l = Percentage change in Import Duty rate for Lubricants

E = Error Term

(The derivation of the above coefficients using the Linest Function in Microsoft Excel is shown in Appendix IX.)

The above regression equation was found to be useful in predicting the percentage change in the PV of Specific Import Duty cash flows with an observed F value of 295.48 against a critical F value of 4.53 at a significance level of 5 percent.

In terms of the usefulness of the slope coefficient of each variable in estimating the value of this PV only two variables, fuel price changes and changes in the import duty rates of lubricants were found to be statistically significant, with the respective t statistic values being greater than the critical t value of 1.943 at a significance level of 5 percent.

The t statistic values of each variable are as tabulated below:

VARIABLE	t Statistic	> 1.943	SIGNIFICANCE
Exchange Rate	1.16	No	Not Significant
Fuel Price Change Rate	5.70	Yes	Significant
Import Duty Rate – Chemicals	.45	No	Not Significant
Import Duty Rate – Lubricants	19.49	Yes	Significant

Based on this model, the key variables with the largest coefficient is the import duty rate on lubricants which is explained by the high import value of the product, and fuel product prices which form the tax base.

E. MODEL FOR THE PRESENT VALUE OF ROAD MAINTENANCE LEVY CASH FLOWS:

Road Maintenance Levy is charged based on product volumes hence the exchange rate and fuel prices would not be relevant variables. The relevant variables were therefore the tax rates on the eligible products namely Super, Premium and Automotive Diesel Oil.

The Model Expression for the PV of Road Levy cash flows on regressing percentage changes in NPV to percentage changes in the tax rates of the four products was found to be;

$$\partial V_{rml} = - .4175\partial T_s - .0348\partial T_r - .5246\partial T_d + E$$

Where;

The coefficients show the corresponding percentage change in the NPV of Road Levy related cash flows when the value of a particular independent variable changes by one percent.

∂V_{rml} = Percentage change in NPV of Road Levy on fuel products

∂T_s = Percentage change in Road Levy rate for Super

∂T_r = Percentage change in Road Levy rate for Regular

∂T_d = Percentage change in Road Levy rate for Diesel Oil

E = Error Term

(The derivation of the above coefficients using the Linest Function in Microsoft Excel is shown in Appendix X).

The above regression equation was found to be useful in predicting the percentage change in the PV of Road Levy cash flows with an observed F value of 70.00 against a critical F value of 4.35 at a significance level of 5 percent.

In terms of the usefulness of the slope coefficient of each variable in estimating the value of this PV the tax rates for Super and Diesel oils were found to be statistically significant, with the respective t statistic values being greater than the critical t value of 1.895 at a significance level of 5 percent.

The t statistic values of each variable are as tabulated below:

VARIABLE	t Statistic	> 1.895	SIGNIFICANCE
Road Levy Rate –Super	3.97	Yes	Significant
Road Levy Rate –Regular	0.44	No	Not Significant
Road Levy Rate –Diesel Oil	7.59	Yes	Significant

Based on this model, the two key variables influencing exposure to road levy are the tax rates on premium and diesel oil. With a current common rate of tax (KSH 5.80), the relative significance of these two variables is accounted by the high volumes of the products on which they are charged.

4.2 POLICY IMPLICATIONS OF THE FINDINGS :

1. It was found that the case study entity faced higher exposure to VAT, relative to other tax types. However eighty five percent of this VAT was attributable to one product only (Fuel Oil), which is supplied to industrial consumers. This implies that the company could lobby for a shift to excise Tax to replace VAT on Fuel Oil. Since Excise Duty is based on quantities, in contrast to VAT which is based on monetary value of goods, exposure to exchange rate and fuel price fluctuation would reduce.

2. Although the study was conducted on a one-year horizon, it can be theorized that in the long run a shift to specific (quantity based) taxes from *ad valorem* taxes will be more beneficial to the company and other players in the industry. This is because, in the long term, the Exchange Rate between the Kenya Shilling and the US Dollar and Fuel Prices will either move adversely (that is Kenya Shilling depreciation or increase in fuel prices) or exhibit fluctuations negatively impacting on the firm's cash flows and increasing risk exposure.

