EMPIRICAL RESEARCH INTO THE SHIFTING OF THE CORPORATE INCOME TAX OF LIFE INSURANCE COMPANIES

BY

SCOTT RANDALL FOUCH

Bachelor of Science
Northeast Missouri State University
Kirksville, Missouri
1982

Master of Accounting Science
University of Illinois
Champaign, Illinois
1986

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
DOCTOR OF PHILOSOPHY
December, 1990

EMPIRICAL RESEARCH INTO THE SHIFTING

OF THE CORPORATE INCOME TAX

OF LIFE INSURANCE COMPANIES

Thesis Approved:

Janet S. Kimbrell

Thesis Advisor

Laurence H. Hamman

Mary N. Mink

John R. Wingender

Norman N. Durham

Dean of the Graduate College

ACKNOWLEDGMENTS

I wish to express sincere appreciation to Dr. Janet Kimbrell for her patience, encouragement and advice throughout my graduate program. I would also like to thank the remaining members of my dissertation committee, Dr. Larry Hammer, Dr. Mary Gade, and Dr. John Wingender for their guidance and many helpful suggestions.

Most importantly, I would like to thank my wife, children and parents for their support and understanding throughout this endeavor.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Statement of the Problem

The corporate income tax was enacted in the United States in 1909 and was subsequently instituted on a world-wide basis. In 1986, 2.36 trillion dollars or 64% of the gross domestic product originated in non-financial corporate institutions alone [Rosen, 1988]. Given the extent and length of time the tax has been in place, it seems reasonable to assume that its economic and social effects would be well known. Unfortunately, this is not the case.

At the most fundamental level, there is no general agreement as to who really bears the economic burden of the tax. Some believe that it is borne solely by the corporation, and therefore, by its shareholders. For example, Goode [1951] has long been a staunch supporter of this view. Adelman [1957], Hall [1964], and Oakland [1972], among others, have provided empirical evidence that is consistent with this proposition.

Others believe that the tax is fully shifted to consumers by way of higher prices and/or to labor through a systematic reduction in the net wage rate. For example,

based on the results of their econometric study, Kryzyzaniak and Musgrave [1963] concluded that the corporate tax was fully shifted to prevent a decline in the net rate of return on corporate investment. After reviewing the early empirical work on shifting, Ratchford and Hahn [1957] came to essentially the same conclusion - a substantial portion of the corporate tax had been shifted.

Still others believe that a partial shifting occurs and that shareholders, labor, and consumers bear the burden of the corporate tax, although not proportionately. Bayer [1970] provided the first empirical evidence as to the existence of a partial shifting to wage earners. Examples of other empirical evidence consistent with the partial shifting view include Beck [1950] and Lerner and Hendricksen [1956].

Yet another view is that the owners of capital in both the corporate and the non-corporate sectors bear the burden of the tax. The strongest proponent of this view is Harberger [1962]. Using a general equilibrium framework, Harberger concluded that the owners of capital bear almost 100 percent of the burden of the corporate tax.

Although there has been considerable research done in this area, there remains no more controversial issue in taxation than the question, "Who bears the corporate income tax [Pechman, 1985]?" Due to various methodological problems which will be addressed in Chapter IV, empirical research has yet to provide conclusive evidence to support

any position. The purpose of this study is to apply a methodology that should provide insight into the economic burden of the corporate income tax. Specifically, an events study methodology will be used to examine the incidence of the corporate income tax in the life insurance industry.

Before discussing the research design and methodology, it may be helpful to define some basic terms and concepts. These are examined in the following section.

The Incidence Concept

Over the years there has been considerable controversy over the meaning of the term tax incidence. The traditional approach, and the one taken in this research, is to relate incidence to economic burden. Therefore, the focal point of the analysis will be on the individual, or class of individuals, who actually pay the tax. It is this direct money burden that defines the ultimate incidence of any tax [Dalton, 1954].

Consistent with the discussion above, reference will be made to two types of incidence: statutory incidence and economic incidence [Musgrave and Musgrave, 1989]. Statutory incidence refers to those taxpayers who have the <u>legal</u> responsibility for payment of the tax. In contrast, economic incidence is concerned with who really bears the burden. Operationally, economic incidence is defined as the

change in the distribution of private real income brought about by the tax.[1]

Private real income may be affected by either a change in the sources of income, uses of income, or both. The effect on the sources side depends on how the tax changes the distribution of income among labor and capital (commonly referred to as factors of production).[2] On the uses side, private real income is affected by changes in commodity prices brought about by the tax.[3]

At this point, a distinction should probably be made between the incidence of a tax and the effects of a tax. Conceptually, the effects of a tax could include changes in productivity, factor usage, the propensity to save, the labor leisure choice and the consumption pattern of goods. These particular effects are not addressed in this study.

The goal of this research is to determine to what extent, if any, the statutory incidence of the corporate income tax of life insurance companies differs from its economic incidence. This difference is the amount of tax

---

[1]However incidence has been defined, the effect of the tax on the distribution of real income for private use has been considered extremely important [Pechman, 1985; Peacock, 1969; Musgrave, 1959].

[2]Economic incidence (at least as it refers to the sources side) may then be calculated by using information as to the proportion of each individual's income from capital and labor.

[3]Economic incidence is then a function of the propensity of the different income classes to consume the commodities affected.

burden passed on to labor and/or consumers and is referred to as the amount of tax shifting.

Research Design and Methodology

As previously discussed, the purpose of this research is to provide evidence as to the amount of the corporate tax burden remaining on the corporate shareholder of life insurance companies. To this end, an events study methodology will be applied to investigate tax incidence. Maintaining the assumption of efficient market hypothesis in the semi-strong form [Fama, 1970], the stock price reaction to a tax law change should provide an unbiased expectation of the discounted future cash flow effects of the legislative action. In terms of tax incidence, the market behavior should provide evidence as to the amount of the tax burden borne by the stockholders of the company. Shifting will have occurred to the extent that the amount borne by the stockholders differs from that imposed by statute.

The specific tax law change examined in this study is The Life Insurance Company Income Tax Act of 1959. The 1959 Act was chosen for four reasons. First, the 1959 Act substantially increased the corporate income tax burden of life insurance companies. For the companies in the sample, the average increase in corporate taxes was nearly 90 percent. Second, the 1959 Act did not contain any other tax policy changes, such as the investment tax credit, that might produce confounding affects. Third, since the 1959

Act was intended to be a permanent solution to the problems of taxing life insurance companies, it is reasonable to assume that the market would make a long-term assessment of the changes. Finally, as detailed in Chapter IV, the life insurance industry and the 1959 Act have already been the subject of two extensive econometric tax incidence studies.

A two stage process was used to determine the extent of shifting of the corporate income tax in the life insurance industry. Stage one consisted of an estimate of the statutory tax burden imposed under the 1959 Act for the 36 companies in the sample. Next, the estimate of the statutory burden was used to predict stock price reactions under various shifting assumptions. The stock price reaction was intended to capture the amount of the economic burden of the tax that remained on the shareholders of the life insurance companies. Again, shifting will have occurred to the extent that the economic burden differs from the statutory burden. The second stage of the analysis involved estimating the stock price reaction to the 1959 Act. This was accomplished by applying a modified version of the standard events study methodology.

The methodology applied in this study addresses a major criticism of prior empirical research into the incidence of the corporate income tax. The criticism is that these studies fail to isolate the tax effect from other economic factors bearing on the determination of the corporate rate of return on capital. Given efficient capital markets, the

cash flow effect of the legislation should be quickly and accurately impounded in stock prices. By focusing on rates of return on or around key event dates, any abnormal returns should provide a direct and unambiguous means of judging tax induced reactions.

Motivation for the Study

Tax Policy Implications

The corporate income tax is but one component of an overall taxation policy. Taxation, in general, has three important goals: to transfer resources from the private to the public sector; to distribute the cost of government fairly; and to promote economic growth, stability and efficiency [Pechman, 1985a].

The corporate income tax plays a significant role in the goal of transferring resources from the private to the public sector. In 1985, receipts from the tax totalled 80.4 billion dollars [Rosen, 1988]. Only the personal income tax and the social security tax generated more federal revenues. The effect of the corporate income tax on equity and economic factors is less clear and is subject to much debate.

Most authors in public finance agree that a knowledge of who bears the tax is fundamental to understanding the social and economic implications of any tax policy. Krzyzaniak [1966, p.255] notes that "the place of the corporate income tax in the tax structure depends quite

fundamentally on whether or not it is taken to be shifted." Along the same line, Rolph and Break [1961, p.236] state that "undertaxation or overtaxation of corporate income in relation to other income relies heavily on whether or not the tax is shifted."

