

UNIVERSITY OF KWAZULU-NATAL

**A CRITICAL ANALYSIS OF THE CONTRIBUTIONS OF JAMES TOBIN TO
ECONOMICS AND ITS RELEVANCE TO THE SOUTH AFRICAN
ECONOMY**

By

**MOHAMMAD ZIAD GOOLAB
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SUPERVISOR: DR. RICHARD SIMSON

2009



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The research reported in this thesis, except where otherwise indicated, is my original research but draws heavily on the work of Tobin. It has not been submitted for any degree or examination at another University. This work has also been submitted to TURNITIN™ and the matches to existing research are fully acknowledged. Any errors of syntax and semantics remain the responsibility of the student.

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DEDICATIONS

This study is dedicated to my father, Mr. Mohammad Adatoolah Goolab, my mother Mrs. Nazma Bibi Goolab, and my sister Amreen and her family, for all the love, support and encouragement throughout my entire studies in South Africa.

ABSTRACT

This study reviews three of Tobin's major contributions to economics, namely; Tobin's q , liquidity preference as a behavior towards risk, and Tobin's global transaction tax on foreign exchange transactions to identify any potential unifying features. The original suggestion of this thesis, given Tobin's last contribution, is the role of savings that links all three contributions. The extension of this study aims to review these contributions so as to come up with possible links between them and apply the theory of q to a sample of forty five South African firms to assess firm diversification and performance measurement when it comes to monopoly profits, as well as the stability of any exchange rate when it comes to the Tobin tax issue, given South Africa's links to the Pound, Dollar and Euro. Our findings out of the empirical analysis performed hints at investors how to go about in maximizing profit in the South African market based on the diversification strategies they can adopt. Indeed non-diversified firms have a higher risk involved and performed better than diversified ones from 2007 to 2009. Our results based on book values are also of great relevancy to entrepreneurs in assessing the degree of diversification optional to them. The deviation of q from unity is another interesting point to note when it comes to ordinary profits for monopoly firms like Eskom. Tobin's q and risk are indeed connected through discounting and the relationship between risk and a transaction tax imposed on international financial transactions is taxation itself. In order for economic growth to arise into an economy, investment is crucial and this is achieved if volatility in financial markets is reduced, and hence the importance of reviewing the Tobin tax. The focus here is to link savings, the Tobin tax and the issue of international financial market liberalization to determine the impact on global developments and trace these through to the South African situation. We also review Tobin's q and its important link to the *IS/LM* framework which differs from the normal textbook and Keynesian view. In other words we explore in detail, Tobin's (1969) general equilibrium approach to monetary policy and look at how financial policies and events can influence aggregate demand, through an effect on the valuation of physical assets relative to their replacement cost. As the review hopes to find a common theme, in the three contributions, we present a discussion of each original article in some detail. Chapter Two and Three includes Tobin's q and portfolio decisions respectively. Chapter Four covers the tax on foreign exchange transactions in greater detail, and

attempts to view this as a solution to the passing current world economic crisis. A final chapter provides a summary of our results and modest macroeconomic proposals for South Africa.

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CHAPTER ONE

1. Introduction

James Tobin is one of America's most distinguished Keynesian economists who passed away in 2002. He added to Keynes' "General Theory" of income determination which he strongly believed could be reconstructed so as to face the macroeconomic problems of the 1980's. As a result, his theory proved to be relevant in 2009, and beyond, as South Africa hosts the world cup for football. For several decades, his contribution and empirical research at a macroeconomic level made him one of the greatest economists of his generation (Willem, 2003). A great deal of Tobin's analysis is mostly concerned with consumption and saving theory, the interest elasticity of the demand for money, and the effects of financial variables on spending decisions. Enormous efforts were also made in his 'Dynamic Aggregative Model' of economic growth to include money and business cycles, which can also be considered a precursor to the one-sector neoclassical growth model developed by Robert Solow and Swan in 1956 (Willem, 2003). In addition, Tobin's criticism of Milton Friedman's theory of money together with his criticism of the new classical macroeconomics won him the Nobel Prize in economics in 1981 (Blaug, 1985). Many of Tobin's ideas are thus worth revisiting, as in modern times many issues other economists have elaborated on were first examined by him and are still relevant today, given conditions in financial markets.

1.1 Background and Motivation of Research

This study reviews three of Tobin's major works, namely; the Tobin q , liquidity preference as a behavior towards risk, and the Tobin's global transaction tax on foreign exchange transactions to identify any potential unifying features. The original suggestion

here, given his last contribution is the role of savings that links all three contributions. The extension of this study would aim mostly at looking more in depth into those critical contributions as a further attempt to come up with possible links and application thereof to the South African economy like the calculation of q for Eskom in assessing the firm dimension in illustrating the idea of performance measurement when it comes to monopoly profits, as well as the stability of the European Monetary System (EMS) or the Rand Monetary Area when it comes to the Tobin tax issue (See future research in Section 4 below). Tobin's q and risk are indeed connected through discounting and the relationship between risk and a transaction tax imposed on international financial transactions is taxation itself. In order for economic growth to arise into an economy, investment is crucial and this is achieved if volatility in financial markets is reduced, and hence the importance of reviewing the Tobin tax. The focus here is to link savings alongside with the Tobin tax coupled with the issue of international financial market liberalization and the impact on world development. We also link Tobin's major contributions via the original suggestion to capital inflows and the work of other authors such as Mark Mobius, Ajay Shah, and Susan Thomas, to review how international savings are directed towards productive investment and to what extent it can contribute to world development (Eatwell, 1997). We also review Tobin's q which has a firm dimension and show that it has an important link to the *IS/LM* framework which differs from the normal text book and Keynesian view. In other words we explore in detail, Tobin's (1969) general equilibrium approach to monetary policy and look at how financial policies and events can influence aggregate demand, through an effect on the valuations of physical assets relative to their replacement costs.

Based on these specific explanations and a review of Tobin's contribution, we cover three areas: Tobin's q , portfolio decisions and finally Tobin's tax on foreign exchange transactions. As part of this study, three chapters will cover each of the above three areas in explicit detail. As the review hopes to find a common theme, in the three contributions, we present each original article in some detail. Chapter Two and Three include Tobin's q and portfolio decisions respectively. Chapter Four will cover the tax on foreign exchange

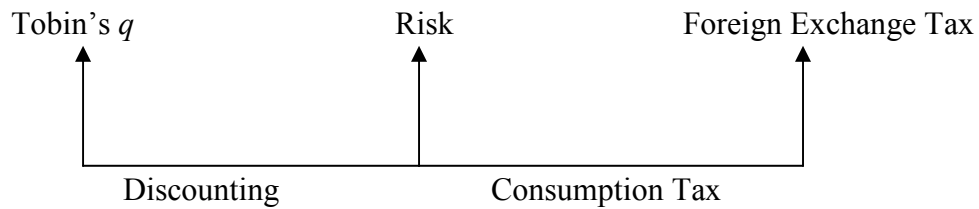
transactions in greater detail, and attempts to link it with solutions to current economic crisis. A final chapter provides a summary and modest macroeconomic proposals.

Tobin's q makes the case for a new transmission mechanism. But we are of the opinion that what is even more important is that Tobin makes use of discounting the future relative to today's market evaluation of an asset when examining investment decisions. Now in order for firms to have the funds for investment, one possible source is private saving. The problem is how does one get access to private saving? This is answered by justifying that individuals hold a portfolio of assets, which Tobin demonstrates must be the case in his analysis of risk which we will present in Chapter Three, and savings need not only be in the form of idle balances but can be held as claims against firms' making investment decisions as will be covered in Chapter Two of this review of the work of Tobin. We must point out that, as is the case for Tobin's q , the unifying feature we discovered is that of approaches to time preference. However, Tobin in his analysis of risk hints at the need for a tax on consumption. The hidden assumption being Tobin's q requires a channeling of savings to firms, which can be increased if consumption, which is defined to include a taste for global investments, is taxed. So once taxation appears it is not too much of a leap to tax those transactions which prevent domestic saving from being enhanced by saving from abroad. One element that could prevent foreign savings adding to domestic sources is exchange rate volatility. Thus, to prevent such volatility, and the resultant reduction in the global quantity of savings, Tobin proposes a modest tax on international transactions.

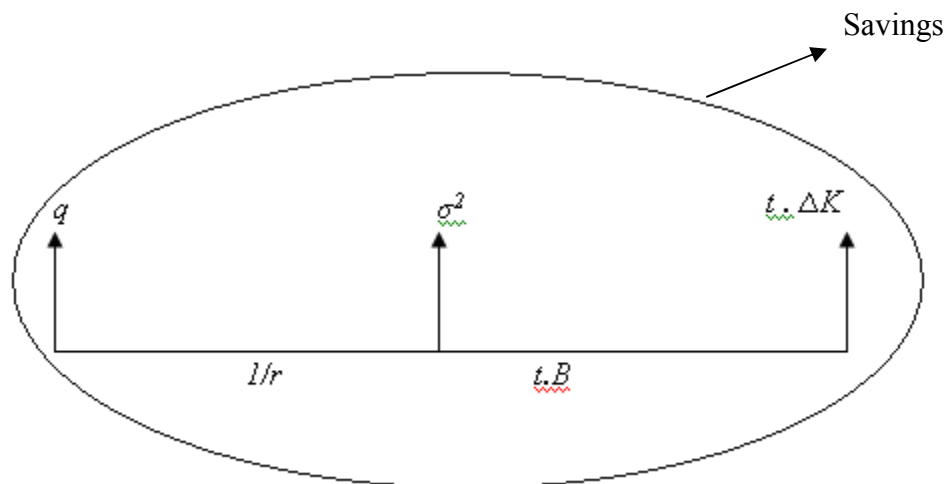
1.2 Proposed Original Finding

Thus, it turns out that the three pieces of Tobin's research are related. The link between Tobin's q and risk is discounting and the link between risk and taxation of foreign exchange transactions is taxation as a requirement for volatility reduction. The following

scheme classifies the linkages we have identified (and examine in greater detail in this partial thesis) after a review of Tobin's contribution to the literature.



And we will see (in the coming chapters) there is an internal consistency in the work of Tobin as the above scheme must have its own unifying factor. What we suggest, as an original contribution, is that the only consistent and unifying theme to the above scheme is savings. This can be shown as follows, where we propose to argue that savings provides the internal consistency to three up until now separate pieces of Tobin's work.



Therefore to allow for growth, investment must rise, and this is only possible if one has a global society of savers not facing exchange rate volatility. The one criticism that can be leveled against Tobin, as is briefly pointed out in Chapter Four and is a topic for future research, is that inter-temporal effects (notice the discounting and taxation in our unifying scheme) cannot be avoided by human action conducted in private: an unknown assumption in the contribution of Tobin to economic analysis also not identified, as of yet, in the literature.

1.3 Further Key Areas of Research for Future Study and an Outline of the Coming Chapters.

In order to assess the integrity of savings in Tobin's work, we therefore look at how different groups of individuals' consumption habits can be reduced by promoting a greater propensity to save. This indeed can be achieved by changes to personal income tax levels in the present period and possibly implementing a penalty scheme on low savings. But problems lie in postponing the actual inflationary effects to a future period and thus, the possibility of savings being an anti-inflationary weapon in the work of Tobin is worth revisiting in today's time. The effectiveness of exempting savings from taxation could indeed be useful in weakening long-term inflationary pressures. These issues are beyond the scope of the current analysis.

However what is possible in some of the chapters to come is some empirical analysis of South African firms, especially as we see deviations of q above unity indicates some degree of monopoly power as Lindenberg and Ross (1981) point out and we discuss in Chapter Two. Chapter Two and Three, while primarily focused on Tobin's theoretical analysis, examines estimates of q and β with greater rigour for a larger sample of South African companies.

In addition, Chapter Four reviews a model put forward by Jeanne (1996) in greater detail in an attempt to find out how a small Tobin tax can stabilize an exchange rate and would this tax help to augment domestic savings by reductions in foreign investment outflows. We hope to achieve meaningful policy conclusions from Tobin's analysis as this mini-thesis reviews what we identify as Tobin's major work, given our belief in the linkages between Tobin's q , behavior towards risk α , and the Tobin tax.

What we have identified the unifying feature of the linkages is savings and above major unifies Tobin's work. We can then link our analysis with financial liberalization, and the current (and hopefully passing) economic crisis, and also, look at some impacts on third world development. We do this by examining, in detail, the three separate contributions (the Tobin tax, Tobin's q , and Tobin's portfolio model) to show savings as a unifying theme. And we show how Tobin sheds light on the economic downturn of the last year, and why South Africa remained somewhat insulated from these developments. But we conclude that we as South Africans must not be complacent. We must take Tobin into great consideration. Greater savings can only aid South Africa's future growth and development.

CHAPTER TWO

A REVIEW AND EMPIRICAL ANALYSIS OF TOBIN'S q

In the new century, the increasing response of capital formation to interest rates has been an important theme in the field of macroeconomic theory, where a number of business fluctuation theories tackle the significant changes in the pace of real investment. Much of the change in physical capital of wealth holders arises from these changes in investment and is helped by an increasing ability to control and manage cash flows. It should also be noted that these significant changes themselves also happen due to improved monetary operations of governments and central banks. Tobin's q plays an important role in these financial and physical interactions and we begin this chapter with its definition: the ratio of the market value of a firm to the replacement cost of its assets (Chung and Pruitt, 1994). Tobin and Brainard (1977, in Nelson and Balassa, no date) use asset markets and the cost of capital to explain the concept of Tobin's q . Tobin believed that this ratio is useful in explaining the macroeconomic effects that arise when considering the financial, goods and money markets and the events of 2008 have borne this out. What we hope to do in this chapter is account for the rationale of Tobin's q , how it relates to the capital stock, and link it to the policy implications of the *IS/LM* analysis and finally market power with a view to assessing the value of Tobin's analysis today. A concluding section finds that Tobin's insights are as useful today as they were during the great depression as the world experiences a deep recession in 2009. We review Tobin's q in greater depth by looking at the short run and long run equilibrium of a money-capital economy. This we do to clarify how financial policies and events can affect the valuation of physical capital relative to their replacement costs and also affect aggregate demand. Not to confine ourselves to the numerous useful uses that q is capable of being applied to, we specifically investigate the relationship between diversification and firms' financial performance in the South African economy in an attempt to validate the correlation between diversification, profitability and risk by using Tobin's q .

2.1 The Rational for the Tobin q Analysis; the Valuation of the Capital Stock and Earning streams

In capital markets, both renewable and non-renewable assets like land or mineral deposits and buildings and equipment are subject to fluctuations in their market valuations (Tobin and Brainard, 1977, in Nelson and Balassa, no date). The ever changing value of renewable assets can be explained by the current cost of reproducing them. If the construction costs of buildings are rising, then we should expect the value of existing houses to rise. However when prices of new car models increase, the market value of older vehicles can fall as depreciation may offset the revaluation of components. The higher the new production costs are and the higher the process costs of newly produced components, the higher the replacement value of existing capital stock. One should also bear in mind that the divergence or gap between new and historic prices might differ widely the longer the time periods under consideration and that, the revaluation of existing assets fluctuates more than the prices of a brand substitute. The demand for building new residential areas is encouraged if the high market values of these properties are being compared with high but current building costs. Tobin justifies his ratio q as there is excessive volatility of market prices of assets when compared with replacement cost those same assets, leading to differences in valuations under each view. These differences are not eradicated immediately but in the long run, the increase in the capital stock as part of gross investment makes the market valuation equivalent to the replacement cost. In long run equilibrium, both valuations are equal as new investment takes place at current prices and older quantities are revalued at these selfsame prices.

2.1.1 Business and Corporate Capital

The notion of valuing assets can be extended to the valuation of businesses as a going concern rather than identifying the separate assets that form part of the enterprise's

goodwill. However, Tobin and Brainard (1977) point out that the replacement costs in this case must extend to other items on the firm's balance sheet rather than just the physical assets. As a matter of fact, businesses also change hands on a daily basis and thus, the claim upon the business' assets changes both in terms of owners and valuations. Security markets at the same time provide a constant revaluation of any enterprise changes and also those changes that affect corporate assets directly. These revaluations are variable as there are inconsistencies between the original market valuations and the replacement costs affecting business and corporate capital that are being indirectly valued at the same time as new enterprises are formed. Tobin further argues that in equilibrium, the value of q for reproducible assets should equal to one and be less than one for other assets (Tobin and Brainard, 1977, in Nelson and Balassa, no date). For any values of q in excess of one, investment should rise over and above the requirements for normal growth, and if the value of q is less than one, this should lead to a decline in investment (Tobin and Brainard, 1977, in Nelson and Balassa, no date).

The main reason for differences in the value of q at the macroeconomic level not to be one is justified by Tobin on the ground that discount rates are not the same when valuing the stream earnings of assets at future dates. At the microeconomic level, the income being generated consists of the cash flows over an assets' entire life and for shares in capital assets on the stock market, income is dividends earned. Thus, the value of assets and securities will increase if discount rates are lowered or the value of expected earnings increases when valuing the earnings streams of those assets at future dates.

2.1.2 Valuations and Risks

In addition to the valuation of assets Tobin also considers the risks associated with different assets as a justification for using the ratio q . In fact, Tobin disagrees with Keynes as to the degree of substitutability between bonds and capital. To Keynes, these

two categories of assets are considered perfect substitutes while Tobin stresses that they are more likely to be imperfect substitutes as they have a different margin of yield (Tobin and Brainard, 1977, in Nelson and Balassa, no date). Tobin makes this clear by justifying as his main reason for distinguishing between the two classes of assets as being that capital assets are indeed affected by real events while bonds are affected by changes in future expected rates of inflation and other interest rates. The risks or real events that affect the valuation of capital are technological change, utilization or depreciation, scarcity and labor costs (Tobin and Brainard, 1977, in Nelson and Balassa, no date). Risk is thus an important factor that would affect the valuations of assets leading to volatility in assessing the value of q . In the market for equities, however, Tobin acknowledges the difficulty in estimating the yields on each physical asset alone and rather wants the valuation to be of the firm as a whole. If the list of assets in assessing q includes bonds as well as equities, even the inclusion of less marketable assets such as houses, consumer durables and human capital are as equally relevant to the valuation of stocks and bonds. According to Tobin and Brainard (1977), there are also crucial reasons as to why a firm's valuation cannot be separated from its efficient assets. First corporate income tax is done at the firm level, and second economies of scale that arise from retained sources belong to the firm.

2.1.3 Effects of Inflation on the Value of q

Tobin also notes how inflationary effects affect the value of q , and thus, this provides us with an insight into the imminent effects that can affect the valuation of assets. In the case of anticipated inflation, the ratio q is indeed unaffected since replacement costs rise in step with those new prices used to revalue the assets of the firm by the market. Also, the price of existing assets or the ongoing price will respond to the new prices in the commodity market if both expected real earnings and the real interest rate used to discount them are independent of the expected rate of inflation (Tobin and Brainard, 1977, in Nelson and Balassa, no date). Hence we conclude that in periods of anticipated

inflation, q remains unaffected and constant over time due to the above effects. However, taxes are not independent in this analysis as nominal earnings which have as main purpose the maintenance of the real value of the asset are taxed. This eventually causes profit to be overestimated and leads to higher taxation especially when rates of depreciation are based on original cost (Tobin and Brainard, 1977, in Nelson and Balassa, no date). The q value thus decreases. At the same time, inflation premiums are not precisely included in nominal rates due to a zero interest rate on currency, demand deposits and the rates imposed voluntarily on savings and time deposits. Hence, anticipated inflation reduces the real rates on assets. This rising effect on q can however be eliminated by undertaking monetary policies as is explained in section 2.2 below.

2.1.4 Market Valuations and Investment

It is also crucial to point out that the Tobin's q has both a market valuation and investment dimension that explains its purpose. Under the original or neoclassical theory of investment, firms are driven by the idea of maximizing the market value of outstanding common shares. If firms are willing to undertake a project, they will have to ensure that the proceeds from the investment exceed the cost of financing it for the stock market to view the action in a positive way. Hence, Tobin and Brainard (1977) consider q as the ratio of the increment in market valuation to the cost of the associated investment. The most important point they make is that the marginal value of q must be one. However, the average value of q for the firm can be more than one. Indeed the average value is likely to be higher the greater the degree of monopoly power the firm has (Tobin and Brainard, 1977, in Nelson and Balassa, no date).