3. Mobil Oil Kenya Ltd and or the oil industry in general should lobby for tax structures that would lower tax rates on the products where high risk exposure of the cash flows was found specifically Super, Fuel Oil, Diesel, lubricants and Kerosene and increases in those in which exposure was relatively lower. It is therefore possible to model an optimal regime of indirect taxes for the petroleum companies.

5. CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS:

5.1 CONCLUSION:

The first objective of this study was to identify an appropriate measure of risk exposure to indirect taxes faced by an oil company and develop a model that would measure the relationship between cash flow variability and the values of the underlying variables (exchange rates, fuel prices and tax rates) for each tax type. The present value approach was found to be consistent with the goal of the firm and hence the variability of the present value of the cash flow stream of each tax type was identified as the appropriate measure of risk exposure. For each of the principal indirect tax types, a model that evaluated the variability of the PV of the tax cash flow stream to changes in exchange rates, fuel prices and regulatory variables (tax rates) was developed.

In terms of the tax types, it was found that VAT, Excise Duty and Import Duty had the most adverse effect on the firms operations, based on the magnitude of the Present Value of the Cash flows. Road maintenance levy also had a fairly significant impact on the companies operations. However suspended duty and petroleum Development levy had a negligible impact on the firm's financial position due to the low rates at which they are imposed on oil products.

The second objective of this study was to test the significance of the relationships established by the empirical model and find evidence to support or reject the null/research hypothesis. In terms of the significance of the non-regulatory variables in affecting the NPV of this cash flow stream, it was found that both exchange rates and fuel prices had

significant impact on VAT. Fuel prices also had a significant influence on the discounted value of the *ad valorem* import duty cash flow stream.

In terms of significance of the regulatory variables, the impact of changes in the tax rates on the PV of the cash flow stream depended on the particular product on which it was imposed.

In the case of VAT, it was notable that tax rates on Fuel Oil was the most significant factor given that fuel oil constituted about eighty five percent of the monetary value of goods subject to VAT. It is noteworthy that changes in tax rates of other products are not of any statistical significance in the VAT cash flow stream.

The analysis of excise duty showed that the company was more highly exposed to changes in the tax rates of Super and Automotive Diesel Oil compared to chemicals and Regular fuels, although tax rates on all these products were of statistical significance.

There was evidence to support the hypothesis that there was a statistical relationship between changes in the tax rates of all the products liable to specific import duty and the present value of related cash flows although the changes in the tax rates of Kerosene, Fuel Oil and Diesel appear the most critical variables.

For *ad valorem* import duty the only significant variables were the changes in fuel prices and import duty rate on lubricants, with the latter being the major variable. There was no evidence to reject the null hypothesis in relation to the other variables; exchange rate changes and the import duty rate on chemicals.

The last tax type evaluated was Road Maintenance Levy and there was evidence to show that the cash flow exposure to Road Levy rates imposed on Super and Diesel Oil was significant, while that on regular was not.

In conclusion, this study found evidence to support, in the specified cases above, the research hypothesis that the cash flow streams of each indirect tax type is significantly influenced by the changes in the values of tax rates, fuel prices and exchange rates.

5.2 LIMITATIONS OF THE STUDY:

The limitations of this study can be summarized as follows:

1. The study evaluated the NPV of the indirect tax cash flow stream in isolation while it may have given a more complete picture to evaluate this impact on the firms overall cash flows.
2. The study was limited to taxes affecting the trading cycle of the company. Therefore only product related VAT was included in the study. However VAT affects capital and revenue expenditures of the company hence the full impact of VAT on Company operations may have been understated. The same applies to Import Duty which has an impact on capital expenditures where the assets used are imported.

5.3 SUGGESTIONS FOR FURTHER STUDIES:

1. The study could be replicated on other oil companies to test whether a similar model would be derived.
2. The model derived in this study could be redesigned to evaluate the marginal benefits that would accrue to an oil company or the oil industry in general from a change in tax policy.

SCHEDULE OF INDIRECT TAX RATES ON PETROLEUM AS PER THE FINANCE ACT 2000.