One of the most important effects of taxation is the distribution of its burden. Musgrave [1959] shows that, conceptually, the distribution of the tax burden is dependent on the incidence of the various taxes. Based on simulation results, Pechman [1985b] concludes that the incidence of the corporate and property taxes are the two critical factors in determining the progressivity of the tax system.

McLure and Ture [1972] note that without a clear understanding of the incidence of the corporate income tax, it is impossible to assess its impact on international commerce, world-wide tax harmonization, and intercountry balances of trade. Goode [1951] sees incidence as affecting pricing policies for business firms. Finally, Harberger [1962] concludes that tax shifting is an important factor in determining the investment rate of return in both the corporate and the non-corporate sectors of the economy.

It should be noted that tax shifting doesn't necessarily contravene federal tax policy. There are certain taxes that are fully intended to be shifted. For example, the burden of sales and excise taxes are generally intended to be shifted from the seller to the consumer.

However, the corporate income tax is not considered to fall in this category.[5]

The possibility that part or all of the corporate income tax burden might be shifted has long been recognized in the economics literature [Seligman, 1926; Musgrave, 1959; Due and Frielander, 1977; Auerbach and Feldstein, 1987]. Although not referring specifically to the corporate income tax, John Locke, perhaps somewhat cynically, states the problem encountered by the taxing authority: "Struggle and contrive as you will, lay your taxes as you please, the traders will shift it off from their own gain" [quoted in Rosen, 1988, p.264].

In summary, corporate tax incidence is seen to have an impact on a variety of economic activities. The posited effects range from influencing pricing decisions by individual firms to causing distortions in international commerce. In addition, tax shifting has implications for theories on the behavior of the firm and on empirical tests of stock price reactions to certain accounting changes. These are discussed briefly in the following section.

Other Implications

As Mieszkowski [1969, p.1103] notes, "...incidence theory is based on the marginal productivity theory of

---

[5]Taxes whose burden is expected to be shifted are generally referred to as indirect taxes. Direct taxes, of which the corporate income tax is a member, are not intended to be shifted [Musgrave, 1959].

distribution that assumes firms choose factor proportions so as to minimize costs, and set commodity prices at profit maximizing levels." Therefore, a test of shifting also constitutes a test of the behavior of the firm. Alternatively stated, the presence of short-run shifting indicates that firms are not operating at profit maximizing levels: a condition contrary to many economic theories.

Incidence theory also has implications for empirical research into the stock price reactions of accounting changes that affect taxes. For example, if a tax increase can be fully passed on to consumers or labor, there will be no net cash flow effect on the firm. As a result, no stock price reaction would be expected (at least as it relates to the tax effect). If industries differ with respect to their ability to shift taxes, the research design must take this into account.

Determining the economic incidence of the corporate income tax has proven to be a formidable task. The traditional approach taken has been to first determine if the tax has been shifted. The strategy of this study will be much the same.[6] If shifting has occurred, research as to the direction (i.e. forward to consumers or backward to labor) should then be conducted. If no shifting occurs, the economic burden clearly lies with the corporate shareholders. At a minimum, the research strategy chosen

---

[6]The alternative of focusing on economic incidence without first answering the specific question of whether or not shifting has occurred does not seem practical.

for use in this study should provide insight into the economic burden remaining with the statutory taxpayer.

The remaining chapters of this thesis are organized as follows: A brief discussion of the life insurance industry and the taxation of life insurance companies is given in Chapter II. Chapter III contains an outline of modern tax incidence theory and a critical analysis of the situations where the theoretical results may not be appropriate in describing real-world phenomena. A review of the important empirical work to date is examined in Chapter IV. The methodology to be applied in the study is detailed in Chapter V and the results of the tests and conclusions are included in Chapter VI. Finally, Chapter VII gives a summary of the results along with limitations, tax policy implications, and possible extensions.

CHAPTER II

FEDERAL CORPORATE TAXATION OF THE LIFE INSURANCE INDUSTRY

Due to the unique nature of life insurance company operations, the formulation of satisfactory federal laws has proven to be a formidable task.[7] As a result, the history of life insurance taxation has been one of constant change. Since the market's assessment of the shifting behavior in the life insurance industry should be based on an analysis of prior tax law changes, a cursory review of the events leading up to the passage of The Life Insurance Company Income Tax Act of 1959 is provided in this section. First, it may be instructive to outline a brief description of the life insurance industry.

Industry Description

At the organizational level the life insurance industry is unusual in that it is comprised of both mutual companies and stock companies. Mutual companies operate in a cooperative-type arrangement and are owned solely by the

---

[7]Two key factors contributing to this problem are: (1) the organizational structure of the companies operating within the industry, and (2) the long-term nature of the product sold. For a detailed analysis of the related tax policy issues see Valenti [1963].

policyholders. Presumably, these companies are not established with the objective of making a profit for their owners. Rather, the focal point of operations is to reduce the effective cost of insurance protection. On the other hand, stock companies are organized for profit and must provide low cost insurance as well as directly compete with other firms for capital resources.

At mid-year 1959, there were 1,407 U.S. based legal reserve life insurance companies in operation. Of this total, 151 were organized as mutual companies [Life Insurance Fact Book, 1960]. Although smaller in number, mutual companies are huge financial institutions which accounted for over 60 percent of the life insurance in force during the time covered by this study.

During the period immediately preceding the 1959 Act, the life insurance industry experienced phenomenal growth. In the 1950's alone, the number of life insurance companies increased nearly 135 percent with life insurance in force rising 150 percent [Weinrel, 1959]. This growth can be partially explained by the effective method with which life insurance companies spread risk for policyholders and by the provision of a safe and convenient savings outlet [MacLean, 1957]. Their product, a long-term executory contract, is generally written in two forms: whole life and term.[8]

---

[8]At the end of 1959, roughly 39 percent of all new insurance issued was being written on a term basis [Life Insurance Fact Book, 1960].

Whole life insurance can be seen as providing both a protective element and a savings element. The savings element is in the form of a "cash surrender value" which may be redeemed at anytime during the life of the contract. The face value of the policy will always be payable at the death of the insured. Term insurance differs from whole life insurance in two ways. First, there is no build up of a cash surrender value. Therefore, no savings component exists with term insurance. Second, death claims will only be payable if the insured dies within a stated period of time. This period may be one or more years and is usually 5, 10, 15 or 20 years. Most policies issued on a term basis will not become payable as death claims, the probability being that the insured will outlive the term of the contract [MacLean, 1957].

Since life insurance companies are involved in matters of general social welfare, the industry has been subject to strict and detailed state regulation.[9] Although uniformity among states does not exist, the legislation generally has focused on standards of solvency, examination policies, non-discrimination rules, policy disclosures, specification of acceptable investment instruments, and state taxation. In addition, many states have attempted to

---

[9]In 1944, the Supreme Court firmly established the right of the federal government to regulate the insurance industry [United States v. South-Eastern Underwriters Association, et.al., 332 U.S. 533 (1944)]. However, Congress subsequently passed the McCarran-Ferguson Act, 59 Stat. 33 (1945) which expressly reserved most regulatory authority for the individual states.

limit the expenses of insurance companies by: (1) prohibiting the payment of pensions, political contributions, and excessive commissions; and (2) placing limits on salaries, expenses to secure new business, and the amount of new business that can be written in any one year [Huebner, 1950].

At the federal level, regulation has been limited to the area of taxation. Although subject to numerous changes, the normal corporate tax rate structure has been applied to life insurance company operations since 1861. Despite this rather long history of taxation, the development of a permanent method of taxing life insurance companies was not accomplished until 1959.

Evolution of the 1959 Act

Between 1921 and 1958, the life insurance industry received preferential tax treatment in comparison with corporations in other industries. During this period, the federal tax base for both mutual and stock insurance companies consisted solely of their net investment income. Neither underwriting gains and losses (primarily changes in mortality and operating expenses) nor capital gains and losses were subject to federal income taxes. However, this method of taxation proved to be inflexible and often required legislative adjustments to address intra-industry inequities and to restore diminishing federal tax revenues [Whitman and Thompson, 1967].

The legislative changes generally focused on the method used to determine the reserve requirements for future benefit payments. From 1921 to 1941, a fixed reserve rate was used by all life insurance companies regardless of the actual rate earned on assets which supported the reserves. The major problem encountered with this method of taxation was that the rate established by statute was higher than the rate assumed when the policies were written. The result was a deduction of expenses in excess of that actually incurred.