An under estimation of q can occur even in periods of massive investment into the economy when old and absolute stock of capital goods are being replaced by the new assets. Depreciation or an improvement in technology leads to this phenomenon, thus we

can observe periods of high investment in an economy when the q ratio is low as the market evaluation of the old stock is falling. Tobin acknowledges the important role of declining factor prices that enable us to observe this phenomenon. In 1973, the drastic increase in oil prices lowered the q 's for firms heavily dependent on high energy-using technologies and caused them to shift their financial resources to energy-saving technologies where long investments were made (Tobin and Brainard, 1977, in Nelson and Balassa, no date). The Tobin q can thus be used as a crucial indicator in signaling firms when to diversify in order to reap more profits in the long run, and may be the case today.

One should also bear in mind that there are also strong forces in the economy such as the short run variations in aggregate demand which would raise or lower q . John Ciccolo (1975, cited in Nelson and Balassa, no date) who undertook regression analysis on aggregate business fixed investment concludes that to obtain the full effect of a 0.10 rise in the q ratio, we need to increase the value of investment divided by capital by 0.08. There are also other inconsistencies that may occur between the q ratio and its normal value, but only the rate of investment can eradicate those differences on the basis of adjustment costs and the growth of firms. But on a national extent and for the economy, the short run marginal costs of the investment goods are indispensable (Tobin and Brainard, 1977, in Nelson and Balassa, no date).

Tobin also strongly disagrees with the Keynes investment function in that it does not show the relationship between the marginal efficiency of capital to the flow of investment but to the stock of capital. The Keynesian investment function when observed in a stagnant economy implies that there is no investment at any given rate of interest. On the other hand, if real gross domestic product is increasing rapidly, Keynes' model implies that capital accumulates at the rate of economic growth. The Keynesian investment function omits the point that there is a correlation between investment and capital stock when there are inconsistencies between the marginal efficiency of capital and the rate of

interest. Tobin's q ratio is related to this analysis and can under certain circumstances be defined as the ratio of the marginal efficiency of capital R to the interest rate r_K that is used to discount future earnings. The exposition below is based on Tobin and Brainard (1977).

The marginal efficiency of capital is the sum of future earnings discounted at rate R

$$V = \int_0^{\infty} E(t) e^{-Rt} dt. \quad (1)$$

In equation (1), V defines the cost of capital goods at time 0 and $E(t)$ equals expected earnings.

$$MV = \int_0^{\infty} E(t) e^{-r_K t} dt \quad (2)$$

In equation (2), MV represents the market valuation for capital goods and r_K is the discount rate. If the expected earnings remain constant, then the following valuation becomes a consol.

$$V = E/R, \quad (3)$$

$$MV = E/r_K. \quad (4)$$

This means combining equation (3) and (4) that q (MV/V) is

$$MV/V = R/r_K. \quad (5)$$

Thus, we can see from the above exposition that investment and q can indeed simply be expressed as the ratio of the marginal efficiency of capital and the discount rate. Tobin

and Brainard (1977) further take this hypothesis to illustrate the similarity of the flexible accelerator notion in that the investment function can show the difference between a desired and accumulated capital stock. In this case, if the discount rate is less than the marginal efficiency, the desired stock is greater than the actual stock which means q is high at the margin and investment rises.

2.2 An IS/LM Model with a q Analysis

It is of some interest to link q with a conventional macroeconomic model. One model is the IS/LM framework. We do this in Figure 2.1 below using the following assumptions and analysis:

1. Assume a normal value of q , say \bar{q} .
2. Growth Equilibrium occurs when output is such that saving equals net investment.
3. As Y increases, savings rises at the initial q . So to get investment to rise q must rise. Thus, one can think of an “ IS ” curve with q and Y : a higher Y means a higher q .
4. Just as we can construct an “ IS ” type relationship, we can conceive of an “ LM ” curve with Y and q .
5. The money market determines q as well as interest rates. These prices are determined with an exogenous Y .
6. Assume the marginal efficiency of capital is not related to Y . A rise in Y then raises interest rates but not the marginal efficiency of capital. If interest rates rise, then q falls. This gives the “ LM ” curve in Figure 2.1 for $R = R(Y)$ and in the diagram; q rises towards the bottom of the page.
7. Combining the “ IS ” and “ LM ” curves gives an equilibrium such as E_1 .

8. Policy then works in the usual manner: higher government spending shifts the “*IS*” curve to the right, possibly raising q . Higher money supplies shift the “*LM*” curve downwards.

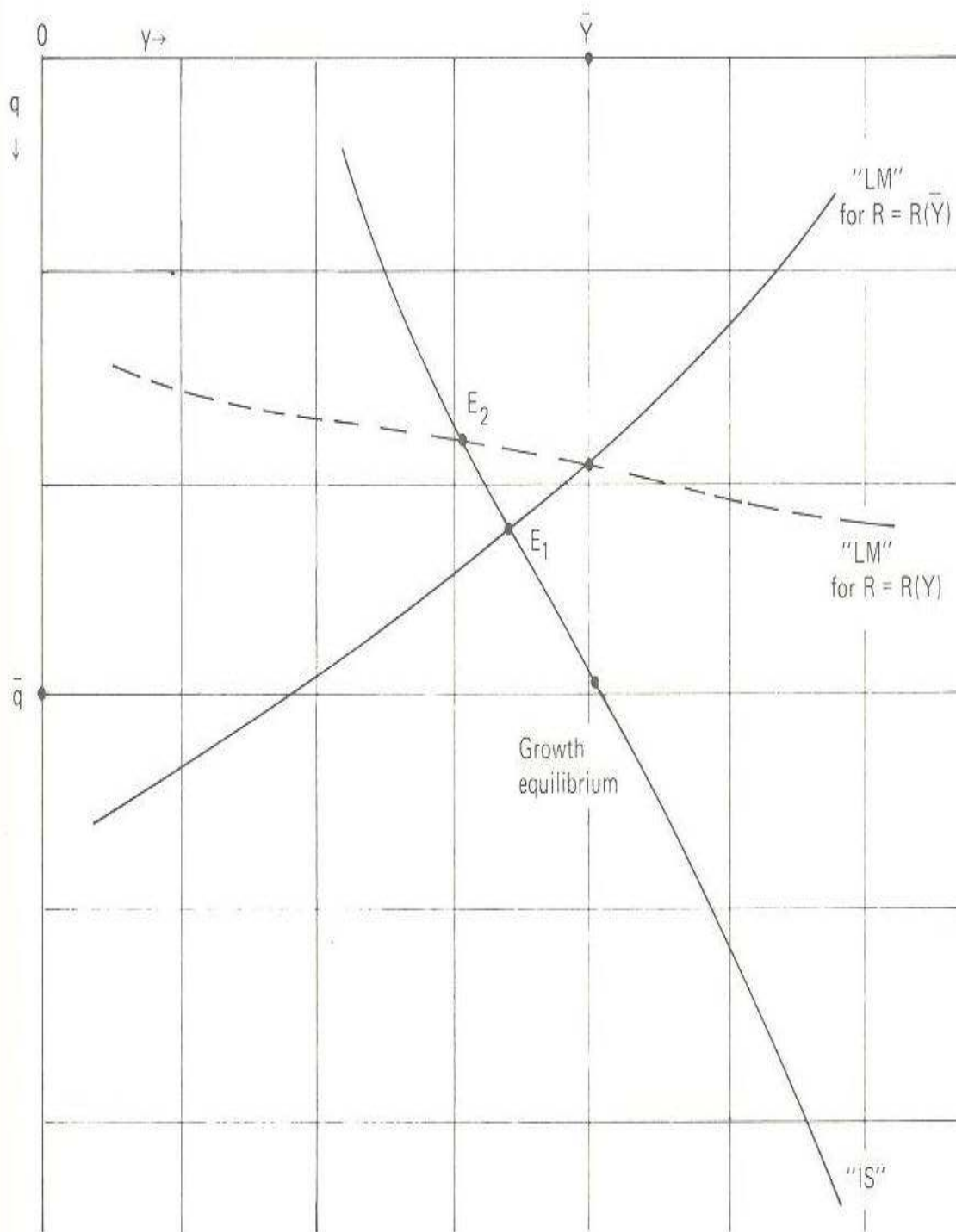


Figure 2.1 IS/LM Analysis in (q/Y) space

Source: (Tobin and Brainard, 1977, in Nelson and Balassa, no date).

We must be careful. The model does not indicate that there is any usable information in a particular value of q . A q can be high if expected returns are high or if discount rates are low. But what a high value of q can tell you is that monetary policy is restrictive.

2.2.1 A General Equilibrium Approach to Monetary Theory – A Macroeconomic Application of Tobin's q

The application of q to a money-capital economy by Tobin (1969) shows the macroeconomic implications of how financial policies and other events influence aggregate demand by changing the valuations of physical assets relative to their replacement costs. Besides monetary policies, Tobin observes how other exogenous events can cause the occurrence of such changes, more specifically in portfolio preferences, asset demand functions of the public, banks, and other sectors of the economy. However, in these sometimes complex situations, there is no reason to believe that the impact on monetary policies is easy to capture in any single exogenous variables such as the monetary stock or interest rate. The model below is based on the short run interpretation of the money-capital model of Tobin (1969).

It is useful to begin by defining the variables. They are:

qp – Market price of existing capital goods;

r_M and r_K – Real rates of return when holding money and capital respectively;

P^e_P – Expected rate of change in commodity prices;

r'_M – Nominal interest rate on money (zero unless specified);

R – Marginal efficiency of capital to replacement costs;

W – Wealth in goods;

Y – Income in goods;

Endogenous variables: r_K, r_M, W, q ;

Exogenous variables: $K, M, Y, p, R, P^e_P, r'_M$.

The endogenous variables are r_k, r_M, W and q . The exogenous variables are K, M, Y, P, R, P^e_P , and r'_M . Assuming that the money-capital economy is taken as given from Tobin (1969), the model can indeed be expressed in a single equation as shown below.

$$f_2[R/q, r_M, (Y/q_K + M/p)](qK + M/p) = M/p \quad (1)$$

From equation (1) above, we have to bear in mind that any expansionary monetary policy increases the valuation of existing capital and triggers investment which means $\partial q/\partial M$ is greater than zero. The same condition ensures that $\partial q/\partial R$ is greater than zero implying that an increase in the marginal efficiency of capital must raise its price and $\partial q/\partial r_M$ is also greater than zero for any increase in interest rate on money to reduce the value of capital. Finally $\partial q/\partial Y$ is less than zero so that for asset equilibrium, a low valuation of capital is required the higher the level of income is to asset stock. A graphical representation of equation (1) is drawn below to represent a specimen of the Keynesian *LM* curve.

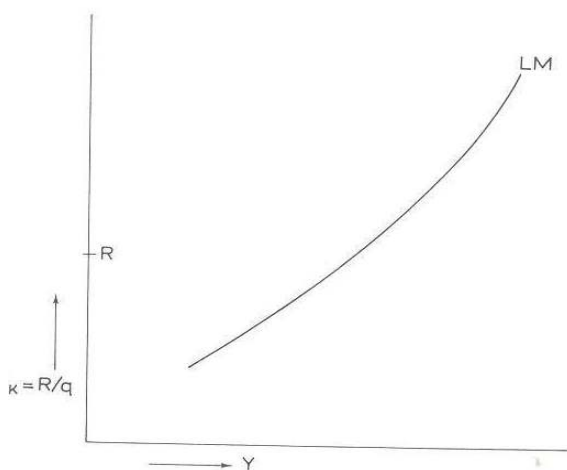


Figure 2.2 LM curve
Source: (Tobin, 1969: 329).

In Figure 2.2 above, what is of crucial observation is that Keynes assumes that return on equity to be the same like the return on bonds or to differ by a constant risk premium only. By dropping this assumption, R/q is measured on the vertical axis and the IS curve illustrating the rate of investment related to q is required to complete the diagram. However, here the LM curve illustrates the combinations of real income and the rate of return on equity r_K or R/q which can form equilibrium in asset markets. After the Keynesian assumption is ignored, q comes into the picture in relation to the IS curve, that is, the rate of investment should be related to capital relative to its replacement costs. This is represented in Figure 2.3 below, where the marginal efficiency of capital R is fixed at a base real income Y where the savings are just sufficient from the growing economy's investment needs.

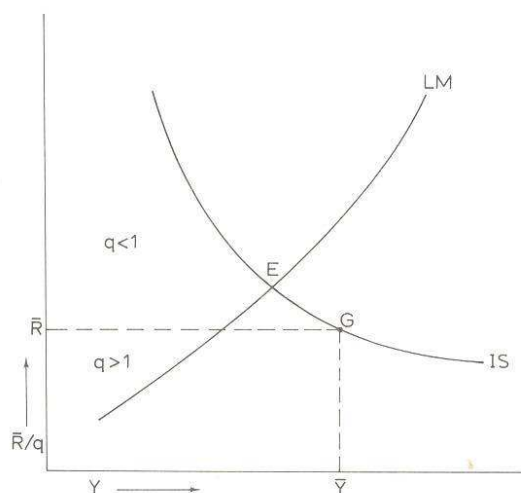


Figure 2.3 LM and IS curve
Source: (Tobin, 1969: 329).

Therefore, from Figure 2.3 above, as R increases with Y , $\partial q/\partial Y$ becomes small and negative. This occurs for any point below Y , the normal rate of investment will be greater than savings and this would require a q less than one. The IS curve passes through the

point (R, Y) , where q is one. Equilibrium in the short run occurs at point E , at a lower income level and equity valuation that occurs at point G . In the long run, the model requires capital to be valued at its reproduction costs at q equal to one. Thus, in the long run, point E and G must be the same. This can only occur if price expectations are such that the LM curve shifts to the right (when P^e_p falls) moving close to q .

2.3 A Simple Approximation of Tobin's q

Tobin's q has been calculated in so many aspects over the years that very often its derivation has proved to be complex and difficult in terms of gathering all the required information. Although it is usually defined as the market value of a firm to its replacement costs, its application in investment and diversification decisions, and in explaining managerial equity ownership and firm value, has led this ratio to be quite useful in explaining financial interactions. Chung and Pruitt (1994) analyzed the q ratio by questioning its computation to be based solely on basic financial information. The astonishing result proved to be that with their simple method they obtained q values within 96% of those calculated with more complicated methods such as Lindenberg and Ross (L-R) (Chung and Pruitt, 1994). The exposition below is based on Chung and Pruitt (1994). The (L-R) definition is:

$$L-R \ q = \frac{PREFST + VCOMS + LTDEBT + STDEBT - ADJ}{TOTASST - BKCAP + NETCAP}, \quad (1)$$

where each variable is defined as:

PREFST: liquidating value of a firm's preferred stock;

VCOMS: firm's common stock price times number of shares due at year end;

LTDEBT: value of firm's long term debt adjusted to time;

STDEBT: book value of the firm's current liabilities;

ADJ: net short term assets;

TOTASST: book value of total assets;

BKCAP: net capital stock;

NETCAP: firm's inflation adjusted net capital stock.

However, Chung and Pruitt (1994) use an approximation value:

$$\text{Approximate } q = (MVE + PS + DEBT)/TA \quad (2)$$

where *MVE* is the product of a firm's share price and the number of common stock shares due, *PS* is the liquidating value of a firm's outstanding stock, *DEBT* relates to the firm's short term liabilities excluding its short term assets and the addition of the book value of the firm's long term debt, and finally *TA* comprises the total assets of the firm.

Hence, we can see that the approximate *q* is less complicated than the L-R *q*. The approximate *q* is however based on the assumption that the firm's fixed assets and stock are equivalent to their book values and both techniques assume the market and book values for short term debt to be identical (Chung and Pruitt, 1994). Thus, by coming up with an approximation for Tobin's *q*, Chung and Pruitt (1994) believed that it could be used as a short cut to avoid complicated computations and this could indeed be of great interest to both financial analysts and academic researchers. It is both the combination of financial and accounting data that enables economists also to carry out analysis of past performance of firms in the market and to predict any forthcoming event that guides investment on a macroeconomic scale, and hence, the importance of the Tobin's *q*.

While we do a larger study in later in this Chapter and in Chapter Three it might be instructive to look at a company like Eskom by way of an example as an introduction to the subject. Using data from Appendix 2, the L-R *q* for Eskom is obtained as follows:

$$L-R \ q \approx [10893 + \beta + 72915 + 31694 - 47647] / [171181 - 64738 + (9.8/100*64738)]$$

$\approx 0.6 + \beta$ (which could imply a q greater than one for some reasonable estimate of Eskom's β).

The value of *NETCAP* is obtained from Appendix 3 where South African consumer price indices are used in the above equation.

Using Eskom's financial statements for 2008 and the Lindenberg and Ross method one can measure q for Eskom as $(0.6 + \beta)$ and for the estimates of β this thesis makes for monopoly firms indicates not only are the assets of Eskom worth more than their replacement costs (as the implied q is 1.2, given average estimates of β at 0.62) but also confirms there are rents in excess of ordinary profits on their capital employed.

2.4 Tobin's q and its Relevance to Industrial Organization

The analysis of Tobin's q examines the correlation between q and the rate of investment. Tobin argues that if q exceeds one, firms in general would have an incentive to invest because the market value of the new capital investment exceeds replacement cost (Lindenberg and Ross, 1981). Lindenberg and Ross (1981) try to test this implication of Tobin's q by using the market value of a firm and its historic cost to measure monopoly rents. They argue that if in the case of perfect competition q is close to one then in the case of a single firm with monopoly power, the rents mean the assets are worth more than replacement costs dictate and q would be greater than one.

The implication of q above unity implies that the market value of the firm is greater when compared to its replacement cost. Just one had perfect competition: free entry and exit of many firms along with the forces of the invisible hand would mean such a demand for assets that replacement costs would rise. As replacement costs rise q would fall, and fall back to unity as the process of entry came to an end. Hence, firms in perfectly

competitive equilibrium will have a q ratio of one; while in a monopolistic market the firm must have a q ratio above unity as in the case of a monopoly there are rents in excess of the ordinary profits on capital employed. Thus, the market value of the firm will increase beyond the replacement cost of capital, implying that q would increase above unity.

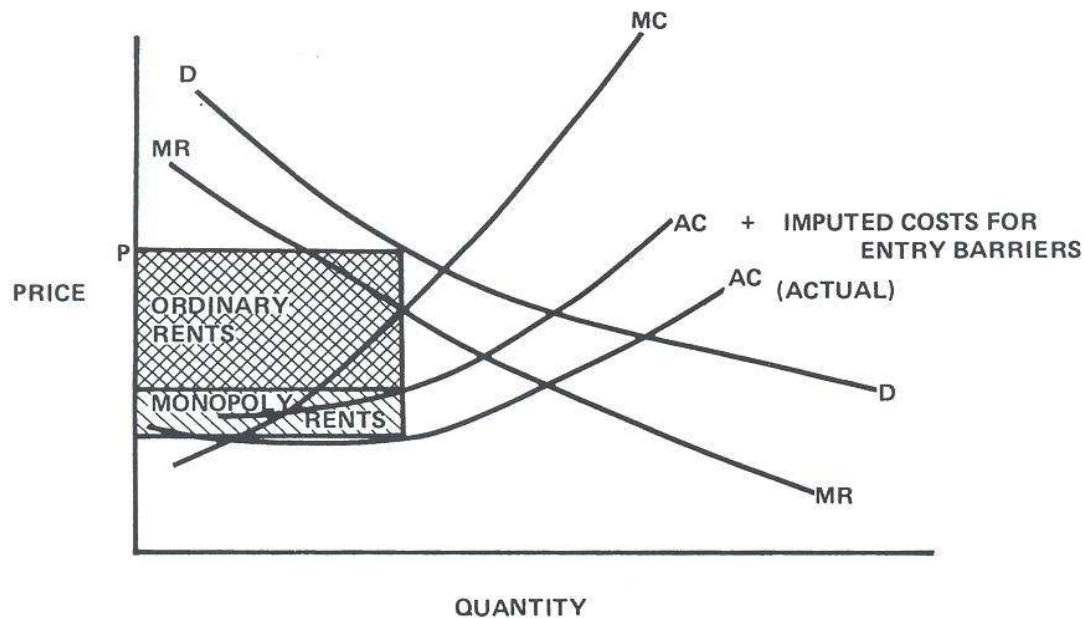


Figure 2.4 Components of a firm rent

Source: (Lindenberg and Ross, 1994).