Product	IMPORT DUTY	EXCISE DUTY	VALUE ADDED TAX RATE	ROAD MAINTENANCE LEVY	PETROLEUM DEVELOPMENT LEVY	TOTAL INDIRECT TAX
PMS	2.500	14.945	-	5.80	0.1140	23.359
RMS	2.500	14.555	-	5.80	0.1140	22.969
AGO	2.704	7.301	-	5.80	0.1140	15.919
Kerosene	5.755	-	-	-	0.1140	5.869
IDO	3.400	-	18%	-	0.1140	
FO 125	1.710	-	18%	-	0.1140	
FO 180	1.485	-	18%	-	0.1140	
FO 280	1.337		18%	-	0.1140	
LPG (Kgs)	3.020	-	18%	-	0.1511	
Asphalt (Kgs)	1.875	-	18%	-	0.1128	
Boiling Spirit	1.250	5.800	-	-	-	7.050
White Spirit	1.250	5.800	-	-	-	7.050
Hexane	1.250	5.800	-	-	-	7.050
Exxsol D80	1.250	5.800	-	-	-	7.050
Isopar G	1.250	5.800	-	-	-	7.050
Isopar M	1.250	5.800	-	-	-	7.050
Lubes	15%	-	18%	-	-	
Chemicals- all other	5%	-	18%	-	-	

Source : Collated from the Finance Bill/Act 2000 .

SUMMARY OF PRODUCT VOLUMES MOVED OUT OF BOND:

SEPTEMBER1998- AUGUST 2000 :

PRODUCT / MONTH	PMS	RMS	AGO	KERO	IDO	FO125	FO180	LPG	ASPHALT
Aug-00	5560511	3078542	8792322	9040629	363237	1598455	10485774	351596	1500
Jul-00	5096916	2958931	10384264	3815922	357174	321496	4987251	336047	15000
Jun-00	5560511	3078542	8792322	9040629	363237	1598455	10485774	351596	1500
May-00	4592736	2590951	6493425	11524862	340419	188249	5084112	312984	0
Apr-00	3993707	2201141	5417751	3124244	198132	437239	4453151	300068	97600
Mar-00	4845457	2700506	8590255	6797919	254434	476867	90333428	381171	246160
Feb-00	4253011	2522724	7104253	5540905	285785	553281	10915243	353936	218750
Jan-00	4152760	2636019	7692989	3611803	214475	60110	1015052	54678	12417
Dec-99	5037140	3340910	9118836	14232016	324547	41597	6664004	349292	111880
Nov-99	4830764	2807469	7062035	9181174	277615	162118	7366566	422432	116280
Oct-99	4688230	2681229	7308174	11854499	254827	160811	8999874	328789	184890
Sep-99	4565500	2408273	7220183	8478779	316133	470991	9474017	317396	122200
	57177243	**33005237**	**93976809**	**96243381**	**3550015**	**6069669**	**170264246**	**3859985**	**1128177**
Aug-99	4403925	2381296	8538021	7827648	231609	257026	5108665	340574	288110
Jul-99	3719242	1801032	12874289	8181666	192963	401641	5567496	378723	419790
Jun-99	3333200	1538673	5891745	8110224	231480	1257465	8429727	309636	686640
May-99	3580983	1782548	6030413	1488666	169696	1370089	7044029	324679	815040
Apr-99	3697175	1841008	7633916	2660247	165501	1402892	9925650	302926	-18500
Mar-99	4086601	1977794	8565421	2227851	240083	1865870	3282817	364635	138200
Feb-99	3404063	1814916	7054890	2136759	229799	1611326	7125715	283137	570024
Jan-99	3428637	1883900	10453499	6128374	238537	1591827	4967665	324537	340732
Dec-98	4060947	2251183	6971762	15444818	265456	1083768	5467594	334832	488836
Nov-98	3182421	1797219	6316494	3657127	295238	1900322	6094005	295213	66496
Oct-98	3614622	1916338	7112756	8263558	351349	1646769	4811431	202204	407540
Sep-98	4231483	2182442	7306256	10507920	333582	1480958	7420777	271346	364800
	44743299	**23168349**	**94749462**	**76634858**	**2945293**	**15869953**	**75245571**	**3732442**	**4567708**

FUEL PRODUCT PRICES IN USD :

FUEL PRICES PER CUBIC METRE :