When interest rates started to decline in the 1930's companies were unable to find investments which could generate enough earnings to satisfy their reserve needs. Since the statutory reserve rate remained unchanged, declining investment yields caused the federal tax liabilities of the insurance industry to fall substantially. In 1942,[10] rather than addressing what seemed to be an unworkable taxing scheme, the Treasury changed from a fixed reserve rate to an industry ratio. However, in substance, the 1942 Act did nothing more than reduce the effective reserve rate. Although insurance companies were again paying federal income taxes, this condition would not last for long.

The inadequacies of the net investment income approach were once again highlighted in 1947 and 1948 when, despite continued growth in the industry, life insurance companies

---

[10]Revenue Act of 1942, P.L. 753, (77th Congress), 1942.

paid virtually no federal income taxes.[11] During the period that followed, Congress seemed unable to develop a permanent method for taxing life insurance companies. Rather than repealing the 1942 Act, in 1950 Congress enacted the first of what became a series of net investment income "stop-gap" legislation.[12] The 1950 Act was modified the following year and remained essentially unchanged through 1954.

In 1956, the Mills Law[13] was proposed as a permanent solution to the problem of life insurance company taxation. Although a fixed reserve ratio was still used, the Mills Law was more flexible in that it contained special provisions for companies which used especially high or low reserve interest requirements. Despite rather substantive changes, the Mills Law was only enacted on a one-year basis, retroactive to 1955, and then subsequently extended to cover 1956.

In 1957, representatives of the life insurance industry requested that the Treasury Department design a permanent method for taxing life insurance companies. However, early in 1958 it became apparent that no such proposal would be

---

[11]Under the net investment income approach, the interest rate used to calculate the deduction for policy reserves was established by statute. During 1947 and 1948, the rate of return on investment was declining whereas the rate used to calculate reserve deductions remained unchanged. The result was a decline in net investment income and the virtual elimination of federal income taxes.

[12]Had the stop-gap legislation not been reenacted periodically, the provisions of the 1942 Act would have applied automatically.

[13]Life Insurance Company Tax Act of 1955, P.L. 429, (84th Congress), 1956.

forthcoming so the Mills Law was once again extended one year to cover 1957 [Abelle, 1963]. Finally, in April of 1958, the Treasury Department informed the House Ways and Means Committee Chairman that it had developed an alternative solution to the taxation of life insurance companies. The details of the proposal, which ultimately became law, were first presented to the House Ways and Means Committee in November of 1958. On June 25, 1959, The Life Insurance Company Income Tax Act of 1959 eliminated much of the uncertainty about federal taxes that had plagued the industry since 1948.

The 1959 Act was made retroactive to 1958 and instituted an intricate "total income" approach to taxing life insurance companies. The result was a substantial increase in the tax burden of life insurance companies over that imposed by the previous "stop-gap" legislation. In addition, the preferential treatment that the life insurance industry had enjoyed since 1921 had come to an end. Life insurance companies now faced an effective federal tax rate comparable to that incurred by corporations in other industries [Whitman and Thompson, 1968].

The Life Insurance Company Income Tax of 1959

Since actual tax liabilities will be used to estimate the stock price reaction to the legislative changes, only a general description of the provisions of the 1959 Act will

be provided. A more detailed analysis of the taxing scheme may be found in Stagliano [1977] or Abelle [1963].

As in prior legislation, the 1959 Act applies the normal corporate tax rate (30 percent) and the surtax rate (22 percent) to life insurance company taxable income. In addition, a special 25 percent tax is imposed on the amount, if any, that long-term capital gains exceed short-term capital losses. Each calculation is independent and losses from one cannot be used to offset gains from the other.

The increase in the statutory tax burden is a result of the base broadening provisions of the 1959 Act. Under the new method of taxation, the tax base (life insurance company taxable income) is calculated as the sum of three phases. Phase I is the smaller of net investment income or gain from operations. Although similar to the net investment income of prior legislation, the phase I base is larger for most companies under the 1959 Act. Phase II re-institutes a total income approach by taxing one half of the excess gain from operations over the phase I base. Finally, phase III is calculated as the amount of stockholders dividends paid from the untaxed portion of phase II. Since mutual companies have no shareholders, the phase III tax applies only to stock companies.

This chapter included a description of the life insurance industry, a chronology of the events leading up to the passage of the 1959 Act and a cursory review of the provisions of the 1959 Act. During the 20 years preceding

the 1959 Act, the life insurance industry faced a wide range of effective tax rates including two periods where the industry paid virtually no federal income taxes. The important point to be made is that the numerous corporate tax law changes provided the market with several opportunities to assess any shifting behavior in the life insurance industry. The following chapter outlines modern corporate tax incidence theory along with the development of an a priori case for shifting behavior in the life insurance industry.

CHAPTER III

THEORETICAL FRAMEWORK

General

Before presenting tax incidence theory in detail, an issue related to the comprehensiveness of the tax and the appropriate analytical framework needs to be addressed. If a tax is levied on a single industry, and that industry is small in relation to the economy as a whole, partial equilibrium analysis is appropriate [Rosen, 1987]. In contrast, if a large sector of the economy is affected, the interdependencies between prices in the taxed and untaxed sectors must be taken into account. This requires the use of a general equilibrium framework. Since the focus of this study will be on a special tax on the life insurance industry, partial-equilibrium tax incidence theory is appropriate. This will be presented in the following section.

Partial Equilibrium Analysis

Partial equilibrium analysis is the most appropriate method for analyzing a tax which affects only a single industry [Rosen, 1987]. Using this approach, ramifications in the untaxed markets are essentially ignored. This can

only be done when the taxed industry is small in relation to the economy as a whole (as is the case with the life insurance industry in the U.S. economy). Assuming perfect competition[14] and given the market setting just described, traditional tax incidence theory may be described as follows:

In general, if a tax is imposed on capital in the insurance industry, there will be a decline in the rate of return earned by corporate shareholders. The result, will be a tax induced movement of capital out of the insurance industry to other industries where the yield on investment is higher. The ability of capital to make this move will be a function of the elasticities of supply and demand for capital and the time frame being considered. In the short-run, a firm's capital (plant and equipment) is considered to be fixed. However, in the long-run, firms can make a complete adjustment to the environment and all factors of production are considered variable [Mansfield, 1977].

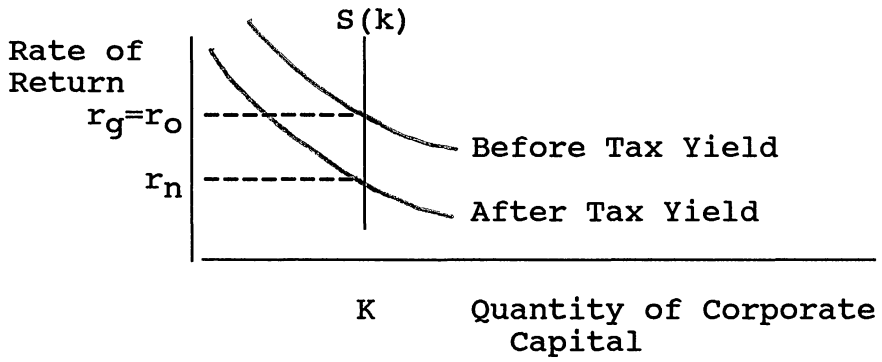
Short-Run Analysis

In the short-run, the total supply of corporate capital is fixed (perfectly inelastic). In other words, the amount of previously invested capital is locked into the insurance

---

[14]Perfect competition is generally assumed when there are many firms operating within the industry. During the period under study, the life insurance industry was comprised of approximately 1,400 companies operating in the United States (see Chapter II for a brief description of the life insurance industry).

industry. A graphical representation of the effects of imposing a tax on corporate capital is given in Figure 1.



r_o = rate of return on capital prior to the imposition of the tax;
r_g = pre-tax rate of return;
r_n = after-tax rate of return.

Figure 1. Imposition of a Tax on Corporate Capital: Short-run Analysis

The decrease in demand causes the net return to capital to fall by an amount exactly equal to the tax (i.e., $r_n = (1-t) * r_o$). Therefore, the owners of capital in the insurance industry will bear the full burden of the tax in the short-run.