2.5 Diversification and Corporate performance: An Evaluation of South African Firms

In the last half century, diversification has become an important strategy for firms worldwide so as to expand and explore new operation possibilities and to reap the benefits of profit maximization. In this section we attempt to investigate the relationship between firms' financial performance, risk and profitability by using a sample of 45 South African firms being categorized as diversified and non-diversified. We measure the

financial performance in terms of risk and returns using return on assets (ROA), return on equity (ROE), and Tobin's q by gathering data from the Johannesburg stock exchange (JSE) website, and the annual publication reports of those firms for the period 2007 to 2009. The motivation of this study is to test the validity of the general theory of the diversification effect on the performance of the firm in a developing country like South Africa. Firstly, since diversification can either increase or decrease profitability due to economies of scale, or increase market share and expand resources available, we bear in mind the approach managers take in diverse operations is subject to the agency problem that can also impact negatively on the firm's performance. Secondly, if we can act upon the risk associated with diversification and a firm's performance in making industrial decisions, we can see a link between the two. The results confirm that non-diversified firms (higher risk) in South Africa outperform the diversified ones. The low return of diversified firms is indeed associated with less risk. But our results based on book values differ from that of the market values hinting that firms must be careful about the degree of diversification since the latter can enable them to capture more market share but reduce their profitability.

2.5.1 Research Justification of the Application of Tobin's q

In this the new 21st century, research remains divided given the inconclusive results in the literature of both the positive and negative effects of a firms' diversification strategy on corporate performance. While one group of researchers has come up with a positive impact to divert risk exposure, other groups report a negative impact in their analysis. In both the developed and the developing world, the different means of tackling this relationship of diversification and financial performance has been carried out, but a few studies have maintained the unrelated diversification strategy while the others have remained concentrated on the related diversification approach. Overall we can say there have been both almost an equal amount of reports on the positive effects of diversification in some economies and negative effects in others but we do not really find

significant difference in measuring risk. Rumlet (1974, cited in Afza, Slahudin and Nazir, 2008) analyzed 500 firms in an attempt to test this relationship and concludes that related diversification outperformed unrelated diversified firms. But even though the Rumlet sample is from 1985, there is not a huge dissimilarity in risk measurement (Afza *et al*, 2008).

Similar studies were carried out in the 1990's that are full of loop holes on the importance for firms to diversify. Research conducted by Hill and Hensen (1991, cited in Afza *et al* 2008) concludes that diversification contributes to a firm's downfall and the main reason for decentralization or affiliation of subsidiaries to occur in the pharmaceutical industry in United States is to deal with the fast pace of the technological change in this industry. The literature analyzing this relationship gives mixed results. In their study Lin and Servaes (2002, cited in Afza *et al* 2008) analyze whether investment in a diversified firm would mean buying shares at a discount or a premium and their results concluded that shares could indeed be purchased at a discount in diversified companies compared to undiversified ones. In 2004, the analysis conducted by Villalonga (cited in Afza *et al* 2008) report the shares in diversified firms are being traded at a large premium instead. In many of the other emerging economies like China, Khanna and Yahef (2005, cited in Afza *et al* 2008) reach the conclusion that diversification is never related to corporate performance but it is the endogenous configuration of the firm itself that was responsible for growth. Hence, in the light of all this conflicting evidence and with a lack of empirical work for a developing economy like South Africa, we hope to rectify this situation by evaluating the effect of diversification on firms' performance by using the q analysis.

2.5.2 Research Design

In this experiment that is based on Afza, Slahudin and Nazir, 2008, our sample consists of 45 South African firms from a wide range of sectors in the economy; covering gold

mining, food producers, food retailers, real estate companies, insurance companies, construction materials, industrial transportation, energy companies and travel and leisure firms. We divide this sample into two categories, diversified and non-diversified based on their turnover and from reviewing their related trade activities. Firms that trade in a single related product or line of production are mostly considered as non-diversified and those that engaged in two or more activities are considered diversified. The aim of this study is then to use return on assets (ROA), return on equity (ROE) and q to analyze the relationship between diversification and the firm's performance. After obtaining our two groups there are two possible outcomes. Firstly, there might not be any significant difference between the performances of the two classes of firms or secondly, there could be a significant difference, *a priori*. A paired sample t test is used to test this relationship or hypothesis for each of the performance variables separately. In order to find the relationship between each performance variable and the firm category, we use a general multivariate regression model to determine whether diversification matters or not. Consider the regression model below.

$$Y = \alpha_0 + \alpha_1 CATG + \epsilon, \quad (1)$$

where $Y = [AROA, AROE, Aq]$ and is a row vector and:

$AROA$ = Average Return on Assets;

$AROE$ = Average Return on Equity;

Aq = Average Tobin's q ;

$CATG$ = Category of firm, a binary variable, 1 for diversified and 0 for non-diversified firms;

α_0 = The intercept term, and ϵ is the usual error term.

We make use of estimated parameters from our regression to test the relationship between a particular diversification strategy and corporate performance.

2.5.3 Statistical Analysis

In this study, ROA, ROE, and Tobin's q are used to measure the firms' performance and the CV (coefficient of variation) quantifies the relative risk associated with diversification. The first performance measure, ROA, shows how profitable are the firm's assets and gives us an approximation of how profitable the company's assets have been in generating the profits attributed to shareholders. It is usually defined as net income plus interest after tax savings before dividing by the average total assets. A second approach is to take net income to be distributed to stockholders and divide it by the book value of total assets. To measure risk, both the SD (standard deviation) and CV are calculated for all measures across the two groups of firms.

The second performance measure we use in our paired sample t test is the ROE, which can be defined as net income divided by the average shareholders' equity. This variable indicates how successful a firm is in using common stockholders' equity to generate returns for every one rand of capital. A high value usually shows how well investment funds have been used to generate earnings and is a useful indicator of the firm's internal growth. But we also need to be careful about this variable because consulting firms generally have very low asset base when compared to capital intensive firms and this does not mean that the consulting firms are not generating enough returns on their equity. We have used the AROE across all sampled firms from 2007 to 2009 as a better proxy. In

addition, the SD and the CV of these measures have been used to analyze risk among the two categories of firms in our sample.

Lastly we use the q ratio as a measure of firms' performance in the South African market. But for simplicity sake, we avoid the complex approach of computing q and instead use the market capitalization and divide this by the book value of total assets, which is similar to the $L-R$ q and Chung and Pruitt (1994) approach described in section 2.3. Here again, both the SD and the CV for the two groups are calculated for this measure.

In order for us to observe the behaviour of firms in our data set from the JSE, we divide our sample into the two groups as mentioned in Section 2.5.2 above. The first (upper) panel of Table 2.1 below gives the results for firms that follow a diversification strategy. AROE has the highest mean (20.9) but also has the highest standard deviation. The AROA shows a lower return than equity but with a high standard deviation, while the Tobin q has a value of 2.7 possibly indicating some monopoly power. In the second panel of Table 2.1 where firms adopt a non-diversified strategy or tend to have greater monopoly power (their q is 3.48, higher than the 2.7 above) in the South African economy prove to have higher profitability in terms of AROE which is 491.8 *per cent*. This figure includes the company Clicks as an outlier. Without Clicks the AROE is a more reasonable 38.3 *per cent* which is still higher than the diversified firms. When comparing AROA the non-diversified firms show 19.5 *per cent* (and roughly the same without Clicks) when compared to a 9.4 *per cent* for the diversified firms. One surprising observation is that in terms of Tobin's q the market places more value on non-diversified firms in the South African market as their q is 9.5 compared to 3.7 for diversified firms. This differs from the study undertaken by Afza, Slahudin, and Nazir (2008) with respect to the risk associated between a diversified and undiversified strategy of firms in Pakistan. Of course we do not expect the same results as economic structure and socio-economic factors are not likely to be the same for South Africa and Pakistan. Rather we let the theory underlying Tobin's q inform us as to the likely forces at work. It appears that the market is placing a higher value on firms with monopoly power in South Africa

and in the next chapter the differences in the estimated β for each firm (diversified or otherwise) bears this out.

Table 2.1

Descriptive Statistics							
	N	Minimum	Maximum	Mean	Std.	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
Avg rate of return on Assets	15	.80	33.99	10.7133	9.33709	1.265	.580
Avg rate of return on Equity	15	1.31	89.96	20.9007	22.42699	2.315	.580
Avg q	15	.14	12.30	2.7127	3.72570	1.943	.580
Diversified	15	1	1	1.00	.000	.	.
Valid N (listwise)	15						

Descriptive Statistics							
	N	Minimum	Maximum	Mean	Std.	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
Non- Diversified	30	0	0	.00	.000	.	.
Avg rate of return on Assets	30	-1.58	98.55	19.5063	25.87975	2.097	.427
Avg rate of return on Equity	30	-6.28	13643.06	491.8120	2484.118	5.476	.427
Average q	30	.13	52.53	3.4843	9.46279	5.134	.427
Valid N (listwise)	30						

Descriptive Statistics							
	N	Minimum	Maximum	Mean	Std.	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
Avg rate of return on Assets	45	-1.58	98.55	16.5753	22.06230	2.532	.354
Avg rate of return on Equity	45	-6.28	13643.06	334.8416	2029.213	6.706	.354
Avg q	45	.13	52.53	3.4802	8.08082	5.376	.354
Valid N (listwise)	45						

In Table 2.2 below, the performance and risk data of diversified and non-diversified firms based on ROA are shown. As mentioned, the AROA for non-diversified firms is 19.506 per cent when compared to 10.7 (see the first panel and column five) per cent for diversified firms. Looking at Table 2.2 below, however, the CV of non-diversified firms which is 1.33 and we notice no possible contradiction of general diversification theory as

the diversified firms have a CV of 0.87. Diversified firms in South Africa are generally associated with a lower risk (just in terms of firm variance) as the CV for non-diversified firms is higher. However with higher risk we measure a higher return as expected.

Table 2.2: Performance As: AROA

Descriptive Statistics			
	Mean	Std. Deviation	N
Diversified	10.7133	9.33709	15
Non Diversified	19.5063	25.87975	30

Correlations			
		Diversified	Non Diversified
Diversified	Pearson Correlation	1	-.201
	Sig. (2-tailed)		.473
	Sum of Squares and Cross-products	1220.538	-673.157
	Covariance	87.181	-48.083
	N	15	15
Non Diversified	Pearson Correlation	-.201	1
	Sig. (2-tailed)	.473	
	Sum of Squares and Cross-products	-673.157	19423.079
	Covariance	-48.083	669.761
	N	15	30

Table 2.3: Performance As: AROE

Descriptive Statistics			
	Mean	Std. Deviation	N
Diversified	20.9007	22.42699	15
Non-Diversified	491.8120	2484.11800	30

Correlations			
		Diversified	Non-Diversified
Diversified	Pearson Correlation	1	.004
	Sig. (2-tailed)		.988
	Sum of Squares and Cross-products	7041.580	4855.626
	Covariance	502.970	346.830
	N	15	15
Non-Diversified	Pearson Correlation	.004	1
	Sig. (2-tailed)	.988	
	Sum of Squares and Cross-products	4855.626	178954424.3
	Covariance	346.830	6170842.218
	N	15	30

From Table 2.3 above, the AROE and associated risk for each group of diversified and non-diversified firms are reported, and from this we can see that the behavior of our results is quite similar to those in Table 2.2. Once again, non-diversified firms performed better than diversified ones but with relatively more risk for non-diversified producers with a CV of 5.1 (or 1.33 without the outlier Clicks) when compared to CV of only 1.1 for diversified firms. Once again we can see that accounting information gives consistent results for both measures of return. Now let us examine the measured Tobin's q .

Table 2.4: Performance As: Tobin's q

Descriptive Statistics			
	Mean	Std. Deviation	N
Diversified	2.7127	3.72570	15
Non-Diversified	3.4843	9.46279	30

Correlations			
		Diversified	Non-Diversified
Diversified	Pearson Correlation	1	-.125
	Sig. (2-tailed)		.657
	Sum of Squares and Cross-products	194.332	-14.883
	Covariance	13.881	-1.063
	N	15	15
Non-Diversified	Pearson Correlation	-.125	1
	Sig. (2-tailed)	.657	
	Sum of Squares and Cross-products	-14.883	2596.786
	Covariance	-1.063	89.544
	N	15	30

In Table 2.4 above, we can see that the market gives a lower value of q for diversified firms with an average value of 2.7127 when compared to 3.4843 for non-diversified firms. What this tells us is that there is a direct relationship between q and return. The SD for diversified firms for Tobin's q is much lower than for non-diversified ones giving us more confidence in the measured q of diversified firms. But we confirm the theoretical position that q is higher for monopolies or our non-diversified firms.

After we analyze each of the variations separately in the above three tables, we need to reconcile them; a paired sample t test has thus been done to cluster the relationship

between diversified and non-diversified firms by using each of the variables. The results are tabulated in Table 2.5. The first panel indicates the mean, number of data sets, standard errors of means and standard deviations. The second panel is the paired sample correlation between the grouping of each of the two variables for both groups of firms and the significant value of the two tailed tests alongside the significance levels. In the third panel, labeled paired sample test, we give the results of this analysis. The results show the values of the t statistic for each of the pair of variables for both firm groups with 14 degrees of freedom. Here, the label for each pair is given below.

Pair 1 = $AROA$

Pair 2 = $AROE$

Pair 3 = Aq

By referring to the t values of each pair in Table 2.5 below, there is no significant difference between $AROA$, $AROE$ and q . This implies that statistically there is no difference between the South African firms in our sample. So although one cannot say non-diversified firms perform differently in a statistical sense, the different levels are still instructive. Diversified firms in South Africa have a higher risk involved with high returns. This is because in South African market the *constancy* of monopoly profits reduces risk below that of firms that diversify, and these monopoly firms achieve lower returns but capture a larger market shares. But what is odd is that South Africa has high estimated values of q yet lags behind in investment as savings is an obvious constraint. And it is in the next chapter that we address the issue of savings.

Table 2.5: Paired Sample *t* Test of Diversified and Non-Diversified Firms

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Diversified	10.7133	15	9.33709	2.41083
	Non Diversified	19.4180	15	25.64688	6.62200
Pair 2	Diversified	20.9007	15	22.42699	5.79062
	Non-Diversified	952.1853	15	3510.99832	906.53587
Pair 3	Diversified	2.7127	15	3.72570	.96197
	Non-Diversified	1.9287	15	2.28235	.58930

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	Diversified & Non Diversified	15	-.201	.473
Pair 2	Diversified & Non-Diversified	15	.004	.988
Pair 3	Diversified & Non-Diversified	15	-.125	.657

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Diversified - Non Diversified	-8.70467	29.00188	7.48825	-24.76537	7.35604	-1.162	14	.264
Pair 2	Diversified - Non-Diversified	-931.285	3510.97116	906.52886	-2875.60	1013.026	-1.027	14	.322
Pair 3	Diversified - Non-Diversified	.78400	4.60610	1.18929	-1.76677	3.33477	.659	14	.520

2.6 What Have We Learnt?

In the first instance, what is new from Tobin is a theory of investment related to a ratio called q . This ratio is the market evaluation of an asset relative to its replacement cost. If q is high, investment (under some circumstances) may be high. In that regard, his theory is similar to the neo-classical theory of investment which does not have a relationship

between observed investment levels and the interest rate as one makes up the desired capital stock. However, what we can say is that (based on an *IS/LM* type analysis) a low q , requires active monetary policy, which is exactly what we have observed recently given the activities of Ben Bernanke at the Federal Reserve Board in the US. However, it will take a while for these monetary policy adjustments to work and in the main will affect output levels, which will be higher but at the lower level of observed average q 's. We then looked at q and its relationship to market structure. And we see that in an economy with monopoly elements (like South Africa) q will be higher relative to that of perfect competition. This can be seen for Eskom in South Africa as we compute the *L-R* q ratio in Chapter 1. What this means is that, for a country like South Africa, q might have a limited role in shaping the direction of monetary policy but a high average value provides an indication of the relative strength of the South Africa economy and its ability to cope with the global downturn of the past year.

In order for us to test the validity of the q ratio, we further analyze the hypothesis of the relationship of diversification as a better strategy for corporate growth by taking a sample of 45 South African firms and divide them into two groups namely; diversified and non-diversified. Alongside with the Tobin q , we have used other variables such as *AROE*, and *AROA* to run a correlation analysis with risk (measure using *CV*) by using the paired sample t test. Our results conclude that in the South African market, firms that followed a non-diversified strategy (or those with monopoly power) outperform firms that adopt a diversification strategy for the period 2007 to 2009 and rather perversely the latter have higher returns and higher risk, although these results are *statistically* weak. Our analysis also reveals that there is a significant difference between the book and market values of data we have used. Firms that adopted a diversification strategy can acquire a larger market share but there is no guarantee of profitability and this suggests that entrepreneurs need to be careful in the degree of diversification that they choose. Also a weak competition policy has favoured monopoly elements in the economy but the lower variability of monopoly returns has served to insulate South Africa from the now, it seems, passing global downturn.

What is of overall interest is that we can take an idea of Tobin's, namely his q theory of investment and use it to comment on world developments, especially those pertaining to monetary policy in the United States which does influence the South African economy. Further we note that South African monetary policy does not use q explicitly as monopolistic elements in the South African economy causes values of q to be high (and stable) making q of limited usefulness in macroeconomic policy. So in conclusion, Tobin's analysis is still relevant today as it can be used to place South African monetary and industrial policy in a global context. This is because Tobin's analysis in Section 2 shows restrictive monetary policy gives high q values. But we also see in Section 2.4 monopoly elements also increase the average q in the economy. We suspect that what separates our domestic economy from the impacts that have really hurt other economies in the past year of economic downturn is that measured q in South Africa is higher.

CHAPTER THREE

LIQUIDITY PREFERENCE AS BEHAVIOR TOWARDS RISK: A REVIEW OF PORTFOLIO LITERATURE AND ANALYSIS

For years, the functional relationship of liquidity preference in the Keynesian model of the economy assumes that the demand for cash balances and the rate of interest is inversely related. These assumptions regarding the behavior of decision making units have been the basis of Tobin's research and concern in his assets and portfolio analysis. Tobin is in fact convinced of the idea that the downward sloping liquidity preference curve was irrational for the following reason: people would not hold non interest bearing obligations of the government when so many other interest bearing obligations are available. Similarly, regardless of the interest rate, holding cash does not make sense. Tobin also wanted to explain why the demand for cash balances is inversely related to an interest rate differential for cash holdings when the yield is less than that on other assets. However, it is important to note that in a world of no uncertainty, "... securities themselves would circulate as money and be acceptable in transactions; demand bank deposit would bear interest just as they often did in this country in the period of the twenties" (Samuelson, 1947, cited in Mueller, 1967: 173). The bulk of this chapter follows Tobin (1958b) closely. However our overall aim is to synthesize this analysis with Tobin's work on his q ratio and taxing excessive financial flows.

3.1 Transaction and Investment Balances

The two main functions of holding money are for transactions and investment purposes. Tobin (1958, cited in Mueller, 1967) argues that there cannot be any perfect symphony in the flow of receipts and expenditures. The accumulation of these balances over time is

what consists of the transaction flow. The transaction flow is in turn dependent of the institutions which are responsible for the receipts and expenditures among individuals or between institutions. Hence, the need for transaction balances is more or less related to the volume of transactions. However, the obvious existence of these institutions to the demand for the transaction balances of the demand for money has led to the view that interest rates are not important. It is obvious that the size of the transaction balances matters but its components also implies that some part of the cash holdings may be in the form of an asset for investors. Either on a short or long term basis, interest earnings may occur despite the costs involved. Thus, Tobin assumed the interest elasticity in the demand for cash matters and shows there is an inverse relationship between the proportion of cash holdings for transactions and the rate of interest.

3.1.1 Investment Balances and Portfolio Decisions

Investment balances differ from transactional balances in that they are not needed for consumption purposes and thus, will not be turned into goods during the year. As a mere fact, the costs of financial transactions do not encourage the holdings of investment balances in cash. Thus, Tobin agrees with Keynes when he proposes the speculative motives of investors and its link to the interest elasticity of the demand for cash. In essence, people will hold cash as a component of investment balances because of fear of loss on other assets. Other cash alternatives that are included in the portfolio are merely cash subject to a yield variable. These consist of future payments with no risk of default. Broadly speaking, they can be classified as small variants of the same species that we call monetary assets. Muller (1967) considers that there is a large variety of other assets such as corporate stocks, real estate and shares in unincorporated businesses and professional practices. Thus, this means that the liquidity preference theory no longer makes a distinction between the species of monetary assets on one hand and the broad classes of other assets on the other. The differences in the investors' choices question other theories in economics such as the theory of investment and consumption. Tobin's liquidity

preference theory concerns itself with how much wealth is invested in monetary assets and what proportion is to be allocated among cash and alternative monetary assets. He also points out, in his portfolio model, that due to the inelasticity of future interest rates and the uncertainty involved, investment balances can be in cash when compared to other monetary assets.