MONTH	SUPER	REGULAR	AUTOMOTIVE DIESEL OIL	HEAVY DIESEL	FUEL OIL -125	FUEL OIL -125
	US DOLLAR	US DOLLAR	US DOLLAR	US DOLLAR	US DOLLAR	US DOLLAR
Aug-00	251.19	233.24	210.3	204.44	157.67	155.53
Jul-00	236.7	219.79	198.16	192.64	148.57	146.55
Jun-00	250.57	232.66	209.77	203.93	157.28	155.15
May-00	236.44	219.54	197.94	192.43	148.41	146.4
Apr-00	227.47	211.22	190.44	185.13	142.78	140.85
Mar-00	252.41	230.17	194.74	194.74	129.41	112.36
Feb-00	243.74	227.835	206.77	201.585	161.25	159.325
Jan-00	237.56	230.28	198.84	193.63	150.955	149.09
Dec-99	234.87	204.43	219.92	214.68	167.03	165.31
Nov-99	247.41	234.84	212.42	207.73	170.74	169.02
Oct-99	237.06	223.01	203.77	199.24	165.22	163.5
Sep-99	253.8	241.02	199.74	194.83	153.5	151.78
Aug-99	247.71	235.68	186.86	182.21	145.82	144.1
Jul-99	218.13	204.8	170.49	165.76	127.95	126.23
Jun-99	183.68	170.48	154.31	149.67	113.57	111.85
May-99	180.57	166.82	152.85	148.26	113.04	111.31
Apr-99	189.31	170.07	152.02	147.19	107.33	105.6
Mar-99	156.11	143.14	131.79	127.15	91.06	89.33
Feb-99	139.75	131.29	116.92	112.55	81.5	79.78
Jan-99	142.47	131.5052	133.99	129.14	89.03	87.31
Dec-98	110.61	99.48	90.27	90.27	57.77	50.09
Nov-98	132.64	119.83	100.24	100.24	63.57	55.5
Oct-98	147.89	142.77	106.61	106.61	68.58	60
Sep-98	150.27	135.5	113.84	113.84	67.77	59.3

DATA SOURCE :

PLATT'S MEDITERRANEAN INDICATIVE RATES .

EXCHANGE RATE (KENYA SHILLING TO THE US DOLLAR)			
AUGUST 1998 - AUGUST 2000			
MONTH	CLOSING RATES	MONTH	CLOSING RATES
Aug-00	77.30	Aug-99	75.17
Jul-00	74.14	Jul-99	74.23
Jun-00	77.90	Jun-99	72.91
May-00	76.70	May-99	70.50
Apr-00	74.86	Apr-99	67.72
Mar-00	74.88	Mar-99	64.91
Feb-00	73.40	Feb-99	63.92
Jan-00	72.81	Jan-99	61.75
Dec-99	72.93	Dec-98	60.16
Nov-99	74.66	Nov-98	59.80
Oct-99	75.19	Oct-98	60.13
Sep-99	77.07	Sep-98	59.68
	Source: Central Bank of Kenya		
	* Exchange Rates as at the end of each month are taken.		

REGRESSION OUTPUT FORMAT USING LINEST FUNCTION IN MS EXCEL

	A	B	C	D	E	F
1	M_n	M_{n-1}	.....	M_2	M_3	b
2	se_n	se_{n-1}	.....	se_2	se_1	se_b
3	r^2	se_y				
4	F	d_f				
5	ss_{reg}	ss_{resid}				

Where

M_n = Value of each coefficient.

se_n = Standard error for each coefficient.

se_b = Standard error for constant b.

r^2 = Coefficient of determination.

se_y = Standard error for the y estimate.

F = F Observed value.

d_f = Degrees of freedom

ss_{reg} = The regression sum of squares.

ss_{resid} = The residual sum of squares.