Once plant and equipment have been purchased, nothing short of terminating operations can be done to avoid the tax. It cannot be passed on to the consumer since, in the short-run, each firm is faced with a horizontal demand curve for its product. Sales can only be made at the market price

and any attempt to raise prices will close the market to the seller [Mansfield, 1977]. Analogously, any attempt to shift the tax to labor will close the labor market to the firm.[15]

Long-Run Analysis

Although the supply of corporate capital is fixed in the short-run, it will not stay that way for long. As time passes, operations may be contracted by not replacing worn-out equipment and/or previously planned expansion may be curtailed. If the rate of return in the insurance industry is less than that available elsewhere, individuals will invest where the yield is higher. The extent of the movement of capital out of the insurance industry will ultimately be determined by the industry's long-run elasticities of supply and demand for capital. In relative terms, as supply becomes more elastic and demand becomes less elastic, more of the tax burden will be shifted (i.e., capital bears less of the burden).

The elasticity of demand for capital will depend, in part, on the demand for the industry's output. The larger the elasticity of demand for insurance, the greater will be the elasticity of demand for capital. The demand for capital is also dependent on the elasticity of substitution between labor and capital in the insurance industry, the share of capital used in production, and the elasticity of

---

[15]The results are essentially the same in both competitive and monopolistic markets [Stiglitz, 1988].

supply of labor [Layard and Walters, 1978]. The larger the elasticity of substitution (i.e. the easier it is to substitute labor for capital), the more elastic will be the demand for capital. As a general rule, the more selective the tax, the easier it will be for investors to avoid its burden. Therefore, supply and demand elasticities for an industry subject to a specific tax will tend to be larger, ceteras paribus [Musgrave and Musgrave, 1989].

There is a special long-run case where incidence may be determined based solely on the elasticity of supply of capital. If the long-run supply of capital is perfectly elastic, the movement of capital out of the insurance industry will prevent the net rate of return on capital from falling (see Figure 2).

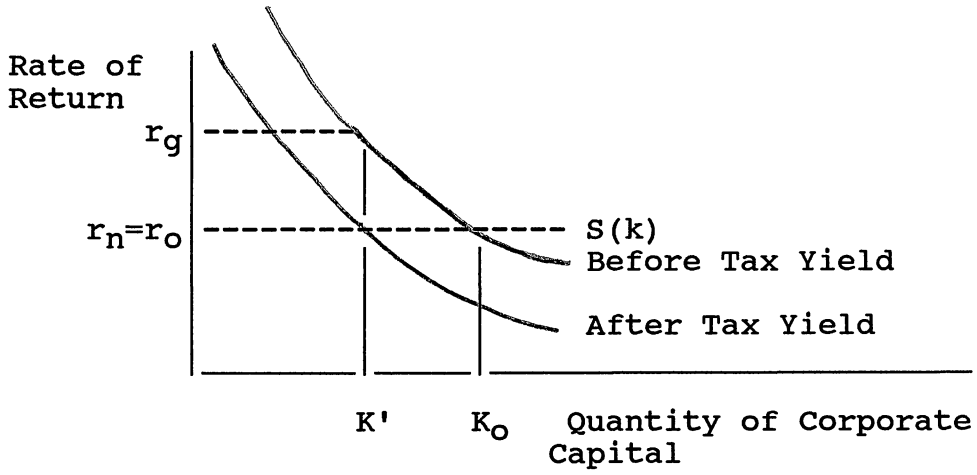


Figure 2. Imposition of a Tax on Corporate Capital: Perfectly Elastic Long-run Supply of Capital

Under this condition, owners of capital are unaffected by the tax (the rate of return before imposition of the tax, r_o, is equal to the net after-tax rate of return, r_n). As a result, the corporate tax is fully shifted to labor through lower wages and/or to the consumers through higher premium prices.

Even if long-run shifting occurs, it is very difficult to determine when the effects of the tax will be fully manifested. However, the analytical works of Sato [1963] and Feldstein [1974] provide some important insights into the length of the process. Sato's analysis indicates that it takes a full 130 years to reach equilibrium, with one-half of the total adjustment being completed within 30 years. Feldstein [1974] reports similar results. He concludes it will take 140 years from the initial post-tax equilibrium to reach a steady state-equilibrium. A full twenty years are necessary for one-half of the adjustment to be completed.

Before concluding, an important point needs to be made. All long-run analyses critically depend on short-run incidence theory being correct. For if the corporate tax is fully shifted in the short-run, analysis of a longer time frame becomes irrelevant. All longer-run theoretical adjustments are dependent on a tax induced movement of capital out of the insurance industry. If the tax is fully shifted in the short-run, no such inducement exists. This is because the net rate of return to capital is unaffected

by the tax: a condition which would result in labor and/or consumers bearing the full economic burden of the tax.

In summary, there is substantial consensus on the burden of the corporate income tax in the short-run: it will be on the owners of capital in the insurance industry. As the time-frame lengthens, and given that short-run theory is correct, the incidence of the tax will depend on the elasticity of supply of capital and the elasticity of demand for capital. Although the question of tax incidence seems to be reduced to that of obtaining accurate estimates of these key parameters, major qualifications to the theoretical results become necessary when the highly restrictive assumptions underlying the economic reasoning are relaxed. These are discussed in the following section.

The Shifting Mechanism

As previously discussed, traditional incidence theory places the short-run incidence of the corporate income tax on the owners of corporate capital. However, total reliance on these abstract results obviates the need to consider shifting as a viable economic phenomena. Realistic modifications to the underlying assumptions may lead to significantly different results. For example, the ideal types of perfect markets which are used in the analysis simply do not exist in the real world [Mansfield, 1979]. Therefore, allowances must be made for behavioral reactions to a factor tax under conditions of nonperfect competition.

In addition, recent research into the behavior of the firm has generated serious questions about the motivations of corporate management. The classical assumption of profit maximization has been criticized on grounds that profits may not be the only, or even the primary, objective of maximization. Rather a firm may wish to maximize sales or market share [Musgrave and Musgrave, 1989]. Alternatively, Simon [1959], among others, has argued that a firm aspires to a "satisfactory" rate of profits; but not the maximum. Finally, there is considerable doubt as to the ability of managers to operate at profit maximizing levels when faced with conditions of uncertainty and imperfect knowledge about the states of nature. These qualifications, and their implications for shifting, are discussed in the following sections.

Nonperfectly Competitive Behavior

A key assumption of traditional tax incidence theory is that firms operate in perfectly competitive markets. However, nonperfectly competitive conditions appears to be more descriptive of actual markets. Unfortunately, there is no well developed theory of tax incidence under nonperfectly competitive conditions [Rosen, 1988]. The problem is that it is unclear how prices are actually determined in such a setting. It is generally recognized that there are a wide variety of possible relationships, varying according to the degree of interdependence (oligopoly) among firms and the

strength of differentiation of products [Due and Frielander, 1977]. Two oligopolistic pricing theories discussed in the literature are the following: price leadership and cost-plus pricing.

Under conditions of price leadership, no one firm will wish to depart from the established price for fear of losing its sales if it raises price or having its competitors follow suit if it lowers prices. Mansfield [1979] describes two types of price leadership: dominant firm and barometric-firms. Dominant-firm pricing is seen to occur in industries where there is one large firm and several small firms. The dominant firm sets the price and whatever the small firms don't sell, the dominant firm does. Under barometric-firm pricing, the first firm to raise its price is quickly followed by the other firms in the industry. The implication of price leadership for tax incidence is that shifting may occur to the extent that a tax increase serves as a signal to firms to raise their price in concert.

Of course, not all oligopolistic pricing theories lead to the possibility that the corporate tax may be shifted. For example, each individual firm may believe that if it raises its price in response to the tax, that the other firms will not follow. If this is the case, none will raise their price. Therefore, the entire burden will fall on the producers.

An alternative pricing theory under nonperfectly competitive markets is that of cost-plus pricing. Under

cost-plus pricing, a firm first estimates the cost per unit and then adds a markup to obtain a target rate-of-return.[16] If the tax is included as a cost of production[17] or the margin is defined net-of-tax, then the pricing rule may lead to behavior which intends to shift the tax. Uncertainty is usually given as the most plausible reason for using standard cost-plus pricing [Penner, 1967]. Furthermore, fear of government, union, or consumer group reprisals may operate to restrain profit motivation in oligopolistic firms which have a high degree of market power [Musgrave, 1959].

When cost-plus pricing is used, the tendency is for profits to be below maximum levels. Unfortunately, theory cannot specify precisely the level of cost-plus pricing. As a result, it is unclear how far the oligopolist can go to recoup a net-of-tax profit level. The ability to shift the tax will depend on the existing amount of unrealized profits, the tax rate, the structure of cost and demand, and uncertain factors [Mansfield, 1979].