3.2 Inelasticity of Future Rate Expectations

In order to simplify his analysis, Tobin assumes that there is only one monetary asset besides cash; which is called a consol. (The exposition here is based on Tobin, 1958 and cited in Mueller, 1967). The return on the consol if $R1$ is invested today will yield an income of Rr annually. Even though the cash asset yields a zero return, it does not matter. The investor must therefore decide from his given total wealth how much to allocate to cash, A_1 , and which proportion goes into consols, A_2 . After one year, r_e is considered to be the expected rate on consols. The expectation of r , r_e is constant to be independent of the current rate r . The capital gain or loss g involved will thus be:

$$g = r/r_e - 1 \quad (1)$$

Equation (1) above implies that consols will be the first choice of investment if the annual income plus the loss exceeds zero. Similarly, if $r + g$ is less than zero, then the cash asset will be a better option. The same conditions can also be expressed in terms of a critical rate r_c , where consols will be the most preferred asset if current rates increases above the critical rates and vice versa.

$$r_c = r_e / (1 + r_e) \quad (2)$$

3.2.1 Stickiness and Certainty in Interest Rate Expectation

The major assumption that the investor's expected interest rate, r_e , is perfectly independent of the current rate, r , can also be relaxed to some degree provided there is some independence from the expected rate. This is illustrated in Figure 3.1 below.

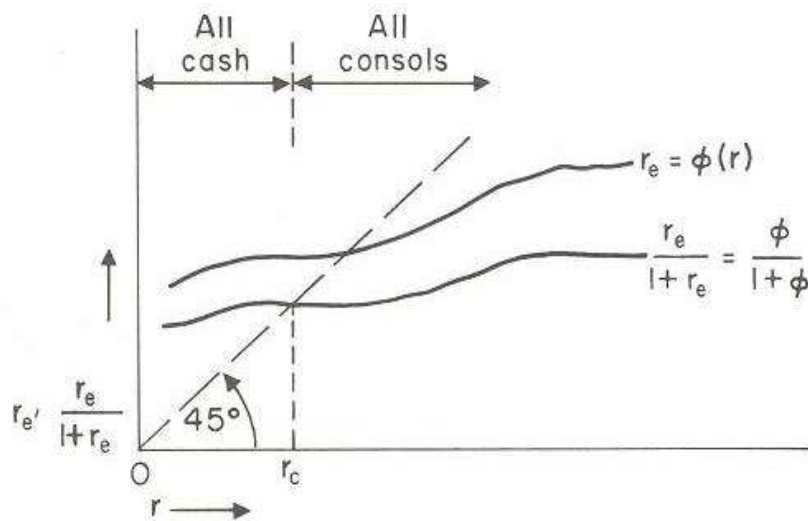


Figure 3.1 Stickiness in the Relation between Expected and Current Interest Rate

Source: (Tobin, 1958).

From Figure 3.1 above, Tobin illustrates the idea that the expected interest rate is a function of the current rate. This implies that $r_e / 1 + r_e$ is a function of the current rate, r . At the intersection of the function with the 45° line, we obtain the critical rate, r_c . Hence, at all points above the function where r exceeds r_c , the investors will not invest in the cash asset.

3.2.2 Differences of Opinion and the Aggregate Demand for Cash

Tobin went further in deriving the aggregate demand for cash balances in this model by showing that the relationship to the current rate of interest would be a discontinuous step function, shown in Figure 3.2 below. The shaded line $LMNW$ shows that the rate of interest and the quantity for cash is inversely related. This is also known as the Keynesian liquidity preference function.

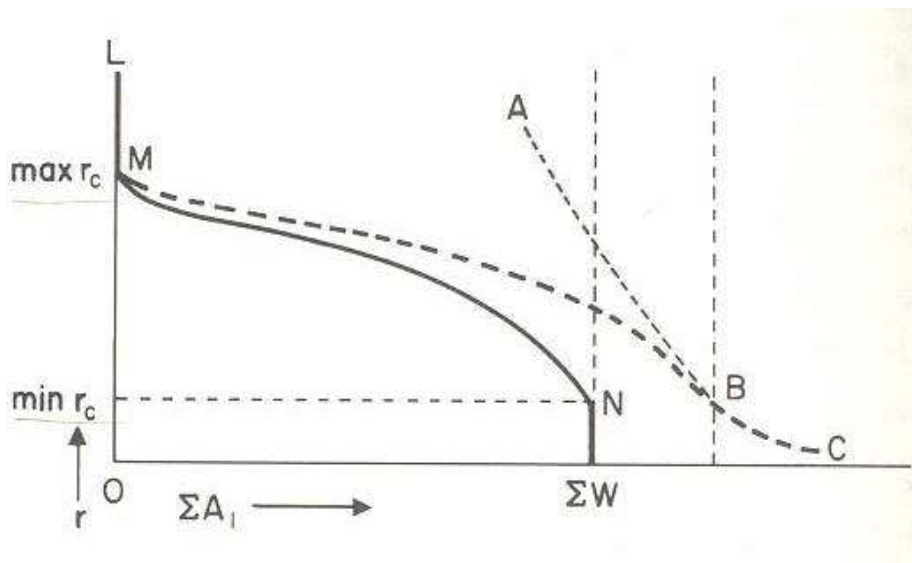


Figure 3.2 Aggregate Demand for Cash Assuming Differences Among Individuals in Interest Rate Expectations
Source: (Tobin, 1958).

In order to get the aggregate demand for cash, Tobin assumed that individuals have different critical rates, r_c . This implies that if the actual rates lie above the maximum critical rates of all the individuals, then the aggregate demand for cash is zero. On the other hand, if the minimum individuals' critical rates lie above the actual rates, the aggregate demand for cash will comprise total investment balances for whole economy. Between $\max r_c$ and $\min r_c$ in Figure 3.2, the rate of interest will vary inversely with the demand for cash. This inverse relationship is in fact shown by the smooth line $LMN\Sigma W$

in Figure 3.2. Its shape depends on the number of investors in the economy and how investment balances are distributed at the critical rate.

3.2.3 Capital Gains or Losses and Open Market Operation

In the above analysis, Tobin also points out that the size of the investment balances for the economy as a whole will vary inversely to the current rate of interest, provided that there are returns that are due on previous consols. Thus, whatever returns that investors are bound to receive depending on the previous fixed coupon rate at the current relationship, there would be capital gains or losses. For only one individual, the returns on investment balances would not be constant at the point $\sum W$ in Figure 3.2 above but which we can just call W . The same reasoning applies for all individuals in the economy which would justify returns at the current rate r as represented by the curve ABC . Hence, the demand for consols at any interest rate is the horizontal distance between $LMBC$ and ABC in Figure 3.2. The line ABC simply implies that the value of consols goes to infinity as BC tends towards the horizontal axis which it will never touch. It is also important to note that if bonds with different maturities are included, then the size of the total investment balances would be limited to a certain extent.

The implications of the liquidity preference theory implies that the curve $LMBC$ signals the central bank when to start transactions on the open market operation when there is the claim for future outstanding payments in the form of bonds and consols. Given that the amount of transactions on the open market operations is constantly changing the quantity of bonds and consols, the curve will not remain stagnant. It also depicts the quantity of cash needed to set the interest rate at a specific level. Whenever the central bank decides to set the rate below the min r_c , the outstanding bonds and consols must be purchased, causing the community's investment balances to change and to become independent of the interest rate and this is shown by a vertical line cutting through B , or to the right of B

in Figure 3.2. We can thus picture the new line so generated lying above LMB and having the same shape as the original $LMN\Sigma W$ curve shown in Figure 3.2.

3.2.4 Criticism of the Keynesian Liquidity Preference Theory

So far, this liquidity preference theory is close to Keynes' theory and Tobin agrees with Keynes to a certain extent. But there have been several critics especially Leontief, who argues that although it is part of an explanation of the underemployment equilibrium in the Keynesian model, "liquidity preference must be zero in equilibrium, regardless of the interest rate" (Tobin, 1958, cited in Mueller, 1967: 178). Feller (1946, cited in Mueller, 1967) makes the same remark, namely, that unemployment cannot be an equilibrium that is static in theory but rather we should have more dynamic explanations of the problem of unemployment. His work in fact reveals whether or not it is possible to do without the stickiness of the interest rate without getting rid of the Keynesian implications of the liquidity preference theory.

3.3 The Locus of Opportunity for Risk and Expected Return

Assuming that the uncertainty condition about future interest rates holds, Tobin illustrates the idea of an opportunity cost for risk and expected return in the portfolio selection problem in Figure 3.3 below.

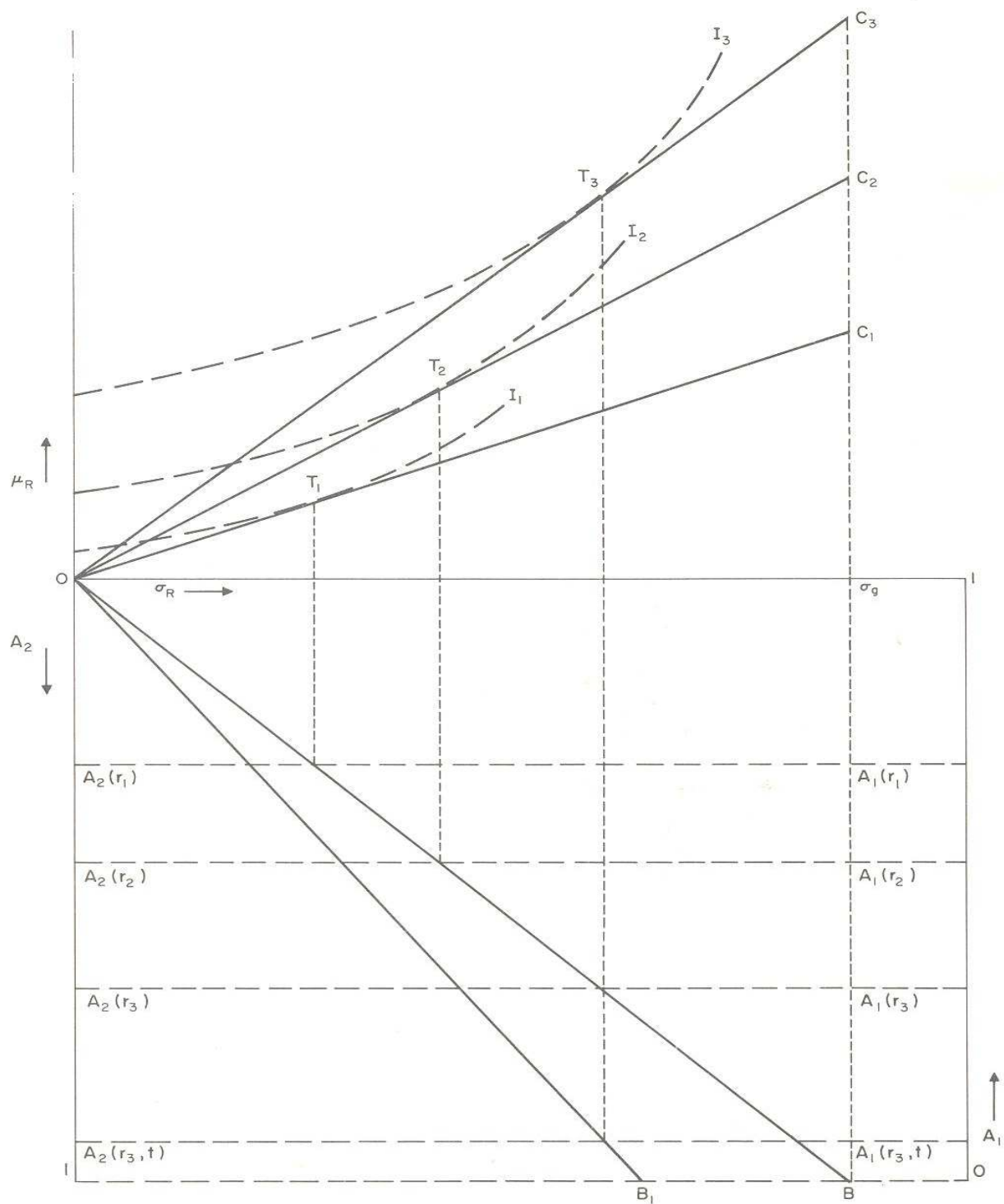


Figure 3.3 Portfolio Selection at Various Interest Rates and Before and After Taxation
Source: (Tobin, 1958).

In Figure 3.3, we can see that the greater the amount of investment in consols, the degree of the risk factor assumed on behalf of the investor will be greater while expected returns will also increase. This is shown in the first half of the figure where expected return on the vertical axis is plotted against risk. OC_1 illustrates this relationship indicating, that a higher risk involves a greater return. Moving downwards from the origin, the vertical axis in the second half of the diagram shows the investment in consols. The line OB measures the ratio of the degree of risk involved with consols as total investment in consols rises to 100 per cent. By inserting uncertainty into the model, here the investor will be assumed to be uncertain of the capital gain or loss g (defined in equation 1 in Section 3.2). But, his investment decision will be based mostly on the probability distribution of g which is completely independent of the current rate (r) on consols.

In the above analysis, we can see that the portfolio selection will comprise of A_1 in cash and A_2 in consols. It is also important to remember that the summation of A_1 and A_2 must equal to one while negative values are not taken into consideration implying that only certain institutions such as the government and banks are allowed to issue cash and consols. The expression that follows here is based on James Tobin (1958).

The return on the portfolio can be expressed algebraically as follows where:

$$R = A_2(r + g), \quad 0 \leq A_2 \leq 1 \quad (1)$$

Expected return will thus be:

$$E(R) = \mu_R = A_2r, \quad (Eg = 0) \quad (2)$$

Where the standard deviation formula for calculating risk consists of:

$$\sigma_R = A_2 \sigma_g, \quad 0 \leq A_2 \leq 1 \quad (3)$$

The mean value:

$$\mu_R = r / \sigma_g * \sigma_R. \quad 0 \leq A_R \leq \sigma_g \quad (4)$$

Equation (3) gives us the standard deviation of R , the expected return, around the various possible returns of the mean value μ_R . If the value of equation (3) is high, this implies that returns will deviate widely around the mean return. The investor here will be subject to large capital gains or losses. On the other hand, a low value simply indicates that returns will be more or less around the mean return. The investor will be unable to avoid large capital loss as he can occasionally reap unusual gains.

Equation (4) is derived from equation (2) and equation (3) above and shows that the investor can obtain greater expected returns when he assumes greater risks. This is illustrated by the line OC_1 in Figure 3.3. If the interest rate climbs higher to r_2 or r_3 , the opportunity locus would lie on OC_2 and OC_3 .

3.3.1 Indifference Curves between Combination of Risk and Expected Returns

The preceding analysis sheds light on both high and low σ_R implying that investors have a choice leading to preferences between expected return μ_R and risk σ_R . These preferences explain the different locations of the investors on the indifference curves. For risk-lovers, the slope of the indifference curves would be negative, implying that there is willingness for a low expected return so that the chances of reaping high capital gains are small. For risk-averters, the willingness to accept greater risk would not happen unless there is an expectation of high expected returns. These indifference curves would differ in being

positively sloped. Tobin also distinguishes two classes of risk-aversers, namely; diversifiers with concave upward indifference curves and plungers whose indifference curves would also be upward sloping but either linear or convex.

3.3.2 Indifference Curves as Loci of Constant Expected Utility of Wealth

The existence of the indifference curves that investors face can be explained by the assumption that Tobin (1958) made in explaining the liquidity preference theory as a behavior towards risk. Given the wide range of probability distributions of returns available to the investor, a choice is made based on the two parameters of the distributions. Thus, the mean μ_R and the standard deviation σ_R may not be the two parameters that the investor will choose. We can justify the use of the mean and the standard deviation when the investor expects the gains and losses to be lying around zero or when he expects capital gains or losses to be approximated by a normal distribution. However, as soon as the mean and the standard deviation are specified, the probability distribution will be determined. Thus, the indifference curves over choices of μ_R and σ_R can be used to analyze the investor's choice, as well as the use of any independent parameters.

The main reason for relying on the mean and standard deviation is justified by Tobin on the assumption that utility is in the quadratic form as shown below. The exposition here is based on Tobin (1958).

In the case of a risk-lover where $0 < b < 1$, and for that of a risk-averter, $-1 < b < 0$

$$U(R) = (1 + b)R + bR^2 \quad (1)$$

Equation (1) above cannot describe the full utility on the return R because marginal utility cannot be negative. Thus, this function can only apply when the condition below holds.

$$(1 + b) + 2bR \geq 0 \quad (2)$$

From equation (2) we derive,

$$R \geq - (1 + b / 2b), (b > 0) \quad (3)$$

$$R \leq - (1+b / 2b), (b < 0) \quad (4)$$

Equation (3) and (4) tell us that any values of R outside these limits must be excluded. For a risk-lover, the value of b must be positive while for that of a risk-averse investor, b must be a negative value. However, investment only in consols or when A_2 equals one, the return on the portfolio must comprise the current rate of interest and the capital gain or loss. Therefore, to take into account the highest rate of interest, a risk-averter must not exceed the capital gains, g , for which the probability is greater than zero.

Hence, we can rewrite equation (4) as follows:

$$r + g \leq - (1 + b / 2b) \quad (5)$$

In order for the risk-lover to take into account the lowest interest rate, the corresponding limitations must be as follows:

$$r + g \geq - (1 + b / 2b) \quad (6)$$

From Figure 3.4 above, we can see that the investor is initially in equilibrium at T_1 on indifference curve I_1 and the corresponding point on line OB_1 ; $A_2(r_1, \sigma_g)$ which shows the initial interest rate r_1 and risk σ_g . The line OB_1 in fact shows the risk-consols relationship. The opportunity locus moves to OC_2 and to point T_2 on I_2 if the investor reduces his risk by half. The point T_2 can in fact be attained if the interest rate is increased two times and the investor's risk estimate σ_g remains fixed. Thus in this case, Tobin (1958) points out the following relationship holds:

$$\sigma_g / A_2 * dA_2 / d\sigma_g = -r / A_2 * dA_2 / dr - 1 \quad (1)$$

Equation (1) gives us the relationship between the elasticity of the demand for consols with respect to risk and its elasticity with respect to the interest rate.

We can also see the effect of an increase in tax in Figure 3.4. Assuming that the investor is at T_2 on I_2 and $A_2(2r_1, \sigma_g)$ on line OB_1 , where $2r_1$ is the initial interest rate and σ_g is the risk taken. Both interest income and capital gains are now subject to a fifty percent tax. The idea behind the imposition of the tax is to reduce the net return on consols from $2r_1$ to r_1 on line OB_1 and to decrease the risk per dollar on consols from σ_g to $\sigma_g/2$. At any interest rate, such a tax reduces the demand for cash by shifting liquidity preference. However, if only the interest income of the investor is subject to tax, then they would move from point T_2 on I_2 to T_1 on I_1 . This implies that the demand for cash balances would have increased and liquidity preference is shifts to the right.

3.5 The Extension of Markowitz Modern Portfolio Theory

James Tobin's separation theorem extends Markowitz theory of portfolio selection when it introduces the risk-free asset and subsequently derives the capital market line (CML). Tobin's separation theorem asserts that portfolio selection can be separated into two independent tasks: first identifying the optimal risky portfolio lying on the Markowitz efficient frontier, and then allocating portfolio weightings between this optimal risky portfolio and the risk-free asset (Bodie, Kane and Marcus, 2003: 192). Given the Markowitz assumptions, additional assumptions are taken on when modern portfolio theory introduces the risk-free asset into the investor's investment strategy and subsequently derives the capital market line. Firstly, it assumes that investors are not restricted from borrowing and lending at the risk-free rate. In addition, there are homogenous expectations on the part of investors, and their estimates of the means, variances, and covariances of the security returns are the same (Fuller, 1981: 11). Besides, there are no taxes; there are no transaction costs in these perfect capital markets (Fuller, 1981: 11).

3.5.1 The New Efficient Frontier: The Capital Market Line

Capital allocation lines (CAL) plot available risk-return combinations by varying portfolio weightings between the risk-free asset (R_f) and a risky portfolio (Bodie *et al*, 2003: 152). The capital asset line is the reward-to-variability ratio, representing the increase in expected portfolio return that an investor can earn per unit of additional standard deviation (Bodie *et al*, 2003: 152). The steeper the capital allocation line, the greater the expected return for every unit increase in standard deviation or measure of risk. Investors have an infinite number of feasible capital allocation lines extending from the risk-free asset to risky portfolios and securities located anywhere in the opportunity set. The optimal capital allocation line is the one with the highest reward-to-variability

ratio, for instance, the capital allocation line with the steepest slope. The steepest capital allocation line is the one that is tangent to the Markowitz efficient frontier. Figure 3.5 below, illustrates the best possible capital allocation line when it is tangent to the efficient frontier.