PRESENT VALUE ANALYSIS :VALUE ADDED TAX

PRODUCT	DUTY PAID VOLUMES IN THOUSANDS	CUSTOMS VALUE IN USDOLLARS
PREMIUM	57,177.00	**********
REGULAR	33,001.00	**********
DIESEL OIL	93,974.00	**********
KEROSENE	96,330.00	**********
HEAVY DIESEL	3,657.00	906,651.00
FUEL OIL-125	3,545.00	466,212.00
FUEL OIL-180	84,484.00	115,264,417.00
LPG	7,740.00	2,417,510.00
ASPHALT	3,716.00	201,220.00
CHEMICALS-1	392.00	**********
CHEMICALS-2	0.00	1,968,307.00
LUBRICANTS	0.00	7,785,047.00

SIMULATION RUN NUMBER 1	% Change On Base Valu	% Change On Expected Value
Forex Change	8%	0%
Product Price Change	19%	0%
Sales Growth Rate	4%	0%
Petr Levy Change	0%	0%
Import Dty Change	0%	0%
Excluse Duty Change	0%	0%
Road Levy Change	0%	0%
Suspnded Duty Change	0%	0%
VAT Change	0%	0%

NPV OF VALUE ADDED TAX :

BASE VALUES		BASIC DYNAMIC VARIABLES		
TOTAL VOLUMES	0.00 0.00	Forecast Growth	4.30%	
		Forex Rate	7.80%	0.00
		Fuel Price Change	18.50%	0.00

QUANTITY	000 of Litres KSH	Base Rate	Tax Rate New Rate		NPV OF TAX CASH FLOWS
HEAVY DIESEL	906,651.00	0.1800	0.1800	0.00%	163197.1800
FUEL OIL-125	466,212.00	0.1800	0.1800	0.00%	83918.1600
FUEL OIL-180	115,264,417.00	0.1800	0.1800	0.00%	20747595.0600
LPG	2,417,510.00	0.1800	0.1800	0.00%	435151.8000
CHEMICALS-2	1,968,307.00	0.1800	0.1800	0.00%	354295.2600
LUBRICANTS	7,785,047.00	0.1800	0.1800	0.00%	1401308.4600
	128,808,144.00				23,185,465.92
					2,355,158,471.82
IMPORT DUTY FROM ABOVE	615,237,879.46				2,258,061,813.83
	0.9809 1			0.00%	-40,811,754.54

Forex Rate	Fuel Price Change	HEAVY DIESEL	FUEL OIL-125	FUEL OIL-180	LPG	CHEMICALS-2	LUBRICANTS	OUTPUT	
90	55	30.00	85.00	70.00	60.00	45.00	60.00	-90.68	
35	40	70.00	55.00	25.00	90.00	80.00	55.00	-39.00	
20	70	25.00	70.00	85.00	45.00	50.00	90.00	-101.70	
25	60	90.00	70.00	55.00	95.00	70.00	40.00	-69.68	
20	25	95.00	70.00	60.00	40.00	80.00	50.00	-65.14	
80	70	65.00	55.00	70.00	80.00	40.00	55.00	-93.55	
25	50	90.00	90.00	55.00	40.00	35.00	60.00	-67.03	
25	55	80.00	75.00	60.00	70.00	90.00	70.00	-74.91	
50	30	50.00	80.00	70.00	45.00	50.00	60.00	-79.03	
65	70	80.00	45.00	40.00	30.00	55.00	80.00	-62.82	

REGRESSION OUTPUT USING LINEST FUNCTION IN MICROSOFT EXCEL :

-0.02255	-0.01087	-0.01515	-0.94043	-0.01089	-0.01760	-0.25231	-0.10642	0.00000
0.03477	0.02669	0.02220	0.02307	0.02480	0.01480	0.03502	0.01132	#N/A
0.99956	0.80592	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
567.16740	2.00000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
2947.02703	1.29901	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

PRESENT VALUE ANALYSIS :EXCISE DUTY

PRODUCT	DUTY PAID VOLUM IN THOUSANDS	CUSTOMS VALUE IN USDOLLARS
PREMIUM	57,177.00	**********
REGULAR	33,001.00	**********
DIESEL OIL	93,974.00	**********
KEROSENE	96,330.00	**********
HEAVY DIESEL	3,657.00	906,651.00
FUEL OIL-125	3,545.00	466,212.00
FUEL OIL-180	84,484.00	115,264,417.00
LPG	7,740.00	2,417,510.00
ASPHALT	3,716.00	201,220.00
CHEMICALS-1	392.00	**********
CHEMICALS-2	0.00	1,968,307.00
LUBRICANTS	0.00	7,785,047.00

SIMULATION RUN NUMBER 1

	% Change On Base Va	% Change On Expected Value
Forex Change	8%	0%
Product Price (	19%	0%
Sales Growth F	4%	0%
Petr Levy Char	0%	0%
Import Dty Cha	0%	0%
Excluse Duty C	0%	0%
Road Levy Cha	0%	0%
Suspnded Duty	0%	0%
VAT Change	0%	0%