---

[16]There is a variety of cost-plus pricing schemes such as full-cost, average-cost and limit-pricing. The analysis and the implications for shifting are essentially the same. However, limit pricing, a price set to limit entry into the industry, may result in a greater difference between the established price and the profit maximizing price (at least in the short-run).

[17]A survey of manufacturers indicated that most considered the corporate tax as a cost of production [Kimmel, 1958]. Also see Due and Frielander [1977], Musgrave and Musgrave [1989], among others.

Sales Maximization Behavior

Sales maximization has been proposed as an alternative to profit maximization [Baumol, 1973]. Baumol's argument is that firms seek to maximize total sales subject to a minimum profit constraint. Sales maximization is defended on grounds that management's success is often based on the firm's ability to obtain market share. Baumol [1973] also notes that there is a stronger correlation between management's compensation and sales than there is between compensation and profits. Sales maximization, however, is considered to be bounded by a requirement to attain some reasonable return on investment. According to Baumol [1973], the constraint is determined by the capital markets where firm value and the firm's credit worthiness are competitively set. It can be shown mathematically that, if the profit constraint is defined net-of-tax, there may be a behavioral pattern which leads to shifting (see Appendix).

Satisficing Behavior

The behavioral assumption of maximization has been questioned by Simon [1959] and Cyert and March [1964], among others. They assert that management attempts to attain a satisfactory rate of profit rather than maximizing either profits or sales.[18] An important feature of their theory is

---

[18]Along a similar vein, Galbraith [1967] maintains that the principle of profit maximization became obsolete with the separation of ownership and control in the firm. He contends that the corporation is dominated by a

the emphasis on organizational slack which is defined as the difference between total resources and necessary payments. The types of organizational slack that have the greatest implication for tax incidence are: (1) the setting of prices below that necessary to maintain adequate revenue from customers, and (2) the setting of wage rates higher than that needed to retain labor [Cohen and Cyert, 1965].

If satisficing behavior occurs, then organizational slack can be used as a stabilizing force to deal with changes in the external environment. Since an increase in the corporate income tax will result in lower profits, the firm may increase prices or reduce the wage rate so that the satisficing profit level is maintained. Presumably, the amount of shifting will depend, at least in part, on the amount of organizational slack in the firm.

In summary, although the question of short-run shifting of the corporate income tax might be settled under traditional tax incidence theory, a number of modifications are in order. If certain conditions are met, the results of traditional incidence theory may not hold. These conditions are: (1) that firms treat the tax as an expense for price determination; (2) there is substantial uniformity in pricing policies within an industry; and (3) the firms, as a whole, are not maximizing profits. Such market conditions appear to be relatively descriptive of many industries in

---

technostructure which seeks survival and autonomy through planning and stability.

the United States. Therefore, an increase in the corporate income tax, at least in certain industries, may lead to short-run adjustments in price and output, and thus, a shifting of the corporate tax burden.

The point of the previous discussion is not to negate the usefulness, for analytical purposes, of abstract theories of tax incidence. Rather it is intended to identify circumstances where the theoretical arguments may not hold. In the short-run, modification to traditional incidence theory generally follows along two lines: (1) profit maximizing behavior occurs but markets are nonperfectly competitive, and (2) management pursues goals other than absolute profit maximization. Taken together, they cast serious doubt on the conclusion that owners of corporate capital must bear the burden of the corporate income tax in the short-run. These modifications are not suggested simply for the sake of "realism," but to make some positive contribution to the question of tax incidence.

The preceding analysis has merely shown that under conditions of nonperfect competition, the corporate income tax <u>may</u> be shifted. Whether or not shifting actually occurs, must ultimately be determined empirically. It is to that end that this research hopes to contribute. Rather than testing shifting for the entire corporate sector, the strategy of this research is to identify an industry where the qualifications to theory are most prevalent. If the theoretical results hold under these conditions, they are

likely to hold under more favorable market settings. Factors which tend to promote shifting in the specific case of life insurance companies are presented in the following section.

A Priori Case for Shifting in the Life Insurance Industry

There is substantial evidence to suggest that life insurance companies operate in a nonperfectly competitive market: a condition which is necessary for shifting behavior to occur. First, although there is some disagreement on this issue, evidence exists to indicate that price competition is seriously lacking in the life insurance market [Belth, 1966]. Second, the industry has many characteristics of an oligopolistic market. There is a high degree of industry concentration [Cummins, et al, 1972] and empirical evidence on returns to scale is consistent with that which would be expected to exist in an oligopolistic market [Houston and Simon, 1970]. Finally, Launie [1968] makes a strong argument that consumers do not have a reasonable amount of knowledge as to product cost in the life insurance market; a condition which may lead to market failure [Scitovsky, 1951].

Nevertheless, the existence of imperfect competition is not a sufficient condition for shifting to occur. Shifting will still be dependent on, among other things, the pricing mechanism employed. On this point, there is little

disagreement as to the method used by insurance companies in determining premium prices. The insurance industry pricing scheme has been described as the purest form of cost-plus pricing used in the U.S [The Life Insurance Company Income Tax Act of 1959--Panel Discussion, 1960]. The implication is that, to the extent that the markup is defined net-of-tax, shifting behavior may be the norm rather than the exception.

Still, shifting will be limited to the amount of unrealized profits existing in the market.[19] After an extensive examination of life insurance company operations, Walter [1962] concluded that profit maximization was not the primary objective of life insurance companies. Rather, market share and the amount of life insurance in force seemed to be a more important goal. Given the exceptions to the assumptions underlying traditional tax incidence theory, the life insurance industry seems to be a likely candidate for shifting behavior. Before discussing the methodology to be applied in the study, a review of the important empirical work on shifting will be provided in Chapter IV.

---

[19]Unrealized profits are the difference between the current profits and those which would exist if the companies were operating at profit maximizing levels.

CHAPTER IV

LITERATURE REVIEW

Given the number of qualifications to the results of traditional tax incidence theory, it is not surprising that considerable empirical research has been done in this area. The research can generally be classified into three distinct groups: (1) early research, which was basically descriptive in nature, (2) econometric analysis, and (3) analytical and simulation analysis. A review and critical evaluation of the more important works is presented in the following sections.

Early Empirical Research

As noted in section Chapter III, the inclusion of the corporate tax as a cost of production may lead to shifting behavior on the part of management. Evidence to support this position was provided by Kimmel [1950].[20] In a questionnaire to 1,000 manufacturing companies, 60 percent of the respondents reported that the corporate income tax influenced their pricing decisions. Although suggestive of

---

[20]An earlier study by the National Industrial Conference Board [1928], had shown that approximately 25 percent of the managers surveyed considered the corporate tax as a cost of production.

management's attitude towards the tax, Kimmel's study is subject to criticism on two grounds: (1) the response rate was extremely low, 20 percent, and (2) no attempt was made to determine how important the tax was to the overall pricing decision.

Alternative methodologies focused on the effect of the tax on factor shares or on its effect on the rate of return on capital. Unfortunately, the early empirical studies, including Lerner and Hendriksen [1956], Beck [1950], Adelman [1957], and Ratchford and Hahn [1957], among others, made no effort to separate the effects of the tax from other factors bearing on the determination of corporate earnings. Therefore, it is generally recognized that these studies provide little insight into the shifting of the corporate tax [Mieszkowski, 1969; Due and Frielander, 1977; Musgrave and Musgrave, 1989].

In the nineteen-sixties, concerted efforts were made to address the methodological problems of earlier empirical research. These systematic attempts to isolate the effects of the corporate tax generally applied one of two approaches. One examines the rate of return on capital around changes in the corporate tax. The other focuses on the changes in the share of corporate profits as a percentage of total income originating in the corporate sector. Empirical research applying these two approaches is examined next.

Econometric Analysis

Rate of Return Approach

The study of Krzyzaniak and Musgrave [1963] (hereafter referred to as K-M) was the first attempt to employ a model and to use sophisticated econometric techniques in the analysis of corporate tax incidence. The thrust of their study was the construction of a profit-behavior model which could be used to isolate the effects of the corporate tax rate from other exogenous variables influencing the rate of return on corporate investment.[21] The profit-behavior model was used to predict the level of pre-tax profits that would have existed in the absence of any corporate tax rate changes. By using multiple regression techniques, K-M were able to compare actual pre-tax profits with those suggested by their model (absent any tax changes). Since year-by-year comparisons were made, the analysis was strictly short-run.