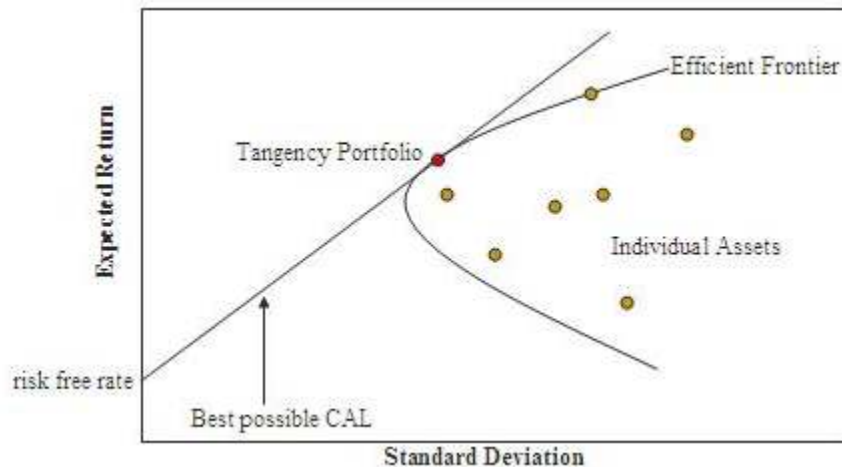


Figure 3.5 The Efficient Frontier
Source: Retrieved from Wikipedia, (2007).

From the above figure (Figure 3.5), we can see that the capital allocation line measures the relationship between risk and expected return and can also be expressed mathematically as follows: (The expressions that follow are based on those in Wikipedia, 2007).

$$CAL: E(r_C) = r_F + \sigma_C * [E(r_P) - r_F / \sigma_P] \quad (1)$$

In equation (1), the risky portfolio is denoted by P , while the riskless portfolio is represented by F and C is a combination of P and F . Without the assumption of homogenous expectations, investors can have their own unique perceptions of the opportunity set, as in the case with Markowitz's theory (Fuller, 1981: 12). However,

under the assumption of homogenous expectations, all investors have identical estimates of security means, variances and covariances within the same single holding period and experience the same tax consequences, and thus all investors visualize the same opportunity set and efficient frontier (Fuller, 1981: 13). The capital market line equation can thus be expressed algebraically below.

$$CML: E(r_C) = r_F + \sigma_C * [E(r_M) - r_F / \sigma_M] \quad (2)$$

Equation (2) above indicates that the capital market line is in fact the optimal capital allocation line.

3.5.2 Identification of the Optimal Risky Portfolio

The point of tangency between the Markowitz efficient frontier and the capital market line is the optimal risky portfolio (Bodie *et al*, 2003: 152). The market portfolio is the completely diversified, market-value weighted portfolio of all existing risky securities (Fuller: 1981:13). All investors, regardless of their risk aversion, would hold the portfolio of risky assets represented by the market portfolio. This, once again, arises from investors' homogeneous expectations. Because all investors derive the identical efficient frontier and capital market line, they will just have the same tangency portfolio 'M' with the capital market line and efficient frontier (Bodie *et al*, 2003: 222).

With the capital market line being the new efficient frontier, investors can achieve a higher return for the same level of risk by combining the risk-free asset with the market portfolio, than they could by constructing portfolios with just risky assets alone (Fuller, 1981: 13). By deriving the new efficient frontier (the CML) and identifying the optimal

risky portfolio (the market portfolio), the first part of Tobin's separation theorem is satisfied. Identifying the market portfolio is purely a technical decision based on external characteristics being estimates of assets' expected returns, variances and correlations.

3.5.3 Combining the Risk Free Asset and the Market Portfolio

Investors, based on their level of risk aversion, decide in what proportions they will combine this optimal risky portfolio with the risk-free asset. This is a personal choice based on an investor's internal characteristics (Bodie *et al*, 2003: 192). The investor's optimal portfolio comes from where their indifference curves are tangential to the capital market line. A risk averse investor with steeper, upward sloping indifference curves will hold more of the risk-free asset and less of the risky market portfolio (Bodie *et al*, 2003: 154). The levered portfolios offer a higher risk and reward. The capital market line expresses risk and return for efficient portfolios only, and is a function of total risk. The next major milestone in modern market portfolio is the development of the capital asset pricing model by Sharp, Lintner and Mossin. The capital asset pricing model and its security market line, applies to both efficient and inefficient portfolios and individual securities, while expressing the expected return on an asset as a function of systematic risk.

3.6 The Implications of Modern Market Portfolio for Risk Adverse Investors

According to Fuller (1981), Markowitz' theory implies investors will hold portfolios and they will diversify their portfolios and hold any portfolios that lie on the efficient frontier (Fuller, 1981: 11). Investor's utility will be maximized when they hold an efficient portfolio (Fuller, 1981: 3). Fuller also maintains that the capital market line and Tobin's separation theorem imply that investors will choose to hold the market portfolio and only

differ in how much is invested in the risk free asset (Fuller, 1981: 11). This portfolio when plotted on the capital market line dominates all other portfolios (Fuller, 1981: 11).

According to Brandhorst highlights, modern portfolio theory asserts that the market portfolio is optimal, which means that no other portfolio (including actively managed mutual funds) has a better reward-to-risk ratio on a forward looking basis. This implies that all investors should hold a portfolio in the form of a broad-based index that is representative of the market portfolio.

3.7 An Application of Market Portfolio to Evaluate Risk in South Africa

Using our sample of forty-five South African firms, we have extended our analysis, using the same data, of the relationship between risk and diversification (from Chapter Three) to the capital asset pricing model (CAPM) and we estimate σ_C in equation 2 above: it is commonly called a firm's β . Our observations, given our data from McGregor, enables us to confirm the β values for non-diversified firms on average 0.62, thus indicating less relative risk in the assets of these firms. This once again highlights a higher rate of return is associated with investing in those firms as possibly their monopoly power counteracts their lack of diversification. In this context, portfolio risk is reflected by a higher variance associated with the overall portfolio risk. As the value of β thus indicates exposure by an investor we measure the β of diversified firms at a higher value of 0.67, indicating higher risk in the South African market. Thus, an investor should always have a diversified portfolio and expect performance according to the market. The Table in appendix 7 gives us a summary of the overall description of our sample of companies.

3.8 Implications of the Analysis for Liquidity Preference Theory

In analyzing investors' behavior towards risk, Tobin's foundation is based on the assumption that the inverse relationship of the demand for cash and the rate of interest might not necessarily depend on the elasticity of future interest rate expectations but the expected value of g , or the capital gain or loss from holding interest bearing assets. Tobin extends our understanding of the general theory of Keynes in that investors can diversify their investment decisions in holding both cash and consols rather than holding only one asset in the Keynesian theory.

Other criticisms of the Keynesian theory in an attempt to explain the under unemployment equilibrium comes from Leontief and Fellner (Tobin, 1958). According to Leontief's argument the gap between the current and expected rate of interest disappears completely to zero as investors learn from mistakes or experience. In equilibrium, the liquidity preference theory must thus be of no effect or in the event that it is low enough for a long period of time before equilibrium is reached it would be considered normal. Hence we can say that Leontief's understanding of the static theory highlights his major criticism against Keynes that "(...) unemployment was not a feature of equilibrium, but a phenomenon of disequilibrium requiring analysis by dynamic theory" (Tobin, 1958: 248). On the other hand, Fellner's question concerns wealth owners beliefs about price levels before a depression, and the correlation between a fall in wages and a fall in consumption and investment demand could be regarded as normal no matter how elastic is the investors' liquidity preference.

But would Leontief's argument of the liquidity behavior towards risk imply a constant equilibrium of zero? We would assume this to a lesser degree since experience will teach even the most stubborn investor to ignore the potential of constancy in interest rates. In fact in a pure stationary equilibrium, as long as investors generally estimate risk, σ_g , to be

zero, the rate of interest on consols would remain the same. Therefore we can see that irrespective of a stationary state, Tobin's portfolio analysis increases our knowledge concerning the diversification of investment opportunities of investors' behavior which can be useful in making an aggregative analysis.

However, Tobin (1958) himself acknowledges the complications that exist with regards to the direction of the relationship between the interest rate and the demand for cash balances. For as the interest rate approaches zero, a negative elasticity of the demand for cash holdings exists as *per* the theory. But at high interest rates and as investors expect a low risk on capital gain or loss, the demand for cash balances can increase rather than decrease, being a function of the rate of interest. However, this analysis comes with the fact that at high interest rates, an investor can also reduce consol holdings to hold more of cash. In addition, in reality, individuals' expectation of interest rates would differ rather than remain constant and this will require analysis of specific market situations. But for simplicity sake we can also view the Keynesian inverse relationship of the demand for cash balances not as irrelevant but as a complementary, instead of being competitive, with Tobin's liquidity preference theory.

3.9 How has Tobin's Analysis Added to Our Knowledge?

In Chapter Two we conclude that Tobin points us in the direction of when to invest. Now in this chapter we see this process when the investor is monitored by the decisions of shareholders to allocate wealth to firms making those investment decisions. Tobin provides the first (or one of the first) justifications that individual investors hold a diversified portfolio of investments in firms themselves making decisions. Preferences towards risk are important but come second to the conclusion that for most investors the 'market portfolio' should be their choice as this is an optimal strategy. Given current developments in the world financial markets, we can see why the sub-prime mortgage

market has had such a devastating effect: portfolios of banks were not in line with Tobin's recommendation: you cannot hold one asset no matter what returns it gave historically. A unifying theme between Tobin's q and Tobin's A_2 , is the use of discounting albeit of a simple investment. In the background is the notion that to encourage investment of the type in this chapter, consumption should be taxed. But what if that savings leaves the domestic economy. The resolution to this problem of excess capital flight is the subject of Chapter Four where we discuss the tax Tobin suggests.

CHAPTER FOUR

A REVIEW AND ANALYSIS OF THE TOBIN TAX LITERATURE

4.1 Brief Overview and the Origin of the Tobin Tax

The original idea of the Tobin tax is first advocated in 1978 when Tobin came up with the first proposal “to throw some sand in the wheels of our excessively efficient international markets” so that to enhance the ability of central banks and governments to undertake monetary and fiscal policies in addressing internal economic circumstances (Tobin, 1978, cited in Willem, 2003). The proposed tax is to be applied on all trade of currencies across countries, thus, restricting short term speculation and would be set as low as possible. The international charge on foreign exchange transactions was first proposed after Richard Nixon expressed his opinion that the US dollar would no longer convert to gold and eventually led to an end of the Bretton Woods system (Wikipedia, 2007). Later on, in 1981, Tobin was rewarded for his work by receiving the Nobel Prize in economics. There have also been various encouragements among European countries, Canada and the United States in acknowledging the implementation of the tax. The United Nations was the first body considered for the responsibility of managing the Tobin tax with its independent funding large enough apart from the monetary contributions received from other nations. In 2004, Belgium announced that it will introduce the tax only after all countries of the European zone amend their legislation while the Canadian government has already passed a resolution to establish a tax on financial transactions (Wikipedia, 2007).

However, there has been much misunderstanding with regards to the Tobin tax, which led many to believe that he was part of the anti-globalization campaign. Tobin, himself,

denied this accusation in an interview with Der Spiegel when he put it in his own words as follows:

“I have absolutely nothing in common with those anti-globalization rebels. Of course I am pleased; but the loudest applause is coming from the wrong side. Look, I am an economist and, like most economists, I support free trade. Furthermore, I am in favor of the International Monetary Fund, the World Bank, the World Trade Organization. They’ve hijacked my name...The tax on foreign exchange transactions was devised to cushion exchange rate fluctuations. The idea is very simple: at each exchange of a currency into another a small tax would be levied – let’s say, 0.1% of the volume of the transaction. This dissuades speculators as many investors invest their money in foreign exchange on a very short-term basis (...)” (Wikipedia, 2007).

The idea behind the Tobin tax is thus to restrict the volume of foreign exchange transaction while those of the anti-globalization campaigns emphasize the need to use the funds so derived to improve world welfare. The Tobin tax, in fact, created different opinions; some argue that its aim is to protect countries from financial crisis and others argue that it would eventually lead to a reduction in the world’s liquidity.

4.2 The Two Cases for “Sand in the Wheels” of International Finance

One reason behind the Tobin tax is to improve the ability of both central banks and governments to pursue efficient monetary and fiscal policies by restricting international financial mobility and thus, to unfasten the changing pace of national interest rates. Before the Bretton woods system, there were several economic analyses leading to the view that countries who wish to have exchange rate stability would have to sacrifice their monetary independence (Eichengreen, Tobin and Wyplosz, 1995). Due to high capital

mobility, the degree of monetary policy independence produces major effects in financial markets. While floating currencies can fluctuate widely, any attempt by the authorities to keep them fixed would involve high costs in terms of reserve losses and interest rate changes. On the other hand, governments cannot attempt to keep the exchange rate fixed when market forces increase (or decrease) interest rates to significantly different levels. Hence, the government will have no choice but be forced to abandon its defense of the currency. The first option that is available is thus to maintain a fixed exchange rate like that of the United States, Canada and other federations (Eichengreen *et al*, 1995). Even though, the European Union has followed a similar path, the transition involved exchange rate instability detrimental to the goals of the European Union. The second option advocated by Eichengreen, Tobin and Wyplosz (1995) is to have a floating exchange rate where the European Union would form a single currency as it indeed has done so. However, when the formation of a uniform currency is not optional, national currencies should be made adjustable while international capital and money markets must be compatible with monetary and macroeconomic policy (Eichengreen *et al*, 1995).

4.2.1 A Global Transaction Tax

There is a great deal of concern for macroeconomic outcomes for which government nowadays is responsible. This results largely from the degree of monetary independence across national borders. At the same time, there is a tremendous rise in international capital mobility that has made policy tradeoffs more important, thereby reducing the autonomy of government intervention. More precisely, “it has eliminated the breathtaking space required to consult and to arrange orderly realignments” making adjustable fixed exchange rate unfavorable (Eichengreen *et al*, 1995: 163). Those who favor a floating exchange rate argue that national monetary policies should be free from constraints imposed by foreign exchange commitments. One should bear in mind that the same interest arbitrage that restricts the central bank’s independence under a fixed exchange rate applies to that of a floating exchange rate and it is sometimes difficult for the

government as well as the central bank to maintain exchange rate expectations consistent with the domestic interest rate they want.

The globalization of financial markets is occurring at a rapid rate and with innovations in technologies of communication; new markets and institutions are indeed contributing to the occurrence of both an increase in domestic and international financial transactions. In these markets, transaction costs are very small when compared to the huge economies of scale involved. A small amount of speculative transactions can result in a great amount of capital gains or losses given the total amount of capital at risk. It also happens that the outcomes in these financial markets can impact negatively on economies. In this case, markets will adjust imperfectly and welfare can be improved considerably through the intervention of transaction taxes which “in a way throws sand in the wheels of super-efficient financial vehicles” (Eichengreen *et al*, 1995: 163).

In order for national currencies to contribute toward macroeconomic goals, domestic interest rates must differ widely. In fact, the application of a Tobin tax of 0,5 *per cent* would eventually convert to 4 *per cent, per annum*, on a three months’ round trip in a foreign money market (Eichengreen *et al*, 1995). Tobin also argues that this tax would be too low to have any effect on transaction costs to affect trade activities and it should be given a greater role in long term portfolio changes or direct investments in other economies.

The Keynesian view, to which Tobin adheres, is that such a transaction tax would indeed increase the stock-marking of prices as opposed to the short term behavior of the speculators’ guesses. But for the transaction tax to decrease the excess volatility, this will depend on the assumption that Keynes made; that is, speculators must have shorter horizons and holding periods rather than being engaged in long term foreign investment. Hence, the assumption that the tax influences speculators in the short run is based on the

presumption that financial markets are not subject to volatility. The main idea for introducing the Tobin tax is thus to increase the independence of national monetary policies of countries' irrespective of the purpose of reducing volatility in financial money markets. The purpose of Tobin tax would thus be to increase greater awareness among the G-7 countries that they need to be more concerned about average levels of interest rates, allowing for some deviation depending on their national economic circumstances. One should also bear in mind that the transaction tax cannot prevent the individual nation's macroeconomic authorities from ignoring the international repercussions of their policies. Furthermore, the tax would not protect obvious mis-valuations in exchange parities and any inevitable short term speculations that would exceed the tax costs. Also the idea that the transaction tax would make macroeconomic policies among major countries unfavorable is to be rejected.

The global transaction tax advocated by Tobin on the exchange of foreign exchange would have to be uniform across countries and thus, conform to legal systems, while its rate should be equalized across markets. In the case where a country independently imposes the tax, the foreign exchange market would simply move offshore; implying that it could ship its currency to foreign branches where it would be sold as foreign currency net of tax (Eichengreen *et al*, 1995). In order to achieve all this, the role of the International Monetary Fund or the Bank for International Settlements is indeed crucial in monitoring and regulating the jurisdictions that regulate them. Thus, we can say that Tobin never associated himself with the anti-globalization movement of his time. Instead, he made reference to the General Agreement of Tariff and Trade which has succeeded in establishing a much more complex set of rules for international economic conduct. Likewise, he argued that the International Monetary Fund can support a global foreign exchange transaction tax to ensure a multilateral intervention as no one country will have the ability of monitoring cross border payments where there is a dangerous risk of the free rider problem.

4.2.2 A Tax on Lending to Non-Residents for Stage II of the Maastricht Process

The second case of throwing sand in the wheels of international finance which Tobin discusses along with Eichengreen and Wyplosz (1995) consist of either applying a tax or a deposit requirement for all domestic currency lending to non-residents, with the main objective of eliminating the speculative sales of that currency without taking into account the market in which they were booked (Eichengreen *et al*, 1995). In order to enter the European Union, the Maastricht treaty specified that a currency must stay without a devaluation for a minimum period of two years before entry. However, there is a high cost of convergence in doing so, and thus, a country might want to experience high interest rates and increase other costs to indicate their seriousness to enter the European Monetary Union. At the same time the occurrence of speculative attacks might make it such that interest rates need to be increased to higher levels to protect against the speculative sales of the currency. All this might make the government of a country drop the idea of entering the European Monetary Union because the austerity costs are too high. In order to minimize this occurrence, Tobin suggests the idea of either taxing or placing a deposit on loans in the local currency to non-residents (Eichengreen *et al*, 1995). For instance, assuming that speculators want to bet against the French franc; besides its availability through the liquidation of offshore assets, the French franc would only be obtained from the French financial authorities (Eichengreen *et al*, 1995). By placing a deposit fee equivalent to the loan, it could be made as an interest free loan to the central bank while the lending bank acquires the initial cost which is passed onto future potential borrowers partly or in full. Eventually, in periods of speculation, the interest rate forgone would make the interest rate rise automatically. However, this proposition is not the permanent answer to exchange rate fluctuations but can be applied by nations having as a main objective entry into the European Monetary Union.

4.3 The Application of the Tobin Tax to the European Monetary System

A number of other factors can be mentioned such as the German unification shock, the recession in Europe, and the rising doubts about the future of the European Monetary Union contributed to the crisis of the European Monetary Union in the period 1992-93 (Jeanne, 1996). In his published article, Oliver Jeanne (1996) took the Tobin tax to another level when he questions whether Tobin's analysis can improve the credibility of an exchange rate peg by relaxing the foreign exchange rate constraint and make it less costly for the government to stay in the fixed exchange rate system. His analysis, comprising a target zone where the tension grows between a foreign interest rate and a domestic interest rate objective, reveals that the Tobin tax could in fact stabilize the fixed exchange rate system through two different ways. Firstly, the tax would be able to some degree separate domestic monetary policy from external shocks and strengthens the system against a wider range of other shocks. Secondly, the Tobin tax would have an indirect effect by decreasing the amount of realignment expectations as currency traders revise these downwards give the impact of the tax.