NPV OF EXCISE DUTY :

BASE VALUES		BASIC DYNAMIC VARIABLES		
	0.00			NPV OF TAX CASH FLOWS
TOTAL VOLUMES	0.00	Forecast Growth	4.30%	
		Forex Rate	7.80%	
		Fuel Price Chang	0.00%	

QUANTITY	000 of Litres	Base Rate	Tax Rate New Rate		
PREMIUM	57,177.00	14.9450	14.9450	0.00%	854510.2650
REGULAR	33,001.00	14.5550	14.5550	0.00%	480329.5550
DIESEL OIL	93,974.00	7.3010	7.3010	0.00%	686104.1740
CHEMICALS-1	392.00	5.8000	5.8000	0.00%	2273.6000
					2,023,217.59

AD VALOREM BASE	usd	Tax Rate	
CONSTANT VALUES			
	0.90726		
	0.9809		
	1		
Multiplication Factor	-0.0173287		
Base Index	100%		
Forex Rate	76.24		-36,567,227.39

VARIABLE M1	Premium Fuel	Regular Fuel	Light Diesel Oil	Chemicals	OUTPUT
	10.00	5.00	20.00	60.00	-12.26
	15.00	30.00	25.00	70.00	-22.01
	20.00	45.00	35.00	90.00	-31.10
	30.00	55.00	15.00	40.00	-30.86
	70.00	80.00	5.00	55.00	-50.31
	65.00	90.00	10.00	60.00	-52.28
	45.00	70.00	40.00	75.00	-49.27
	60.00	60.00	55.00	85.00	-58.33
	75.00	65.00	60.00	90.00	-67.56
	90.00	70.00	70.00	54.00	-78.43

REGRESSION OUTPUT USING LINEST FUNCTION IN MICROSOFT EXCEL :

-0.001095	-0.339148	-0.237384	-0.422383	0.000000
0.000051	0.000080	0.000088	0.000094	#N/A
1.000000	0.003158	#N/A	#N/A	#N/A
97697257.668283	6.000000	#N/A	#N/A	#N/A
3896.651230	0.000060	#N/A	#N/A	#N/A

PRESENT VALUE ANALYSIS *SPECIFIC* IMPORT DUTY

PRODUCT	DUTY PAID VOLUMI IN THOUSANDS	CUSTOMS VALUE IN USDOLLARS
PREMIUM	57,177.00	**********
REGULAR	33,001.00	**********
DIESEL OIL	93,974.00	**********
KEROSENE	96,330.00	**********
HEAVY DIESEL	3,657.00	906,651.00
FUEL OIL-125	3,545.00	466,212.00
FUEL OIL-180	84,484.00	115,264,417.00
LPG	7,740.00	2,417,510.00
ASPHALT	3,716.00	201,220.00
CHEMICALS-1	392.00	**********
CHEMICALS-2	0.00	1,968,307.00
LUBRICANTS	0.00	7,785,047.00

SIMULATION RUN NUMBER 1

	% Change On Base Va	% Change On Expected Value
Forex Change	8%	0%
Product Price Chan	19%	0%
Sales Growth Rate	4%	0%
Petr Levy Change	0%	0%
Import Dty Change	0%	0%
Excluse Duty Chanç	0%	0%
Road Levy Change	0%	0%
Suspnded Duty Cha	0%	0%
VAT Change	0%	0%

NPV OF IMPORT DUTY :