The study was conducted using aggregate data of all U.S. manufacturing companies for the periods 1936 to 1942 and 1949 to 1959. The primary conclusion was that the after-tax rate of return on capital was maintained at the level that would have prevailed in the absence of the tax. In fact, not only was the tax burden avoided, but it was overshifted. A $1.00 increase in the corporate tax seemed

---

[21]Exogenous variables included: (1) consumption expenditures, (2) the ratio of inventory to sales, (3) tax accruals, (4) federal purchases, (5) the market interest rate of corporate bonds, and (6) federal balance budget variable.

to generate a $1.34 increase in the before tax rate of return.[22] The authors subsequently qualified their results noting that, due to weaknesses in estimation techniques, the amount of shifting was probably overstated. However, even after certain adjustments were made to the model, K-M concluded that the corporate income tax had been over 100 percent shifted.

The K-M study has been the subject of prolonged and substantial criticism. The most serious charge[23] is that the model doesn't adequately isolate the tax influence from the other variables affecting the rate of return (i.e., model miss-specification). For example, during the period under study, there were several factors that tended to produce a high correlation between the tax rate and profits levels. These included both a high level of aggregate expenditure and full employment. Working within the K-M framework, but introducing a cyclical variable and a dummy variable to represent wartime mobilization, Cragg et al. [1967] replicated the K-M study. Their results indicated that no short-run shifting had occurred. More importantly, their study showed how sensitive the K-M model was to the data used.

---

[22]Thurow [1971] argues that overshifting has not occurred but rather the tax has caused a decline in the corporate supply of capital which raises the rate of return.

[23]K-M have also been criticized for failure to give a satisfactory a priori explanation of the possibility of immediate forward shifting. However, Bruno [1970] has provided analytical support for such a possibility.

Goode [1966] and Slitor [1966] also questioned the adequacy of the K-M model to isolate the tax effect. They suggested that the tax variable was given undue weight because other economic factors were not carefully modelled. Both authors introduced a "pressure variable," the ratio of actual to potential GNP, into the K-M model. The pressure variable was intended to capture the overall macroeconomic effects of capacity utilization, employment levels and aggregate demand changes. Using the modified K-M model, Goode and Slitor concluded that shifting was substantially less that than that originally reported by K-M (but still close to 100 percent).[24]

Factor-Shares Approach

The focus of the previous studies was on the effect of the tax on the after-tax rate of return on capital. However, a constant after-tax rate of return is not a priori evidence of shifting. If technological change was causing the marginal productivity of capital goods to rise during the period under study, the rate of return should also have been rising. Therefore, under these conditions, a constant after-tax rate of return would indicate no shifting. To address this problem, a factor-shares approach was proposed. The contention was that shifting occurs only to the extent

---

[24]K-M have criticized the use of a "pressure variable" on grounds that it captures part of the effect of the tax and does not show the failure to shift [Krzyzaniak and Musgrave, 1963].

that the pre-tax share of profits in income originating in the corporate sector increases.

In an extensive study, Hall [1963] examined the behavior of relative factor inputs, factor outputs and income shares, in an attempt to assess the impact of the corporate tax on these factors.[25] The analysis was based on a set of simplifying assumptions including: (1) a Cobb-Douglas production function, (2) constant cost conditions, and (3) technological neutrality. Using an ordinary least-squares technique to estimate various production functions, Hall concluded that the tax did not alter the input-output relations among the various factors. In other words, no shifting had occurred.

The Hall study has also been subject to criticism. First, given the set of highly restrictive assumptions, the results may be very sensitive to the parameters chosen [Due and Frielander, 1977]. More importantly, only a 2.67 percent change in the deflated hourly output would have resulted in a complete reversal of the conclusion (i.e., from no shifting to full shifting occurred). Therefore, as Musgrave [1964] noted, it would seem that the margin for error is too small to yield anything but very tentative conclusions.

Hall's study was subsequently extended by Turek [1970]. Assuming a constant elasticity production function of

---

[25]Although the first to apply a factor-shares approach, Adelman's [1957] study is subject to the methodological problems noted earlier in this chapter.

American manufacturing and a constant degree of monopoly power, Turek [1970] derived an estimation equation for the rate of factor shares. The model included a tax rate variable, a variable (time) to represent a constant rate of technological progress, a capital to labor ratio, and two cyclical variables as explanatory variables. Despite a rather large standard error for the tax rate variable, the author was able to reject the conclusion of full shifting. However, unlike Hall's [1963] study, partial shifting could not be ruled out.

Gordon [1967] attempted to reconcile the conflicting results reached by Krzyzaniak and Musgrave [1963] and Hall [1963]. He derived an alternative model based on the assumption that mark-up pricing policies were predominant in U.S. manufacturing. Included in the formulation was a variable to account for changes in the productivity of capital. With this model, he was able to reconcile the conclusions of the factor-shares and rate of return models. The results indicated that, with the use of mark-up pricing, firms were able to maintain their profit margins as the tax increased. However, the stable profit margins were caused by the rising productivity of capital and not to any shifting of the tax burden.[26]

Gordon's model is not without significant criticism of its own. For example, Sebold [1970] argues that the

---

[26]Although shifting for the manufacturing sector was rejected, the shifting parameter was significantly positive for four industries and significantly negative for two industries.

underlying assumptions bias the results in the direction of no shifting.[27] Nevertheless, the study's major contribution is that it shows the weakness in K-M's analysis of ignoring the productivity issue.

Other Studies

Despite the rather extensive criticisms noted in the previous sections, the importance of the K-M model should not be understated. It was the first serious attempt to disentangle the tax effects from other economic factors bearing on the determination of the rate of return on capital. Even the K-M detractors have applied a profit-behavior model in re-examining their results.

Other studies have continued to replicate, revise, and extend the K-M model in the study of tax incidence. For example, Roskamp [1965] applied the K-M model to West German corporations and Spencer [1969] to Canadian corporations. Both obtained results very similar to that of K-M.[28]

In a rather unique modification of the K-M model, Oakland [1972] used cash flows as a proxy for the dependent net income variable. His argument was that the only valid way to test for short-run shifting was to develop a model that violated the profit maximization hypothesis. Using his

---

[27]The controversy surrounds the assumption of a constant ratio of profits to sales. Also see Gordon [1970] for a discussion of the problem.

[28]See Davis [1977] for a summary of the foreign applications of the K-M model.

multiplicative cash flow model, Oakland concluded that the corporate tax was not shifted during the period between 1938 and 1968.

Both Kilpatrick [1965] and Levesgue [1967] took a different approach to the analysis of corporate tax shifting. The authors' contention was that industry concentration and the degree of shifting are positively related. The analysis was carried out by regressing the change in industry profits on a concentration index, while holding other variables constant. Their results indicated that full shifting had occurred in the manufacturing sector. As in the previous studies, the accuracy of their estimations depend critically on how well they isolated the non-tax factors. While Levesgue's analysis of Canadian corporations might be suspect, Kilpatrick's examination of U.S. firms is more complete [Mieszkowski, 1969].[29]

A limitation of the Krzyzaniak and Musgrave [1963] study, as well as many of the other econometric studies, relates to its level of aggregation. If the objective of incidence studies is to determine the distribution of its burden, then the shifting parameter is insufficient. Distributional effects depend on the industries in which shifting is possible and the various magnitude of shifting within these industries. Therefore, if distributional

---

[29]The results are somewhat questionable in that Kilpatrick [1965] also showed that, in pre-Korean War years, profits and concentration ratios were positively related for pairs of years in which no tax rate change occurred. Again, the model may have been miss-specified.

effects are to be determined, a disaggregate analysis must be performed. Disaggregate studies, of differing levels, are discussed next.

Based on the assumption that shifting ability would differ according to degree of market power, Song [1976] analyzed the shifting behavior of both manufacturing and non-manufacturing corporations. In an attempt to address previous criticisms of K-M's independent variable selection,[30] Song's macro model was derived from a system of simultaneous equations that represents the structural relationship suggested by economic theory.

The study covered the same period as the K-M analysis, as well as an extended period, 1934 to 1971. In assessing shifting for the entire corporate sector, and using the period covered by K-M, Song concluded that shifting was in the neighborhood of 87 percent. However, when applied only to the manufacturing sector, the results were nearly identical to that of K-M (130 percent to 134 percent). Shifting in the non-manufacturing industries was significantly less, 42 percent. The author considered the results to be consistent with the hypothesis that corporations with greater market power (manufacturing corporations) have a greater ability to shift the tax forward to consumers.

---

[30]Although K-M [1963] state that they developed their equation through experimentation, they did provide a general macro system of which the single equation model is the reduced form.