Examining the French Franc in 1991, Jeanne (1996) concludes that a mild Tobin tax of 0,1 *per cent* would have had a stabilizing effect on the fixed exchange rate system, enabling France to have an interest rate similar to the desired level and reducing the reduction in the realignment of its currency against the Deutschemark by a great deal. Figure 4.1 and Figure 4.2 below illustrate how the introduction of the Tobin tax is of benefit to the French currency. We can compare the evolution of the exchange rate and the nominal interest rate. Jeanne (1996) examines the impact of a 0.1 *per cent* Tobin tax. He finds that the tax would enable the interest rate to remain at levels consistent with desired outcomes. Also Jeanne (1996) shows the rate of realignment is much less when a tax is imposed. On the other hand, Figure 4.2 illustrates the degree of flexibility for the government in having the nominal interest rate close to the desired level as there is no

need then for the central bank to deal with excessive volatility in the foreign exchange market.

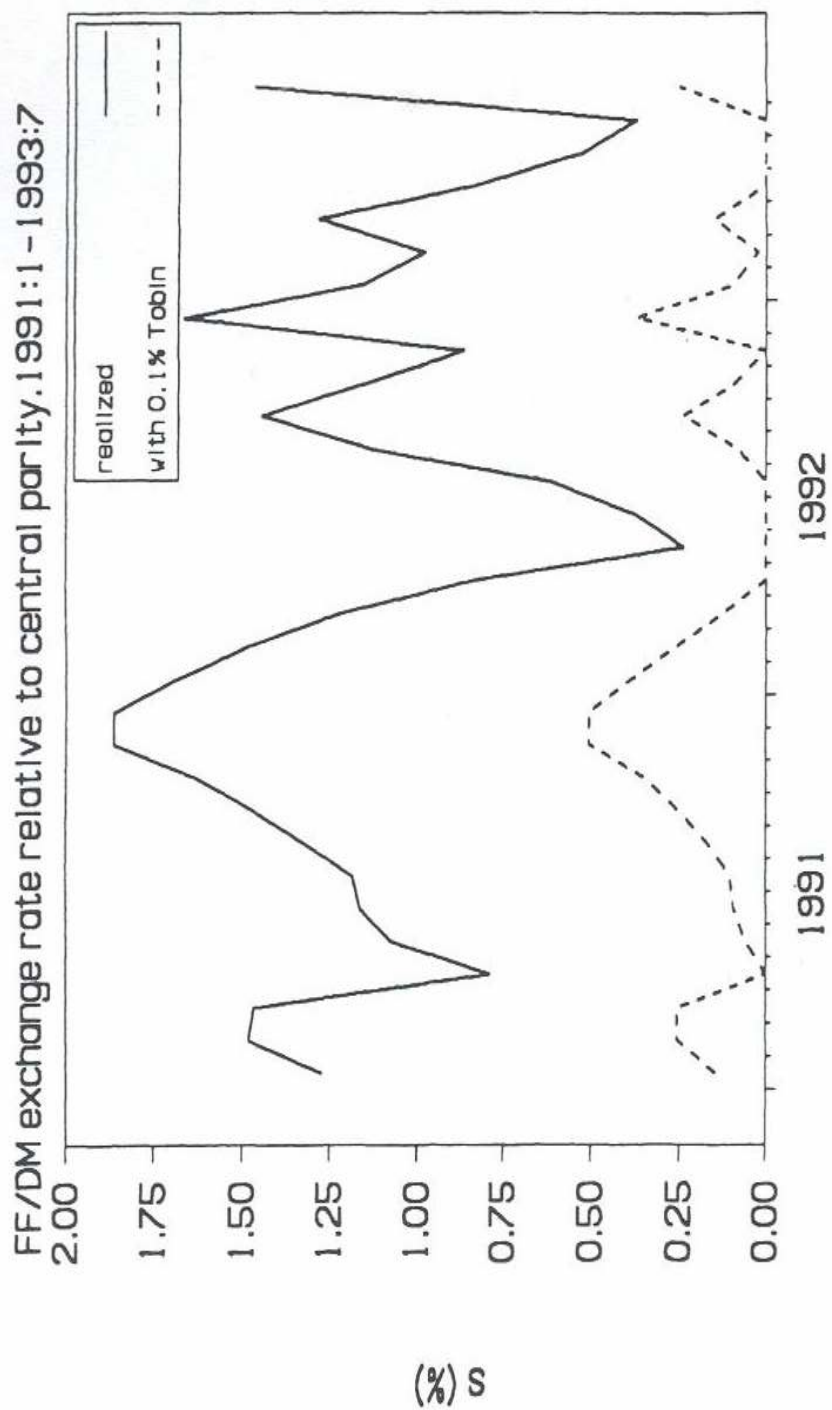


Figure 4.1 FF/DM Exchange Rate Relative to Central Parity, 1991:1 – 1993:7
Source: (Jeanne, 1996).

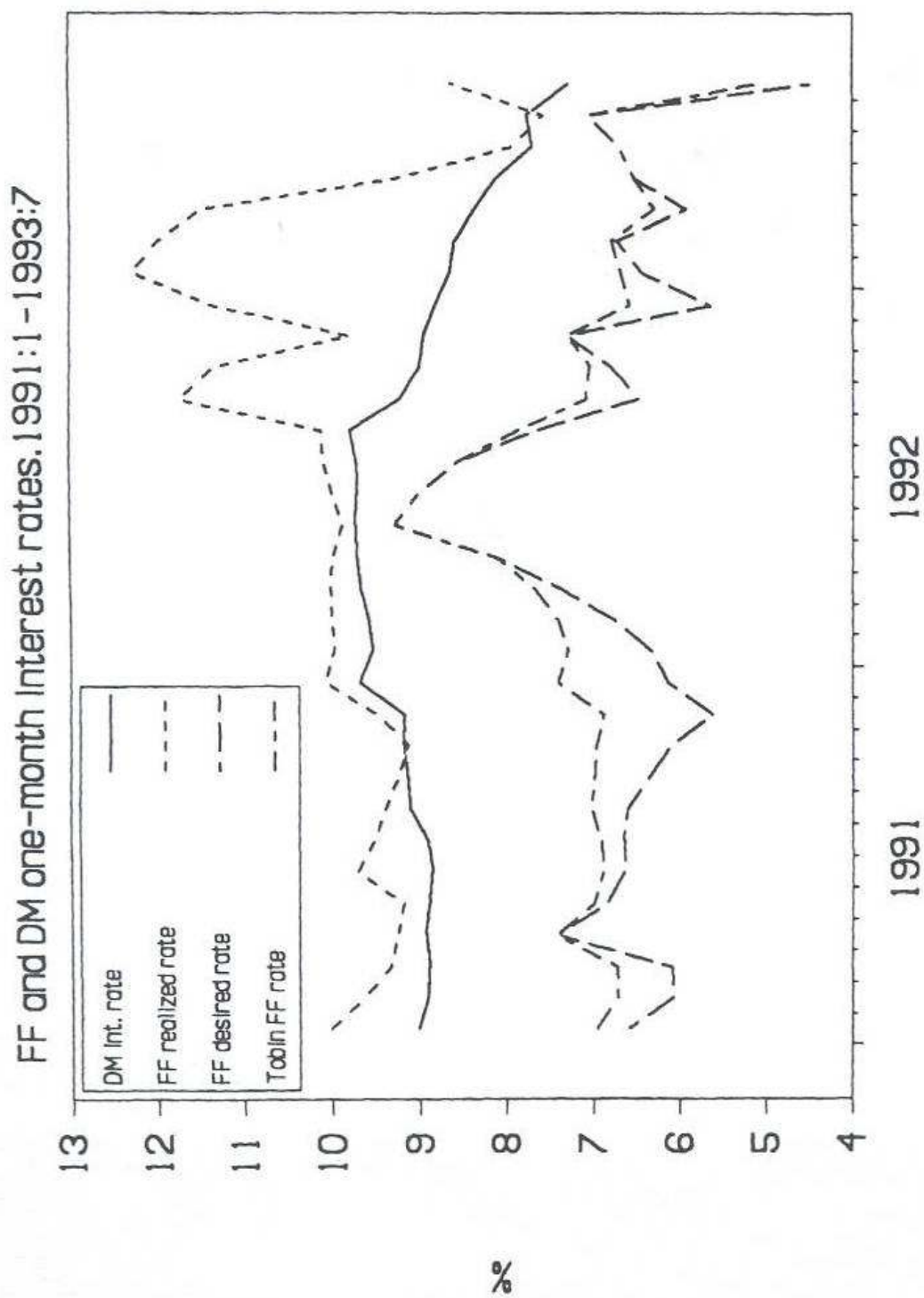


Figure 4.2 FF and DM One-Month Interest Rates, 1991:1-1993:7
Source: (Jeanne, 1996).

Jeanne (1996) also points out that his findings cannot be used to recommend any policy change. The benefits and costs of this application are not done. This is an extremely difficult question to assess; especially the costs of the Tobin tax such as those relating to international competition between financial centers. On the other hand, Jeanne (1996) also makes further suggestions about the short term interest rate as part of the government's objective function on which the above analysis is based. But if this assumption is relaxed to include long term interest rates, then the stabilizing effect of the Tobin tax of a fixed exchange rate is unlikely to occur.

4.4 Criticism of the Tobin Tax and Exchange Rate Stability

Tobin's proposal of the transaction tax has received a great deal of criticism from the anti-globalization campaign even though he advocates that the main reason behind it would be to discourage speculation that affects exchange rate volatility. As a macroeconomist, he was also a strong supporter of free trade and said "my tax would return some margin of manoeuvre to issuing banks in small countries and would be a measure of opposition to the dictate of the financial markets" (Wikipedia, 2007). In fact, the Tobin tax throws sand in the wheels of international finance and allows traders to respond to changes in economic fundamentals and policies. It is indeed superior to other protective measures such as capital controls. The Tobin tax does not only require the international coordination of macroeconomic policies, but can also be used as a policy instrument by organizations such as the International Monetary Fund and the World Bank in achieving both market and global financial stability (Spahn, 1996). However, Tobin's tax has some major problems that restrict its effectiveness.

In order to limit the associated distortions in the financial, capital and money markets, the tax base should include all categories of market participants, and apply to financial institutions, governments and international organizations, producers of goods and services, commercial enterprises and private households (Spahn, 1996). Sometimes, it is of some value not to tax trade activities originating from market makers and any other activities that increase market liquidity. Some financial intermediaries can in fact be excluded from the tax on the basis that

trading activities involve stabilization instead of speculation. Hence, a major problem that arises with the adoption of the Tobin tax is that it cannot differentiate between normal trading activities that stabilize financial markets from volatile financial transactions. The Tobin tax is charged on all exchange dealings whether from firms or individuals. On one side we are faced with those institutions that cannot be excluded from the tax and on the other with the intermediaries that if taxed, could lead to inefficiency. Thus the tax would be difficult to implement.

There is also a major problem associated with the taxable transactions, because the application of the Tobin tax on foreign exchange transactions only is likely to be inadequate as speculators can escape the tax by trading in financial derivatives (Spahn, 1996). We should also consider the fact that there is a lot of substitutability of financial instruments such as cash substitutes that are not taxable, and other short term instruments equivalent to banker's acceptances and commercial paper can also be used to avoid the Tobin tax. Here the financial derivatives consist of forward transactions, futures and financial swaps that convert long positions into short trading activities (Spahn, 1996). Thus, we cannot simply extend the taxable transactions to include all these financial derivatives. As a matter of fact, the Tobin tax underestimates the taxable base that is part of the foreign exchange markets if we understand the notion of taxable transactions. Consequently, the application of the Tobin tax to those derivatives could just eradicate the derivative markets which have as a major role to protect one from the risk associated with exchange rate fluctuations. Thus the tax could result in more volatility given these circumstances. To overcome this problem, Spahn (1996) suggests that lower tax rates could be applied to the notional amounts of derivatives contracts, but, this might be also considered unfavorable as the resulting tax system would be selective and extremely difficult to monitor even though this approach might be justifiable on a lower costs basis.

Tobin's transaction tax also appears to be moderate and uniform, but, it may happen that a one *per cent* round trip on the buying and selling of foreign currencies prevents investors from expecting a short term devaluation of three *per cent* during periods of speculation. Thus, a higher tax rate that discourages speculation might get in the way of efficient financial intermediation and that would defeat the whole purpose of applying the Tobin tax. When the exchange rate is in

equilibrium, it makes sense to have a zero Tobin tax (Spahn, 1996). This implies that the tax could be a variable one instead of a uniform one.

The revenues derived from the application of the Tobin tax and how they are to be distributed respectively is dependent on a number of factors such as the tax rate, the tax base, and the volume of exempt trading. Nevertheless, we should not forget that the “net turnover in the world’s foreign exchange markets is estimated at \$1.23 trillion a day” (Spahn, 1996: 3). Assuming, a one *per cent* tax on the total net turnover that excludes the behavior of market participants; this would trigger an impractical figure of \$13 billion a day (Spahn, 1996). However, the point is that the new tax would still raise revenue and an alternative tax of 0.02 *per cent* would raise up to \$64 billion *per annum*. Some of the proceeds from the application of the Tobin tax could lead to severe political problems, possibly leading to inequality, if they are returned to the national governments of the country of origin. The revenues from the Tobin tax would be greater for countries where the most important financial sectors exist. Even though, Tobin suggests that the World Bank and the International Monetary Fund would be given the task of coordinating the revenues, it does not necessarily mean that the proceeds would be assigned to the institution responsible for orchestrating it (Spahn, 1996). It should be noted that the main objective and philosophy lying behind the Tobin tax is economically sound and the significant proceeds arising from it might be orientated towards multinational organizations to finance the provision of public goods or for other global problems that would benefit humanity in general such as health or protection of the environment. But it might be difficult for all countries to reach such a global agreement as there might be high costs involved. Even when a world wide consensus about the allocation of revenues is attained, a major question that would need to be answered is to what extent should those international organizations be assigned global power? The suggested implementation of the Tobin tax depends on the taxing institution having the power and means to avoid these practical problems.

4.5 Beyond the Tobin Tax: Global Democracy and Global Currency

Myron Frankman (2002) took the Tobin tax to another level where he fully agrees with the latter that a tax on foreign exchange transactions would reduce disturbances in foreign exchange markets, and that, a massive international flow of funds eventually would lead to instability in the world economy after the abolition of the Bretton Woods system. Tobin, in fact, was of the opinion that a global common currency administered by international supporting organizations would be better (Frankman, 2002). Although Tobin was a strong supporter of free trade, recent decades show a rise in the imports and exports of the balance of payments of both developed and developing nations, but the Gini-coefficient of most countries are not necessarily catching up with each other. If the income differentials between countries are widening, then there is definitely an unfulfilled promise of free trade. According to the Human Development report of the United Nations, the ratio of one fifth of the richest people living in the highest income countries to the one fifth living in third world countries has gone up from 30:1 in 1960 to 61:1 in 1991 (Frankman, 2002). Table 4.1 below illustrates how unstable the third world countries' currency has been relative to the US dollar with fluctuations reaching up to fifty percent within a year.

TABLE 4.1
RATIO OF CHANGES IN END-OF-YEAR
EXCHANGE RATES (ORIGINALLY
EXPRESSED IN HOME
CURRENCY UNITS / U.S.\$)

	1990/ 1980	2000/ 1990	2000/ 1980
Algeria	3.1	6.2	19.0
Argentina	>>	1.8	>>
Bangladesh	2.2	1.5	3.3
Brazil	>>	>>	>>
China	3.4	1.6	5.4
Colombia	11.2	3.8	42.9
Democratic Republic of the Congo	>>	>>	>>
Egypt	2.9	1.8	5.3
Ethiopia	1.0	4.0	4.0
India	2.3	2.6	5.9
Indonesia	3.0	5.0	15.3
Iran	0.9	34.6	31.3
Kenya	3.2	3.2	10.3
Korea	1.1	1.8	1.9
Mexico	180.2	2.3	411.6
Morocco	1.9	1.3	2.5
Myanmar ^a	1.0	1.0	1.0
Nigeria	16.5	12.2	201.4
Pakistan	2.2	1.3	2.8
Peru	>>	6.8	>>
Philippines	3.7	1.8	6.6
Poland	206.3	4.4	899.7
Russia ^b		67.9	
South Africa	3.4	3.0	10.2
Tanzania	24.0	4.1	98.2
Thailand	1.2	1.7	2.0
Turkey	32.6	229.8	7482.1
Ukraine ^b		849.1	

Source: (International Monetary Fund, Cited in Frankman, 2002).

Notes: (1) >> = greater than 10 000. Data for Vietnam, which is not a member of the International Monetary Fund, are not reported here.

(2) Figures for Myanmar reflect its currency is fixed in terms of special drawing rights.

(3) Russia and Ukraine: rate change from 1992 to 2000.

The implications of looking beyond the Tobin tax thus indicate that his tax proposition addresses the symptoms and not necessarily the causes of volatile exchange rates. Sometimes, these variations are at the result of capital hyper-mobility and a tax would remedy the situation in this context only. Frankman (2002) also argues that Tobin made it clear that a one world currency with supporting institutions would be preferable.

4.6 Tobin Tax and the Impact on Development in African Countries

Assuming the imposition of a tax on foreign exchange transactions being redistributed to third world economies, one can surely argue that that this would alleviate major deficits in many African countries and improve redistribution of wealth from the North to South. Another possibility that one could probably think of is that SADC countries moving towards the use of one currency and subject to a Tobin Tax with regards to other major currencies like the pound and the euro. But then again, the problem does not lie in the implementation of the Tobin Tax but simply in answering the question of whether Africa is an optimum currency area (OCA). Table 4.2 below gives us the criteria for an optimum currency area in Africa.

Table 4.2 Criteria for Optimum Currency Area

Criterion – Is Africa an OCA?	Satisfied	Why?
Labour\Capital Mobility	No	Institutional barriers- changes in legislation
Production diversification	No	Export a narrow range of agricultural commodities – coffee, tobacco
Openness	No	Barriers to trade – Not fully open
Fiscal transfers	No	Always in debt with IMF –Rely on foreign aid!
Homogenous preferences	No	Every country has different national macroeconomic priorities to deal with!
Commonality of destiny vs. Nationalism	No	Political agreement would not be reached in all African countries – civil war in some would lead to political instability in others!

It is also of no doubt that the adoption of a flexible exchange rate after the use of a common currency among African countries and the imposition of a tax on foreign exchange transactions could help in reducing volatility in financial markets and help towards trade openness and financial liberalization of those countries as compared to each African country with their own currency. But this goes beyond the implementation of the Tobin Tax but has many of the third world nations focusing on trade openness, market access and growth first.

If market access alone was fundamental to reap all the benefits of free trade, then why is it that developing countries still lag behind in terms of growth when a gradual convergence of a declining tariff structure is being adopted? Preeg (in Fekekuty, 1998) focuses mostly on the market access and omits the shift to development perspective and sustainable growth. One example of a successful two-track strategy is that of Mauritius where by adopting a combination of orthodox and heterodox strategies (King and King, 2004) some success has been made. By adopting an export processing zone (EPZ), the textile industry grew massively under free trade principles but allowing for domestic investment at home. However, the government combined an EPZ strategy under a highly protected market until the mid of 1980's (King and King, 2004). There is no country that has developed successfully by moving away from long term capital flows and at the same time a country cannot achieve improvements in their balance of payments by just opening up to foreign trade. What is most crucial is to combine opportunities in world market with a domestic investment and local institutions building strategies to stimulate entrepreneurs.

Many economists tend to think the WTO is designed to expand free trade and thus improves on consumer welfare but in reality it enables countries to bargain about market access and free trade is not always the outcome (King and King, 2004). President Obama's imposition of a 35 *per cent* tax on Chinese tyre imports is good example. World trade regimes and regional blocs should perhaps shift from a market access view to a development perspective especially as regards taxing financial transactions, even if this is done in particular economic areas like Southern Africa.

CHAPTER FIVE

CONCLUSIONS AND POLICY RECOMMENDATIONS

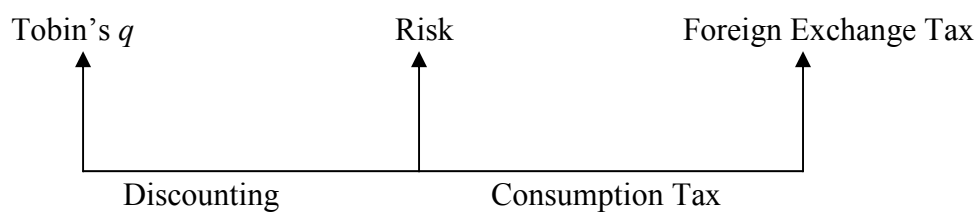
In this review of Tobin's work, we set out to cover three areas: Tobin's q , portfolio decisions and finally Tobin's tax on foreign exchange transactions. As part of this review, three chapters covered each of these areas. As the review hopes to find a common theme, in the three contributions, we present each original article in some detail. Chapter Two and Three include Tobin's q and portfolio decisions respectively. Chapter Four covers the tax on foreign exchange transactions.