BASE VALUES

0.00
TOTAL VOLUMES 0.00

BASIC DYNAMIC VARIABLES

	New Rate
Forecast Growth	4.30%
Forex Rate	0.00
Fuel Price Change	0.00

QUANTITY	000 of Litres	Base Rate	Tax Rate New Rate		NPV OF TAX CASH FLOWS
PREMIUM	57,177.00	2.5000	2.5000	0.00%	142942.5000
REGULAR	33,001.00	2.5000	2.5000	0.00%	82502.5000
DIESEL OIL	93,974.00	2.7040	2.7040	0.00%	254105.6960
KEROSENE	96,330.00	5.7550	5.7550	0.00%	554379.1500
HEAVY DIESEL	3,657.00	4.8500	4.8500	0.00%	17736.4500
FUEL OIL-125	3,545.00	6.5000	6.5000	0.00%	23042.5000
FUEL OIL-180	84,484.00	4.8500	4.8500	0.00%	409747.4000
LPG	7,740.00	3.0200	3.0200	0.00%	23374.8000
					1,507,831.00
AD VALOREM BASEI usd			Tax Rate		0.00
CONSTANT VALUES					
	0.90726				
	0.9809				
	1				
Multiplication Factor	-0.0173287				
Base Index	100%				
Forex Rate	78.24			0.00%	-27,252,233.80

-27,252,233.80

Premium	Regular	Diesel Oil	Kero	IDO	FO125	fo180	lpg	OUTPUT
30.00	30.00	40.00	70.00	95.00	54.00	65.00	35.00	-57.12
25.00	70.00	15.00	30.00	25.00	70.00	15.00	30.00	-25.66
35.00	55.00	20.00	45.00	35.00	90.00	20.00	45.00	-34.27
15.00	40.00	30.00	55.00	15.00	35.00	30.00	55.00	-38.59
40.00	55.00	70.00	80.00	5.00	80.00	70.00	90.00	-69.68
65.00	60.00	65.00	90.00	10.00	65.00	65.00	45.00	-72.96
35.00	75.00	45.00	70.00	40.00	35.00	45.00	70.00	-55.06
85.00	85.00	80.00	80.00	55.00	25.00	80.00	70.00	-83.22
70.00	90.00	75.00	65.00	60.00	40.00	75.00	90.00	-71.19
70.00	54.00	90.00	70.00	70.00	54.00	90.00	45.00	-77.31

REGRESSION OUTPUT USING LINEST FUNCTION IN MICROSOFT EXCEL :

-0.015624	-0.264548	-0.016435	-0.013557	-0.368577	-0.174168	-0.053054	-0.094780	0.000000
0.001319	0.005686	0.000718	0.001303	0.001689	0.004888	0.001764	0.001697	#N/A
0.999998	0.050799	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
140821.778581	2.000000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
2907.153679	0.005161	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

PRESENT VALUE ANALYSIS :*AD VALOREM* IMPORT DUTY

PRODUCT	DUTY PAID VOLUMES IN THOUSANDS	CUSTOMS VALUE IN USDOLLARS
PREMIUM	57,177.00	**********
REGULAR	33,001.00	**********
DIESEL OIL	93,974.00	**********
KEROSENE	96,330.00	**********
HEAVY DIESEL	3,657.00	906,651.00
FUEL OIL-125	3,545.00	466,212.00
FUEL OIL-180	84,484.00	115,264,417.00
LPG	7,740.00	2,417,510.00
ASPHALT	3,716.00	201,220.00
CHEMICALS-1	392.00	**********
CHEMICALS-2	0.00	1,968,307.00
LUBRICANTS	0.00	7,785,047.00

SIMULATION RUN NUMBER 1

	% Change On Base Valu	% Change On Expected Value
Forex Chang	8%	0%
Product Pric	19%	0%
Sales Growth	4%	0%
Petr Levy Ch	0%	0%
Import Dty C	0%	0%
Excluse Duty	0%	0%
Road Levy C	0%	0%
Suspnded Di	0%	0%
VAT Change	0%	0%

NPV OF IMPORT DUTY :

BASE VALUES

	0.00	
TOTAL VOLUMES	0.00	
QUANTITY	000 of Litres	

BASIC DYNAMIC VARIABLES

		New Rate
Forecast Growth	4.30%	
Forex Rate	7.80%	0.00
Fuel Price Change	18.50%	0.00

	Base Rate	*New Rate*
Tax Rate		

AD VALOREM BASED usd			Tax Rate			NPV OF TAX CASH FLOWS
CHEMICALS-2	1,968,307.00	0.05	0.0500	0.00	9,584,795.25	
LUBRICANTS	7,785,047.00	0.15	0.1500	0.00	113,729,334.21	
					123,314,129.46	

CONSTANT VALUES

	0.90726
	0.9809
	1
Multiplication Factor	-0.0173287
Base Index	100%
Forex Rate	76.24