When the analysis was extended to cover the period between 1934 and 1971, shifting for the entire corporate sector was only 25 percent (as compared to 87 percent noted above). In addition, Song found no evidence to support the contention that the tax had been shifted backward to labor.

In a more detailed analysis of manufacturing companies, Bayer [1970] examined shifting by industry (by two-digit manufacturing SIC code), for the period from 1947 to 1963. Bayer's model was an extension of the original K-M [1963] model. His results indicated that no shifting had occurred in nine of the seventeen industries examined. Of the remaining eight, the author concluded that one shifted more than 100 percent of the tax and three others may have fully shifted the tax. Although not contrary to K-M's finding, per se, it is unlikely that the shifting noted in the nine industries was sufficient to infer average shifting greater than 100 percent.

In a later study, Berry [1978] applied a modified K-M model in order to obtain disaggregate shifting data. His modifications included the introduction of two tax policy variables and a pressure variable. The purpose being to further separate the effects of changes in the tax rate from other tax policy effects.

Berry's results showed that, for the time period between 1940 and 1974, 39 percent of the corporate tax burden had been shifted by the manufacturing sector as a whole. Of fourteen industries examined, six were able to

shift more than 100 percent of the tax burden. An analysis of market concentration ratios indicated that there was no positive relationship between market power and shifting behavior.

Studies of the Life Insurance Industry

In a study with a much narrower scope, Launie [1968] examined the incidence of the corporate tax as it relates to life insurance companies. The focus of the analysis was on the significant change in the tax treatment of life insurance companies brought about by the passage of "The Life Insurance Company Tax Act of 1959." As a result of the act, the effective tax rate for life insurance companies was substantially increased. Launie applied a modified version of the K-M [1963] model. The study covered the period from 1952 to 1965 and included a sample of 25 stock companies. His results were nearly identical to those obtained by K-M. The owners of capital did not bear any of the burden of the tax and overshifting seemed to have occurred.

Launie's analysis was subsequently extended by Stagliano [1977]. Stagliano included both mutual and stock companies in his sample and expanded the time-frame to include the period between 1952 and 1974. Although obtaining slightly lower shifting results, he still concluded that life insurance companies were able to completely shift the burden of the tax.

In summary, rigorous econometric evaluation of the incidence of the corporate income tax has generally developed along two lines: factor shares analysis and rate of return analysis. Conclusions derived from the empirical research range along a continuum from no shifting to more than 100 percent shifting. The extent to which these studies provide evidence as to the distribution of the corporate tax burden, depends critically on their ability to isolate the tax effects from other factors bearing on the determination of corporate earnings. Given the myriad of factors that effect corporate profits, and the significant limitations of macro-economic theory, there is a considerable risk of mistaking association for causation. Peacock [1969], in summarizing his review of the econometric studies of tax incidence, concluded that there was no reason to be optimistic concerning solutions to the aforementioned problems.

Due partly to the econometric problems just discussed, simulation analysis has been offered as an alternative methodology in the study of tax incidence. Two such studies are discussed next.

Analytical and Simulation Analysis

It was the pioneering work of Harberger [1962] that first placed tax incidence analysis in a general equilibrium setting. The general framework of the model is a two sector (corporate and non-corporate) abstraction of a perfectly

competitive market. The key assumptions are: 1) a Cobb-Douglas production function exhibiting constant returns to scale, 2) two input factors (labor and capital) of varying mobility, 3) two output products, 4) homogenous consumers, and 5) fixed factor supplies.

Harberger treats the corporate tax as a partial factor tax and assumes that the short-run incidence is on the owners of corporate capital. Consequently, imposition of the tax results in a movement of capital from the corporate to the non-corporate sector. The analysis is carried out in terms of small changes in the tax rate so that the general equilibrium is differentiated with respect to the tax. To analyze the incidence of the tax, it is necessary to solve for the change in the after tax rate of return on capital, relative to the price of labor. If the fall in the net return to capital is equal to the tax proceeds, capital (in both sectors) will bear the entire burden of the tax.

Using empirical estimates of key parameters, Harberger concluded that the owners of capital (corporate and non-corporate) bear close to one-hundred percent of the burden of the corporate income tax.

The Harberger model is not without substantial criticism. Perhaps the most important weakness is the assumption that the short-run burden of the tax is on the owners of capital. Recall that if the tax is shifted in the short-run, there will be no further adjustment in prices. Even in the absence of short-run shifting, there are

considerable qualifications to the theoretical results obtained by Harberger.

Although Harberger's [1962] two-sector abstraction of a perfectly competitive market keeps the analysis both conceptually and mathematically tractable, the simplifying assumptions can lead to misleading results. For example, a multisector approach may lead to significantly different incidence estimates. In addition, the assumptions of fixed capital supply and perfectly mobile factors of production are somewhat peculiar in that the time involved for shifting capital between sectors is generally considered to be the same as the time involved for investment decisions. That is, the time for a change in the aggregate supply of capital [Stiglitz, 1988].

To address many of the criticisms of Harberger, Shoven and Whalley [1972] performed a general equilibrium simulation analysis of corporate tax incidence. Their simulation differed from Harberger's analysis along two important lines. First, Shoven and Whalley incorporated two consumer groups, whereas Harberger assumed homogenous consumers. This modification allows the distributional effects of the tax on the uses side of the equation to be examined.[31] More importantly, the Shoven and Whalley model is solved using an algorithmic approach which does not rely on differential calculus. This addresses a major criticism

---

[31]Additional modifications included the use of a CES production function as opposed to Cobb-Douglas, and the inclusion of a labor/leisure choice.

of the Harberger model which uses a local analysis not well suited for distortions the size of the corporate income tax [approximately 50 percent]. Despite these differences, Shoven and Whalley obtained similar results when they applied their algorithmic model to the original Harberger data.

In a later study, Shoven [1976] extended the algorithmic approach to include 12 productive sectors. Although there were considerable variations in the level of commodity price changes among industries within the corporate sector, the estimated shifting parameter remained unchanged.[32] That is, the results indicate that the owners of capital in both the corporate and non-corporate sectors bear the burden of the tax.

Although the previous models are theoretically more palatable than the original Harberger model, they are subject to several limitations.[33] The most important of which seems to be the failure to consider the case of imperfectly competitive markets. By assumption, the short-run incidence of the corporate tax rests with the owners of corporate capital. As was discussed in Chapter 3, there is considerable reason to doubt the validity of this assumption. As with the Harberger analysis, if the tax is

---

[32]It should be noted that Shoven [1976] and Shoven and Whalley [1972] obtain significantly larger welfare loss estimates using their algorithmic models.

[33]For a more detailed discussion of the limitations of simulation analysis see Fullerton, Henderson and Shoven in chapter 9 of Scarf and Shoven [1984].

shifted in the short-run, the results of the simulation analysis become irrelevant.

In summary, the determination of the incidence of the corporate income tax has proven to be a formidable task. Most of the early empirical studies were defective in that they made no attempt to control for other economic factors affecting corporate earnings. Beginning in the nineteen sixties, attempts were made to develop a profit-behavior model and to use econometric techniques in the study of tax incidence. The models have tended to be very sensitive to the data examined and have generated conflicting and sometimes surprising results: shifting behavior ranging from zero to over 100 percent. Although more rigorous than earlier studies, the econometric analysis has been questioned on grounds that the tax effect has not been properly isolated. Finally, recent advances in computer technology have led to the development of large scale simulation models for studying tax incidence. However, the results depend critically on the short-run incidence of the tax being on the owners of corporate capital.

Given the conflicting empirical results to date, it is clear that closure has not been reached on the question of who bears the burden of the corporate income tax. All previous models have been criticized for their inability to ısolate the effects of the corporate tax on the rate of return on capital. Empirical results inconsistent with a particular view are simply dismissed as spurious

association. It is the purpose of this research to apply an alternative methodology which will establish a direct causal link between the imposition of the tax and the observed effect on the corporate rate of return. This methodology is described in Chapter V.

CHAPTER V

METHODOLOGY

Before describing the methodology in detail, a point should be made about the reliance on market efficiency in the study of tax incidence. As Beaver [1972] notes, market efficiency does not imply clairvoyance. Ex ante beliefs about shifting may or may not be realized. However, there are two reasons to believe that the market would make an accurate assessment of shifting, at least with respect to the short-run. First, the market should be aware of the favorable conditions for shifting that exist in the life insurance industry. More importantly, the market's assessment can be based on an analysis of recent increases in the effective corporate rate paid by life insurance companies. Between 1948 and 1953 the life insurance industries effective corporate tax rate rose from zero to 26 percent. In the next four years corporate taxes increased 46 percent and life insurance companies were paying an effective rate of 38 percent [Whitman and Thompson, 1968]. Given the substantial increases in the effective corporate tax rate, it is unlikely that short-run shifting would go undetected by the market.