Tobin's q makes the case for a new transmission mechanism. But we are of the opinion that what is even more important is that Tobin makes use of discounting the future relative to today's market evaluation of an asset when re-examining investment decisions. Now in order for firms to have the funds for investment, one possible source is private saving. The problem is how does one get access to private saving? One answers this by justifying that individuals hold a portfolio of assets, which Tobin demonstrates must be the case in his analysis of risk which we present in Chapter Three, and savings need not only be in the form of idle balances but can be held as claims against firms' making investment decisions as covered in Chapter Two of this review of the work of Tobin. We must point out that, as is the case for Tobin's q , the unifying feature is discounting. However, Tobin in his analysis of risk hints at the need for a tax on consumption. The hidden agenda being Tobin's q requires a channeling of savings to firms, which can be increased if consumption is taxed.

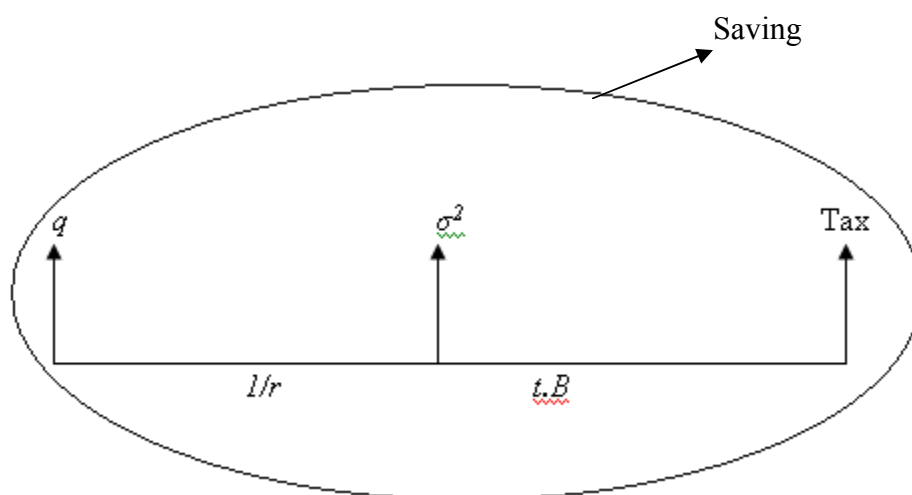
So once taxation appears it is not too much of a leap to tax those transactions which prevent domestic saving from being enhanced by saving from abroad. One element that could prevent foreign savings adding to domestic sources is exchange rate volatility. Thus, to prevent such

volatility, and the reduction in the global quantity of savings, Tobin proposes a modest tax on international transactions.

Thus, it turns out that the three pieces of research are related. The link between Tobin's q and risk is discounting and the link between risk and taxation of foreign exchange transactions is taxation as a necessary evil for achieving other objectives as we saw in Chapter Three. The following scheme classifies the linkages.



And we can see there is an internal consistency in the work of Tobin as the above scheme has its own unifying factor saving. We show this as follows:



Therefore to allow for growth, investment must rise, and this is only possible if one has a global society of savers not facing exchange rate volatility. The one criticism that can be leveled against Tobin, as is briefly pointed out in Chapter Four and is a topic for future research, is that inter-temporal effects (notice the discounting and taxation in our unifying scheme) cannot be avoided by human action conducted in private: the final hidden assumption in the contribution of Tobin to economic analysis.

POLICY RECOMMENDATION FOR THE SOUTH AFRICAN ECONOMY

The unifying theme we identify above is indeed the role of saving in the work of Tobin and below we discuss the main economic challenges facing South Africa in the 21st century and provide appropriate policy responses to these economic challenges.

5.1 Major Economic Challenge – (1) Reducing the Deficit on the Current Account

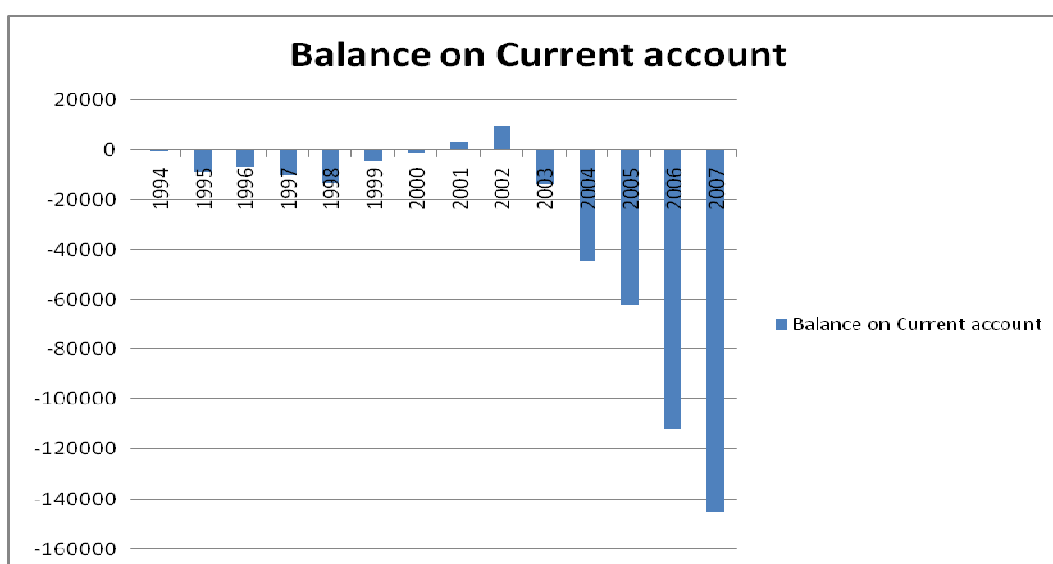


Figure 5.1 Reducing the Deficit on the Current Account
Source: Retrieved from data in Appendix 4.

The opening up of the financial markets with a flexible exchange rate can restrict the effectiveness of policy instruments of monetary and fiscal policies at our disposal to improve on domestic national income in South Africa. Consider the table below.

Table 5.1 Fiscal Government Expenditures and Instruments

	1991	1993	1995	1997	1999	2001	2003
Government consumption/GDP %	19.8	20.1	18.3	19.8	18.3	18.3	19.1
Public sector investment/GDP %	5.9	4.3	4.3	4.6	4.7	3.9	4.9
Government annual deficit/GDP %	-2.7	-7.3	-4.6	-5.0	-2.8	-1.9	-2.3
Government total debt/GDP %	37.2	40.4	49.0	49.2	50.2	45.6	40.2
GDP growth at 2000 prices	-1.0	1.2	3.1	2.6	2.4	2.7	2.8

Source: SARB *Quarterly Bulletin*, various.

Part of the fiscal target in 1994 was to reduce the budget deficit from 6.8 per cent of GDP to 4.5 per cent of GDP with an expected growth rate of GDP of 3 per cent over a five year period (Hirsch, 2005). What we can see is that in order for this to be achieved, government borrowing had to be increased and this conflicted with a high PSBR¹ ratio that has to be financed by cutting down expenditures on the other sectors of the economy.

¹ Public sector borrowing requirement

5.2 Monetary Policy in a Current South African Context – Under a flexible exchange rate, the current economic situation makes it difficult to adopt an expansionary monetary policy in trying to increase aggregate demand and thus domestic national income. This will lead to a decline in r and cause the capital account deficit on the BOP to worsen. The rand against the US dollar has already depreciated, thus affecting the competitiveness of the exports sector on the world market. The effectiveness of an expansionary monetary policy might worsen and conflict with the inflation targeting objective of the reserve bank which will further require another expansionary monetary policy. Currently, a number of exogenous supply shocks are impacting on food and energy prices, thus limiting the use of monetary policy in fighting inflation. Domestic food prices have increased significantly as a result of the demand for high oil prices, thus increasing production costs.

It is important to realize that the effects of the main goals of monetary policy in targeting inflationary rates differs completely from that of the objectives of fiscal policies; and a lack of coordination between the two, makes the implementation of policy actions difficult. But again, the reserve bank might not necessarily adhere to the objectives of fiscal instruments. The adoption of a tighter monetary policy in 2008 was due to an increase in the CPI to 9.4 per cent in February 2008 (Reserve Bank, 2008). This reduced pressure from the aggregate demand of households by April 2008, but exogenous problems resulting in supply shocks (other than oil and food prices) resulted in a tighter monetary policy, thus making it difficult to accommodate for the unemployment problem. Inflation expectations increased mainly due to electricity price developments in 2008 and are expected to continue this year and into 2010. Accommodative monetary policy would only worsen the inflation problem. This would increase nominal wage above the equilibrium wage and thus creating unnecessary frictional unemployment. The gap between actual and potential output would increase and widen involuntary unemployment due to wage distortions in the economy. At the same time, an increase in the money supply would lead to an increase in money in transactions, leading to a continuous rise in prices.

We also have to bear in mind that in 2008, the response on behalf of the reserve bank is limited to a relative price change as a result of uncertainty in the change to electricity prices from Eskom, and the duration of these supply shocks, coupled with sudden increases in oil prices

making for quick changes to inflationary expectations. According to the reserve bank's monetary policy review of 2008, inflation is expected to fluctuate within the target range in 2009. In the meantime, the deficit on the BOP will most likely widen and equilibrium requires continued capital inflows. Household consumption growth has also declined thus making output growth lie below its potential rate which over an extended period means declining wealth effects.

5.3 What can be done with regards to the actual deficit on the BOP? The adoption of an initial monetary policy alone would thus be ineffective in solving the problem as it will always have a compounding effect with regards to inflation as the rand would depreciate in value. If an expansionary fiscal policy is adopted first, it comes at a cost of higher income taxes for the future generation to repay the debt. The domestic interest rate would lie above the world interest rate causing the rand to appreciate while increasing capital inflow to the capital account. But the problem is that the rand cannot appreciate forever as net exports will decline. Therefore the *IS* curve will shift back to its original position with no effect on output. What would be required is probably a policy mix of both monetary and fiscal policies to shift accordingly so that an expansionary monetary policy is accompanied by an expansionary fiscal policy so that the extent of the rand's depreciation is reduced as output grows. Currently the rand has already depreciated against the US dollar and in the reserve bank's annual economic report of 2008; monetary policy is to remain unchanged. Therefore, to what extent would expansionary fiscal policy bring a change in domestic national income is really a waiting game. But indications are that the new minister of finance has held spending steady.

5.4 Major Economic Challenge – (2) Unemployment and Policy Measures to address the Jobless Growth Phenomenon

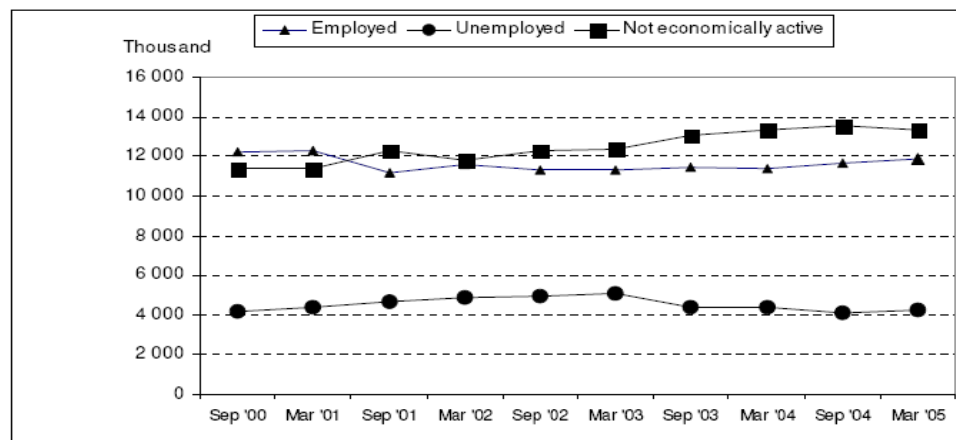


Figure 5.2 Unemployment in South Africa
Source: (Stats SA, 2005).

Unemployment remains one of the major problems in South Africa and has a negative effect on redistributive initiatives in South African. Kingdon and Knight (2003) show that the unemployment rate in South Africa rose from 9.18 percent in 1970s to 30.51 percent in 2002. Unemployment still exists even when the economy is at full sustainable capacity. The high unemployment rate is a contributing factor to inequality and poverty, and despite South Africa's high investment to GDP ratio, investment did not generate more jobs and satisfactory growth because the capital intensity of the economy hampered employment growth. The post 1994 period reveals that South Africa is still under severe pressure to create enough output growth so as to increase the demand for labour. Under a strict definition, at least 30 per cent, around 4.5 million people, are still jobless and under the expanded definition 7, 7 million people are without work. When it comes to income inequality, the Gini coefficient in South Africa is in the region of 0.6; thus indicating huge differentials in wage earnings, especially within group inequality. From the graph above, what is of relevance is that the number of unemployed increased from 4.2 million in September 2000 to 5.3 million in March 2005 (Statsa, 2005). More recent estimates are much higher.

5.5 Policy Measures for the Reduction in Unemployment

Coordinating Fiscal Policies to Accommodate for Public Sector Reform – With the aim of creating the necessary job employment expansion to accommodate for structural unemployment, fiscal policies should make provision for the following:

- The budget deficit should remain in line with past trends and should avoid putting pressure on the PSBR² as this alone would require external borrowing.
- There must be further gradual consolidation of the government's tax revenue and proper allocation of funds in accordance with reconstruction and development priorities. The setting up of industrial development zones as well as expansion of the manufacturing sector into rural areas should be enhanced and their performance being monitored.
- Sustained improvement in the quality of public schooling available to the poor should be considered, as well as promoting enrolment. By having higher private sector participation in higher education, would allow room for improvement in the public sector enhancing the educational opportunities of historically disadvantaged communities.
- Government support for South Africa's domestic sector. This allows some protection from foreign competitors and also hopefully provides future jobs as the domestic sector expands.
- Business incentives *via* tax reductions if companies employ domestic labour or domestic inputs for production. This should raise the demand for domestic labour and domestic inputs.
- Could the depreciation figure on firms' financial statements be temporarily underestimated so that those funds can be used for further re-investment to create jobs, could be one way of restructuring finance to be invested effectively when it comes to alleviating unemployment?

² Public sector borrowing requirement

5.6 Major Economic Challenge – (3) Maintaining Price Stability

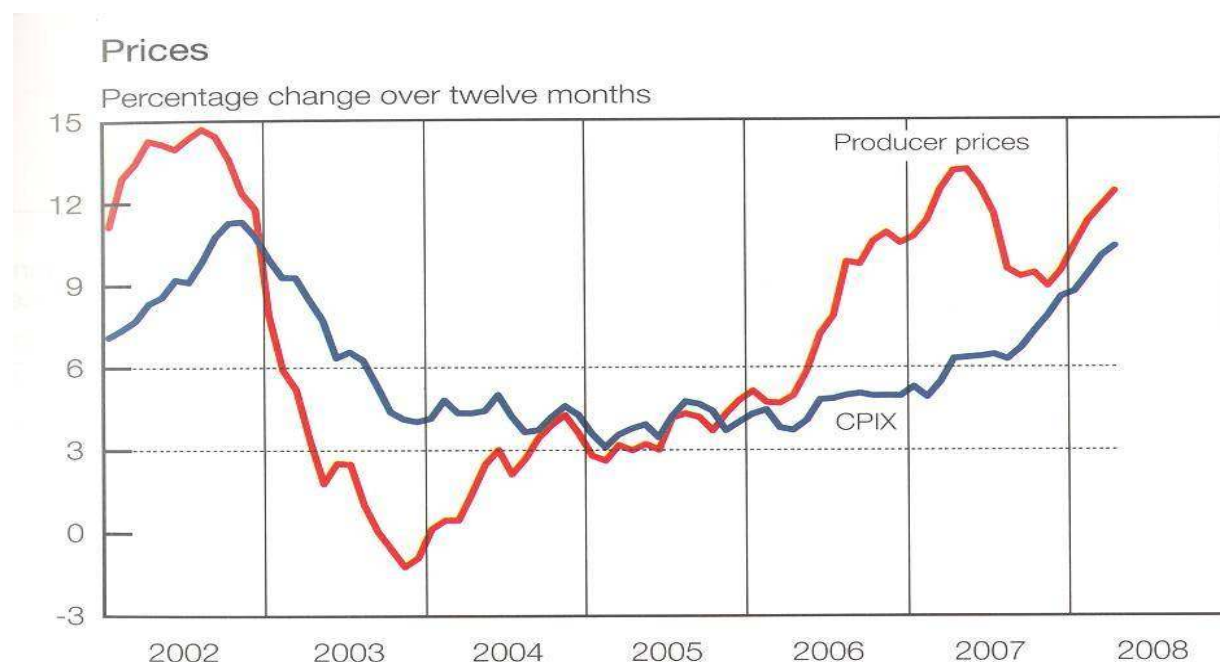


Figure 5.3 Price Movements

Source: SARB, (2008).

Notice from the Figure 5.3 above that the reserve bank fails in keeping inflation within the target range beginning in the second quarter of 2007 due to exogenous supply shocks such as the short increase in crude oil prices and others factors as mentioned above. The reserve bank's annual economic report (2008) indicates that inflation has been above the target range of 6 per cent since April 2007 and amounted to 12.7 per cent in April 2008. A lower level is expected through until 2010 but inflation still remains high.

5.7 Policy Responses – Can Monetary Policy Help? A further tightening of the monetary policy will reduce inflationary pressures in food prices through a decline in aggregate demand affecting household expenditure. Part of the reduction in household consumption has come about due to a reduction in credit extension to the private sector and world declines in output. If household debt keeps on widening as a result of a rising interest rate, then household welfare would be at stake. To date this has not been the case, but the reserve bank does come under new

leadership this month. A tightening of monetary policy as instrument should (although we are not sure what is a “tight” policy in South Africa given the target missing history) only be temporary until inflation rates are brought under control so that it does not conflict with fiscal instruments such as government spending that are useful in creating labour absorption capacity. In the short run, intervention helps but the long run aggregate supply curve might pose a constraint to any further increase domestic output: and thus the reason we put so much stress on savings based on our overall review of the work of Tobin. As it is, South Africa is lying close to the vertical long run supply curve and what would be required would be sustainable and effective investments (government spending or private sector growth might also raise savings) to shift the vertical long run aggregate supply curve outward. But again, the goals of monetary policy in reducing the repo rate will increase commercial banks borrowing and contradict the aims of inflation targeting and serve as a constraint on savings.

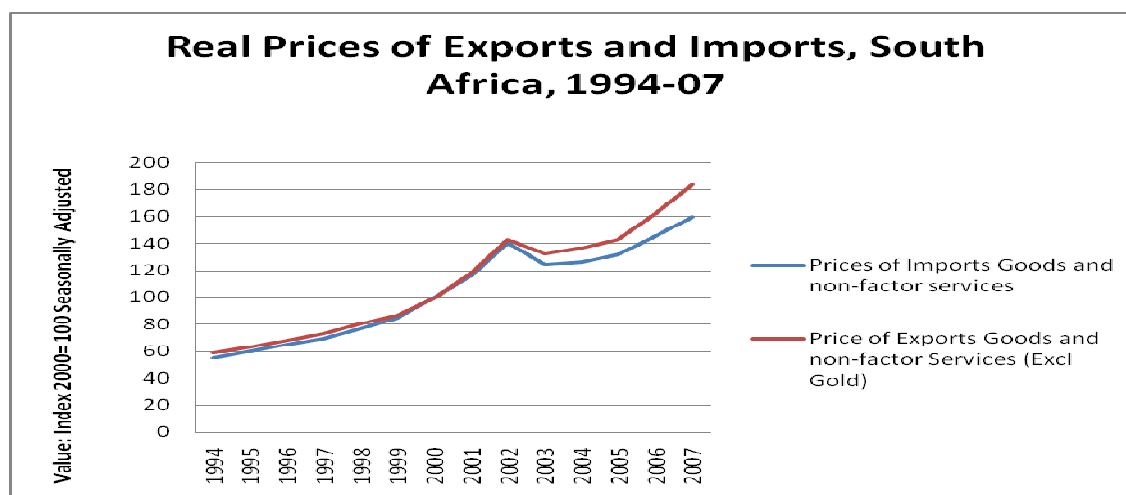


Figure 5.4 Real Prices of Imports and Exports
Source: Retrieved from data in Appendix 5.