0.00% -2,228,754.75

Exchange Rate	Fuel Price Change	Chemicals	Lubricants	OUTPUT
45.00	5.00	20.00	30.00	-34.47
65.00	30.00	25.00	70.00	-82.50
70.00	45.00	35.00	57.00	-74.62
90.00	55.00	15.00	40.00	-59.67
75.00	40.00	10.00	55.00	-69.70
25.00	35.00	30.00	60.00	-69.29
45.00	45.00	40.00	75.00	-90.39
60.00	60.00	55.00	85.00	-108.45
75.00	90.00	60.00	90.00	-125.65
25.00	50.00	70.00	55.00	-71.40

REGRESSION OUTPUT USING LINEST FUNCTION IN MICROSOFT EXCEL :

-0.976198	-0.027426	-0.332899	-0.043166	0.000000
0.050085	0.060617	0.058393	0.037071	#N/A
0.994949	2.209329	#N/A	#N/A	#N/A
295.475178	6.000000	#N/A	#N/A	#N/A
5769.018621	29.286819	#N/A	#N/A	#N/A

PRESENT VALUE ANALYSIS ROAD MAINTENANCE LEVY

PRODUCT	DUTY PAID VOLUMES IN THOUSANDS	CUSTOMS VALUE IN USDOLLARS
PREMIUM	57,177.00	**********
REGULAR	33,001.00	**********
DIESEL OIL	93,974.00	**********
KEROSENE	96,330.00	**********
HEAVY DIESEL	3,657.00	906,651.00
FUEL OIL-125	3,545.00	466,212.00
FUEL OIL-180	64,484.00	115,264,417.00
LPG	7,740.00	2,417,510.00
ASPHALT	3,716.00	201,220.00
CHEMICALS-1	392.00	**********
CHEMICALS-2	0.00	1,968,307.00
LUBRICANTS	0.00	7,785,047.00

	% Change On Base Value	SIMULATION RUN NUMBER 1 % Change On Expected Value
Forex Chang	9%	1%
Product Pric	19%	0%
Sales Growth	4%	0%
Petr Levy Ch	0%	0%
Import Dty C	0%	0%
Excluse Duty	0%	0%
Road Levy C	0%	0%
Suspnded Dt	0%	0%
VAT Change	0%	0%

NPV OF ROAD MAINTENANCE LEVY :

BASE VALUES

TOTAL VOLUMES 0.00 0.00

QUANTITY 000 of Litres

BASIC DYNAMIC VARIABLES

Forecast Growth 4.30%

Forex Rate

Fuel Price Change

Tax Rate

		Base Rate	*New Rate*		
PREMIUM	57,177.00	5.8000	5.8000	0.00%	331626.6000
REGULAR	33,001.00	5.8000	5.8000	0.00%	191405.8000
DIESEL OIL	93,974.00	5.8000	5.8000	0.00%	545049.2000
	184,152.00	5.8000			1,068,081.60

AD VALOREM BASED used

CONSTANT VALUES

0.90726
0.9859
1

Multiplication Factor -0.0127924

Base Index 100%

Forex Rate 76.24 0.0000 0.00

NPV OF TAX CASH FLOWS	NPV OF TAX CASH FLOWS
-14,250,812.25	-14,250,812.25

GRAND TOTAL - NPV ON INDIRECT TAX CASH FLOWS	-14,250,812.25	-14,250,812.25

Premium Fuel	Regular Fuel	Light Diesel Oil	OUTPUT
10.00	5.00	20.00	-14.21
15.00	30.00	25.00	-18.56
20.00	45.00	35.00	-22.79
30.00	55.00	15.00	-21.15
70.00	80.00	5.00	-27.86
65.00	90.00	10.00	-41.41
45.00	70.00	40.00	-46.43
60.00	60.00	55.00	-57.45
75.00	65.00	60.00	-65.55
90.00	70.00	70.00	-76.21

REGRESSION OUTPUT USING LINEST FUNCTION IN MICROSOFT EXCEL :

-0.524607	-0.034772	-0.417471	0.000000
0.089094	0.079529	0.105103	#N/A
0.967743	4.414226	#N/A	#N/A
70.002301	7.000000	#N/A	#N/A
4092.065848	136.397712	#N/A	#N/A

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