5.8 How would an Exchange Rate Mechanism Help? What is of significant relevance from Figure 5.4 above is that the gap between export and import prices of goods widens from the real prices of exports (excluding gold) from 2001. This indicates that with actual inflationary pressures and the depreciation of the rand, the risk of imported inflation into South Africa is a serious challenge. Currently, a depreciation of the Rand would favour exports, and so the current

weak dollar is of some concern for a recovery in GDP growth. And thus we do not know to what extent the existing deficit on the current account is to be reduced in the long term but the stronger gold price currently does provide some relief. Price instability can worsen via the price of imported goods in South Africa when the Rand is depreciating. Local firms can raise prices in the future as a result of rising imported prices if the Rand should weaken again. High imported (on food via fuel input costs) prices in an inflexible labour market are likely to result in unions pressing for increases in nominal wages. One way of providing price stability for low income levels is a consistent monetary policy that sticks to more realistic targets in a political and economic environment that starts to push for some type of Tobin tax to reduce volatility in world markets. Assuming the result is the exchange rate fluctuates less then food prices and other prices are likely to be more stable and protect the purchasing power of low income. And this is true for all income earners; giving savings a much needed boost. Aiding these savings, with incentives on the supply side, would be in keeping with our reappraisal of Tobin whose analysis is in danger of being neglected to our detriment.

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APPENDICES

Appendix 1. Ethical Clearance



RESEARCH OFFICE (GOVAN MBEKI CENTRE)
WESTVILLE CAMPUS
TELEPHONE NO.: 031 – 2603587
EMAIL : ximbap@ukzn.ac.za

22 JUNE 2009

MR. MZ GOOLAB (203517515)
ECONOMICS & FINANCE

Dear Mr. Goolab

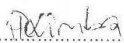
ETHICAL CLEARANCE APPROVAL NUMBER: HSS/0223/09M

I wish to confirm that ethical clearance has been granted for the following project:

**“A critical analysis of the contributions of James Tobin to Economics and its
Relevance to the South African Economy”**

PLEASE NOTE: Research data should be securely stored in the school/department for a period of 5 years

Yours faithfully


.....
MS. PHUMELELE XIMBA
ADMINISTRATOR
HUMANITIES & SOCIAL SCIENCES ETHICS COMMITTEE

cc. Supervisor (Dr. R Simson)
cc. Mrs. G Ponsford

Appendix 2. Balance sheets For Eskom South Africa at 31st March 2008

	Note	Group		Company	
		2008	Restated ¹	2008	Restated ¹
		Rm	2007	Rm	2007
		Rm		Rm	
Assets					
Non-current assets		120 114	105 614	121 815	106 581
Property, plant and equipment	6	96 418	76 962	95 792	76 211
Intangible assets	7	470	412	457	410
Investments in equity accounted investees	8	173	171	95	96
Investment in subsidiaries	9	–	–	2 341	2 358
Future fuel supplies	10	2 585	2 557	2 585	2 557
Deferred tax assets	11	6	4	–	–
Investment in securities	12	5 882	15 674	6 136	15 115
Embedded derivatives	12	10 447	6 882	10 447	6 882
Derivatives held for risk management	12	3 538	2 412	3 538	2 412
Finance lease receivables	12	415	536	415	536
Trade and other receivables	12	180	4	9	4
Current assets		47 647	33 873	45 857	31 809
Loans to subsidiaries	9.1	–	–	530	746
Deferred tax assets	11	2	1	–	–
Inventories	17	3 929	3 637	3 628	3 499
Finance lease receivables	12	10	17	10	15
Trade and other receivables	12	5 433	4 760	5 332	4 566
Taxation		50	–	50	–
Payments made in advance	19	4 256	597	4 197	524
Investment in securities	12	9 137	9 918	8 379	9 892
Financial trading assets	12	2 539	3 386	2 017	2 897
Cash and cash equivalents	12	10 893	9 542	10 322	7 656
Embedded derivatives	12	2 266	1 804	2 260	1 803
Derivatives held for risk management	12	9 132	211	9 132	211
Non-current assets held-for-sale	20	3 420	3 825	–	–
Total assets		171 181	143 312	167 672	138 390
Equity					
Capital and reserves attributable to equity holder of the company		64 532	58 192	62 330	55 581

Minority interest		206	165	–	–
Total equity		64 738	58 357	62 330	55 581
Liabilities					
Non-current liabilities		72 915	61 080	72 451	60 875
Debt securities issued	12	39 788	34 561	39 788	34 561
Borrowings	12	1 480	1 194	1 224	1 063
Embedded derivatives	12	5 077	908	5 077	908
Derivatives held for risk management	12	947	1 375	947	1 375
Deferred tax liabilities	11	8 479	7 149	8 322	7 081
Deferred income	21	4 913	3 863	4 913	3 863
Retirement benefit obligations	22	5 409	5 035	5 286	4 922
Provisions	23	5 607	6 029	5 540	6 026
Finance lease liabilities	12	539	546	678	656
Trade and other payables	12	676	420	676	420
Current liabilities		31 694	22 300	32 891	21 934
Amounts owing to subsidiaries	9.2	–	–	1 300	820
Trade and other payables	12	10 223	8 253	9 843	7 218
Payments received in advance	26	1 328	851	1 281	815
Finance lease liabilities	12	9	4	36	28
Taxation		55	515	–	437
Debt securities issued	12	2 491	583	2 491	583
Borrowings	12	6 920	3 992	7 465	4 164
Financial trading liabilities	12	4 087	3 701	4 087	3 701
Embedded derivatives	12	7	6	7	5
Derivatives held for risk management	12	1 475	587	1 475	587
Deferred tax liabilities	11	3 152	2 214	3 300	2 213
Deferred income	21	269	193	269	193
Retirement benefit obligations	22	161	144	161	144
Provisions	23	1 517	1 257	1 176	1 026
Non-current liabilities held-for-sale	20	1 834	1 575	–	–
Total liabilities		106 443	84 955	105 342	82 809
Total equity and liabilities		171 181	143 312	167 672	138 390

Source: (Eskom, 2008)

Appendix 3. Critical Accounting Estimates and Judgements; Valuations Assumptions

Input	Unit	Year ended 31 March					
		2008	2009 ¹	2010 ¹	2011 ¹	2012 ¹	2013 ¹
Aluminium	USD per ton	2 966	3 137	3 122	2 089	3 084	3 076
Rand/dollar	USD per rand	0,12	-	-	-	-	-
Rand interest rates	Continuous actual/365 days (%)	10,61	11,26	10,94	10,53	10,24	10,05
Dollar interest rates	Annual actual/360 days (%)	3,19	2,40	2,51	2,80	3,14	3,39
United States production price indices	Year-on-year (%)	8,99	2,09	2,03	2,34	2,80	2,47
South African consumer price indices	Year-on-year (%)	9,80	7,08	4,93	6,60	6,37	6,33

Source: (Eskom, 2008)

Appendix 4. Balance of Payments at Current Prices

	Balance of Payments : Total Exports	Balance of Payments : Total Imports	Balance of Payments : balance on current account	Balance of Payments : balance on financial account	Capital movements of liabilities: Total direct investment	Capital movements of liabilities: Total portfolio investment	Capital movements of liabilities: Total other investment	Balance of Payments : change in gross gold & other foreign reserves
2000/01	92.28	93.66	925	-1406	4895	6846	1850	3082
2000/02	98.28	97.63	-71	-1701	677	-1349	7624	2620
2000/03	101.43	101.17	-5126	-1699	1447	8129	7552	3672
2000/04	107.85	107.38	3080	-1616	-861	-1833	-6198	2266
2001/01	112.08	109.78	3330	-1643	2542	3545	-1836	3340
2001/02	115.82	111.91	1733	-1694	52712	-27205	-6985	89
2001/03	115.74	114.88	-3878	-1470	3599	-257	-4337	7114
2001/04	125.91	125.46	1684	-1450	-449	-83	2932	23043
2002/01	141.62	140.12	6572	-1427	10299	4370	10923	-4854
2002/02	141.92	139.28	854	-1441	4820	15696	-1199	-7420
2002/03	144.08	139.61	-175	-1565	3028	-12883	-3336	1772
2002/04	143.65	142.19	2428	-1411	-1607	-1839	-6084	-14112
2003/01	138.02	129.62	3545	-1446	275	-4430	-90	-4847
2003/02	131.73	125.27	-9661	-2201	447	22337	5675	-3266
2003/03	130.88	122.06	-2662	-2176	1807	-4252	-254	-3224
2003/04	128.61	119.46	-4882	-1655	3021	-6107	9263	-1735
2004/01	136.52	121.24	-2019	-2340	8630	5105	4899	9336
2004/02	138.47	128.03	-15212	-3232	-1605	15795	5112	7992
2004/03	136.9	126.01	-14333	-3077	2007	2984	-2888	8009
2004/04	133.94	128	-13067	-2677	-3877	22691	3758	4607
2005/01	133.94	125.75	-10439	-3201	1302	7892	25419	15984
2005/02	144.42	131.98	-16785	-4643	5051	23869	593	25253
2005/03	144.37	134.42	-18681	-5248	29860	8351	5373	16
2005/04	149	134.1	-16274	-4807	6057	-4086	578	6364
2006/01	149.41	132.19	-22730	-5131	9182	52864	16895	11887
2006/02	157.33	138.91	-25160	-4816	3896	35986	27068	29190
2006/03	169.64	152.65	-29233	-4640	-2587	23875	17631	19676
2006/04	172.3	156.42	-35223	-4307	-14058	31512	2566	-12901
2007/01	175.91	153.48	-27081	-4756	2560	28800	2771	14391
2007/02	183.73	156.43	-34549	-5591	11165	42018	19773	6853
2007/03	185.88	161.91	-45314	-5521	13055	33703	30504	9878
2007/04	92.28	165.58	-38072	-4926	13374	2853	5106	14874

Source: SARB, (No Date).

Appendix 5. Real Prices of Imports and Exports

	Prices of Imports Goods and non-factor services	Price of Exports Goods and non-factor Services (Excl Gold)
1994	54.87	58.93
1995	59.53	63.37
1996	65.02	68.27
1997	68.88	73.42
1998	76.42	80.52
1999	84.78	86.63
2000	99.96	99.96
2001	115.51	117.39
2002	140.38	142.82
2003	124.1	132.31
2004	125.82	136.46
2005	131.41	142.93
2006	145.04	162.17
2007	159.35	183.57

Source: SARB, (No Date).

Appendix 6. South African Firms' Data from McGregor Software

Data for the Period [2007-2009]											
Firm	Net Income R (000)	Total Assets R (000)	Shareholders Equity R (000)	Debts (Book Value)R (000)	ROA	ROE	q	MIRKT CAP	CAPM (β)	Spec Risk	STD DEV (MKT)
Rainbow	1221216000	1239218000	1166762000	1692851000	98.55	104.67	2.31	2343608078	0.6103	0.0021	0.058
Drg Gold	33400000	2083000000	1285000000	798000000	1.60	2.60	1.13	N/A	0.5378	0.0024	0.058
Sov Food	1652418.27	32476736	12471066.62	20005669.38	5.09	13.25	1.00	N/A	0.8992	1.0543	0.058
CBH	22172409	955804094	258872116	696931978	2.32	8.57	4.25	4066144313	0.742	0.0015	0.058
Clicks	442308000	3585322000	3242000	2440843000	12.34	13643.06	0.68	5935691459	0.6288	0.002	0.058
Pick and Pay	936800000	9303800000	1433700000	7870100000	10.07	65.34	8.72	8119635862	0.327	0.003	0.058
Shoprite	1085528000	11879673000	3688771000	8190902000	9.14	29.43	2.64	31385938815	0.5573	0.0023	0.058
Argent (2005)	83076000	646694000	389163000	257486000	12.85	21.35	1.15	742977658	0.86	0.0009	0.058
Spar	682000000	5833900000	1487800000	4346100000	11.69	45.84	1.00	N/A	N/A	N/A	N/A
Pikwik	4784000	48616000	25446000	36930000	9.84	18.80	1.28	N/A	N/A	N/A	N/A
Bats	432000000	20449000000	432000000	20017000000	2.11	100.00	1.00	N/A	N/A	N/A	N/A
Richemont	580700000	2807300000	2790000000	17300000	20.69	20.81	1.00	N/A	N/A	N/A	N/A
Buildmax	7470000	66820000	46200000	20620000	11.18	16.17	12.30	822152747	0.5276	0.0024	0.058
PPC	1541000000	4534000000	1713000000	2821000000	33.99	89.96	0.14	641169593	0.6495	0.0019	0.058
WBHO	762524000	7895982000	1815333000	6080649000	9.66	42.00	1.00	N/A	1.3765	-0.0036	0.0632
Woolworths	951600000	11261800000	3582800000	7679000000	8.45	26.56	1.05	1185652864	0.7068	0.0017	0.058
Truworths	1277000000	3903000000	2920000000	983000000	32.72	43.73	0.44	1724282379	0.6337	0.002	0.058
Naspers	1842530000	27093690000	27000251000	93439000000	6.80	6.82	4.45	9400100805	0.7844	0.0013	0.058
COMAIR	61803000	1442429000	459942000	982487000	4.28	13.44	0.52	743400000	0.7829	0.0013	0.058
GoldField	-58300000	27825500000	25891100000	1933600000	-0.21	-0.23	1.00	N/A	N/A	N/A	N/A
Telkom	20957000000	62740000000	34587000000	28153000000	33.40	60.59	0.34	21065708674	0.4257	0.0028	0.058
MTN Group	11135000000	1.70106E+11	80542000000	89564000000	6.55	13.83	1.42	2.40968E+11	0.8909	0.0007	0.058
Vodacom	7080300000	14983700000	6777400000	8206300000	47.25	104.47	5.53	82849278720	-0.4132	-0.6554	0.0391
Blue Tel	207972000	3222229000	1917944000	1304285000	6.45	10.84	1.00	N/A	0.8023	0.0022	0.0794
Altech	435000000	3688000000	2027000000	1661000000	11.80	21.46	1.00	N/A	N/A	N/A	N/A
Emira	555246000	7791887000	5761040000	2030847000	7.13	9.64	0.64	5000233453	0.1577	0.0033	0.058
Sable	4602000	578209000	352050000	226159000	0.80	1.31	0.29	169445800	0.3774	0.0029	0.058
Old Mutual	1078175294	1149356380	1078400146	70956234	93.81	99.98	52.53	66120146526	1.2883	-0.0022	0.058
Sanlam	6379000000	3.40265E+11	31554000000	3.08711E+11	1.87	20.22	0.13	42681600000	0.6539	0.7302	0.058
Discovery Liberty Holdings [2005]	7323000000	10793000000	6164000000	4629000000	67.85	118.80	1.46	15716356929	0.5061	0.0025	0.058
DataTec	1404000000	1.6588E+11	9404000000	1.6588E+11	0.85	14.93	1.06	N/A	0.3843	0.0029	0.058
Foschini	60019000	1675999000	622399000	1053600000	3.58	9.64	2.35	3940744292	1.3821	-0.0031	0.058
Pinnacle	454200000	7074400000	4136100000	2938300000	6.42	10.98	3.10	13405371953	0.7378	0.0015	0.058
Sun Int SA	6167309	33387248	25495735	7891513	18.47	24.19	12.39	413507066	0.9642	0.0002	0.058
Delta	1069000000	4450000000	2250000000	2200000000	24.02	47.51	1.00	3885257269	0.5322	0.0024	0.058
Jasco	39064000	990018000	613837000	376181000	3.95	6.36	0.65	639152189	0.1142	0.0033	0.058
Imperial capital	4815910	20912272	16196154	4746118	23.03	29.73	10.18	212987549	0.4225	0.0028	0.058
Sasol	112974004	2379549373	296078446	2083470927	4.75	38.16	6.35	15103646744	0.8927	0.0007	0.058
Grindrod	17055000000	51626000000	50383000000	1243000000	33.04	33.85	3.54	1.82985E+11	1.2477	-0.0019	0.058
Trencor	2269194000	13983575000	6775011000	5701518000	16.23	33.49	0.89	N/A	1.1675	-0.0012	0.058
Interwaste Holdings	996900000	14464200000	6619100000	7845100000	6.89	15.06	0.27	3936846732	0.2232	0.4992	0.058
Oasis	23378102	399348618	201337363	198011255	5.85	11.61	1.00	N/A	0.3183	0.4421	0.0745
Vox Telcom	70464000	440980000	419817000	21163000	15.98	16.78	0.99	436498459	-0.0877	0.0039	0.0628
1Time SA	54916000	1264250006	642112000	622144000	4.34	8.55	0.47	598590916	N/A	N/A	N/A
	-6313285	400336189	100555570	287208676	-1.58	-6.28	0.97	N/A	N/A	N/A	N/A

Appendix 7. Data for the Period [2007-2009]

Table

Data for the Period [2007-2009]								
Firm	CTAG	AROA	AROE	Aq	CAPM (β)	Spec Risk	STD DEV (MKT)	
Rainbow	0	98.55	104.67	2.31	0.6103	0.0021	0.058	
Drg Gold	1	1.60	2.60	1.13	0.5378	0.0024	0.058	
Sov Food	0	5.09	13.25	1.00	0.8992	1.0543	0.058	
CBH	1	2.32	8.57	4.25	0.742	0.0015	0.058	
Clicks	0	12.34	13643.06	0.68	0.6288	0.002	0.058	
Pick and Pay	0	10.07	65.34	8.72	0.327	0.003	0.058	
Shoprite	0	9.14	29.43	2.64	0.5573	0.0023	0.058	
Argent (2005)	1	12.85	21.35	1.15	0.86	0.0009	0.058	
Spar	0	11.69	45.84	1.00				
Pikwik	0	9.84	18.80	1.28				
Bats	0	2.11	100.00	1.00				
Richemont	1	20.69	20.81	1.00				
Buildmax	1	11.18	16.17	12.30	0.5276	0.0024	0.058	
PPC	1	33.99	89.96	0.14	0.6495	0.0019	0.058	
WBHO	1	9.66	42.00	1.00	1.3765	-0.0036	0.0632	
Woolworths	0	8.45	26.56	1.05	0.7068	0.0017	0.058	
Truworths	0	32.72	43.73	0.44	0.6337	0.002	0.058	
Naspers	1	6.80	6.82	4.45	0.7844	0.0013	0.058	
COMAIR	0	4.28	13.44	0.52	0.7829	0.0013	0.058	
GoldField	0	-0.21	-0.23	1.00				
Telkom	0	33.40	60.59	0.34	0.4257	0.0028	0.058	
MTN Group	0	6.55	13.83	1.42	0.8909	0.0007	0.058	
Vodacom	0	47.25	104.47	5.53	-0.4132	-0.6554	0.0391	
Blue Tel	0	6.45	10.84	1.00	0.8023	0.0022	0.0794	
Altech	0	11.80	21.46	1.00				
Emira	1	7.13	9.64	0.64	0.1577	0.0033	0.058	
Sable	1	0.80	1.31	0.29	0.3774	0.0029	0.058	
Old Mutual	0	93.81	99.98	52.53	1.2883	-0.0022	0.058	
Sanlam	0	1.87	20.22	0.13	0.6539	0.7302	0.058	
Discovery	0	67.85	118.80	1.46	0.5061	0.0025	0.058	
Liberty Holdings [2005]	0	0.85	14.93	1.06	0.3843	0.0029	0.058	
DataTec	1	3.58	9.64	2.35	1.3821	-0.0031	0.058	
Foschini	0	6.42	10.98	3.10	0.7378	0.0015	0.058	

Pinnacle	0	18.47	24.19	12.39	0.9642	0.0002	0.058
Sun Int SA	0	24.02	47.51	1.00	0.5322	0.0024	0.058
Delta	1	3.95	6.36	0.65	0.1142	0.0033	0.058
Jasco	1	23.03	29.73	10.18	0.4225	0.0028	0.058
Imperial capital	0	4.75	38.16	6.35	0.8927	0.0007	0.058
Sasol	0	33.04	33.85	3.54	1.2477	-0.0019	0.058
Grindrod	1	16.23	33.49	0.89	1.1675	-0.0012	0.058
Trencor	1	6.89	15.06	0.27	0.2232	0.4992	0.058
Interwaste Holdings	0	5.85	11.61	1.00	0.3183	0.4421	0.0745
Oasis	0	15.98	16.78	0.99	-0.0877	0.0039	0.0628
Vox Telcom	0	4.34	8.55	0.47			
1Time SA	0	-1.58	-6.28	0.97			

Source: Data retrieved from McGregor Software in Appendix 6.