Since an events study methodology is to be applied in this research, tax incidence needs to be addressed in the context of its affect on stock prices. This is presented in the following section.

Shifting and Its Impact on Stock Prices: Theoretical Considerations

Recall that, under a partial-equilibrium tax incidence framework, the elasticity of supply of capital and the elasticity of demand for capital are sufficient for determining the incidence of the tax. The elasticity of demand for capital is determined by the demand for life insurance, the ease with which labor may be substituted for capital within the industry (elasticity of substitution), the share of capital in the production process, and the elasticity of labor. The elasticity of the supply of capital is determined by the consumer's time preferences and the savings rate. The savings rate is a direct function of the interest rate.

There are two polar cases where shifting estimates may be determined based solely on the elasticity of supply of capital in the insurance industry. These are: (1) a perfectly inelastic supply of capital, in which the owners of capital will bear the entire burden of the tax, and (2) a perfectly elastic supply of capital, where the entire burden is shifted to either consumers or labor. It is the former case that is generally considered descriptive of short-run

operations. Therefore, theoretically, the short-run incidence of the life insurance tax will be on the owners of capital.

In the longer-run, and absent a perfectly elastic supply of capital, shifting estimates will depend on both the elasticities of supply of capital and demand for capital. Unfortunately, empirical estimates of long-run elasticities in the service industry are virtually non-existent. As a result, a sensitivity analysis was performed for alternative elasticities and time-frames.

Perhaps the major contribution of this research is the extent to which it provides corroborative evidence for the prior econometric studies in this area. Both Stagliano [1977] and Launie [1968] concluded that the owners of capital in the insurance industry bore none of the corporate tax burden. Their results indicated that the tax had been fully shifted in the short-run:[34] a result which is in direct conflict with traditional tax incidence theory.

The importance of this point cannot be overstated. It is the short-run burden of the tax that drives all of the longer-run movements suggested by theory. Although the long-run shifting estimates may be less definitive, the current methodology should provide strong evidence as to the occurrence of 100 percent short-run shifting.

---

[34]In fact, Launie's results imply that the owners of capital actually benefited from the increase in the corporate tax. A $1.00 increase in the tax seemed to generate a $1.50 increase in income before taxes.

Implications for Stock Price Behavior

Before considering the question of shifting directly, a brief discussion of the effect of taxes on firm value will be presented. Using the analytical framework of Miller and Modigliani [1963], a firm will be valued at the discounted present value of the expected future cash flows. Absent debt financing and the corporate income tax, the stock price may be determined with the following formula:

$$P_j = \frac{E[X_j]}{i_k} \qquad (1)$$

where:

P_j = the price of firm j;

$E[X_j]$ = the expected annual future cash flows; and

i_k = the risk adjusted rate of return required on any firm in class k.

Introducing the corporate income tax is a relatively straight forward process. The expected cash flows (E[X]) are simply replaced with expected after-tax cash flows ($E[\tilde{X}]$). Provided that the tax reduces expected cash flows, there should be a decline in the stock price. Using the terminology of Beaver [1981], the imposition of the tax will cause a decline in permanent earnings which decreases the firm's future dividend paying ability. The extent of the decline in permanent earnings is clearly dependent on the firm's ability to shift the tax. If the burden is fully shifted in the short-run, as the results of Launie [1971]

and Stagliano [1977] suggest, cash flows will be unaffected by the imposition of the tax (i.e., $E[X] = E[X']$)[35]. As a result, there should be no stock price response to the legislative action.[36]

A simple example showing the affects of shifting on stock returns may be helpful. Let

$E[X] = \$10$; and

$i_k = .035$.

Using model (1), the value of the company at time zero (P_0) would be:

$$P_0 = \frac{\$10}{.035} = \$285.71$$

If a 40 percent tax is subsequently imposed on corporate profits, and no short-run or long-run shifting occurs, the value of the company will drop 40 percent. The calculations are as follows:

$$P_1 = \frac{\$10(1 - .40)}{.035} = \$171.43$$

---

[35]If the firm uses debt financing, after-tax cash flows need not rise to the level that would have existed in the absence of the tax in order to obtain full shifting. This is because the tax shield of debt rises as the tax rate increases.

[36]Since little opportunity exists to shift the retroactive portion of the 1959 Act, a stock price reaction might still be expected. However, using model 2 (see page 60) to estimate the price effect of the change, the predicted stock price reaction would be less than one-half of one percent.

$$P = \frac{285.71 - 171.43}{285.71} = <.40>$$

Recall, however, that Launie's [1968] and Stagliano's [1977] econometric studies indicated that after-tax profits were totally unaffected by the increased corporate tax burden. This implies that insurance companies were able to make short-run adjustments in premium prices and/or sales commissions which allowed complete short-run shifting. In terms of model (1), pre-tax profits would rise to $16.67 and, as shown below, the increased corporate tax burden would cause no change in firm value.

$$P1 = \frac{\$16.67(1 - .4)}{.035} = \$285.71 = P_0$$

Therefore, a test of the results of prior econometric studies (full short-run shifting) leads to the following hypothesis (stated in the null form):

Ho: Stock prices will be unaffected by the passage of the Life Insurance Company Tax Act of 1959.

In the absence of 100 percent short-run shifting, the effect of debt financing must be considered in the analysis. This is because the value of debt will be capitalized at a lower certainty rate than the rate for uncertain streams

[Miller and Modigliani, 1963].[37] When debt financing is used, firm value will be determined as follows:

$$P_j = \frac{E[\tilde{X}_j]}{i_k - t(i_k - r) * D/V} \qquad (2)$$

where:

r = the interest rate on the debt instrument;

D/V = the debt to firm value ratio;

t = the marginal corporate tax rate;

and other variables are as defined earlier in this section.

Recall that, if the short-run burden of the tax is on the owners of capital, there will be a tax-induced movement of capital out of the insurance industry. The magnitude of the movement, and therefore the extent of the shifting, will depend on the long-run elasticities of supply and demand for capital. Because empirical estimates of these parameters are unavailable, several alternative shifting assumptions will be considered (see Table I).

Another important factor that must be considered is the time frame necessary to go from a pre-tax to a post-tax equilibrium. As discussed in Chapter III, the adjustment process may be quite lengthy. It is estimated that one-half of the adjustment may be completed within 20 to 30 years with equilibrium being reached in roughly 140 years [Feldstein, 1974; Sato, 1963]. However, their estimates are

---

[37]Although life insurance companies rarely issue outside debt, the obligations for future benefit payments have many of the same characteristics [Launie, 1971].

based on an analysis of the entire corporate sector, whereas the 1959 Act affects only a single industry. Since the insurance industry experienced rapid growth in the 1950's,[38] the adjustment process may be shorter than that suggested by Feldstein and Sato. Therefore, two alternative time frames are considered in this study: 30 years and 140 years.[39]

The 140-year period is treated in a manner consistent with the results obtained by Feldstein [1974]. One-half of the adjustment process will be considered to have been completed within the first 20 years. Of the remaining adjustment, one-half will be completed within the next 20 years and equilibrium will be reached in an additional 100 years. For the 30-year period, it is assumed that one-half of the adjustment will be completed within 10 years and the remaining adjustment within the next 20 years.

The predicted declines in stock price under the various shifting and time-frame assumptions are presented in Table I. The pre-change and post-change effective tax rates and the debt/value ratio are calculated from data on the firms in the sample. Although actual data is used, sufficient information should have been available to investors to make reasonable estimates of the ultimate tax liability to be imposed under the 1959 Act.

---

[38]Life insurance in force rose 150 percent in the 1950's and the number of life insurance companies grew from 600 to nearly 1300 during this same period [Weinrel, 1959].

[39]A third alternative, 60 years, was considered but the estimated effects on stock prices were not substantially different from those obtained using the 140 year period.

TABLE I

PREDICTED DECLINE IN STOCK PRICE[1]

Long-run Shifting Assumed	Time-frame	
	30-year	140-year
100%	5.02%	8.66%
75%	7.67%	10.46%
50%	10.32%	12.25%
25%	12.98%	14.04%
0%	15.63%	15.63%

[1]Calculated using a modified version of equation (2) and the following parameters:

i_k = 3.5%
r = 3.0% [Launie, 1971]
D/V = 51.3%[40]
Pre-change effective rate = .158
Post-change effective rate = .297

Notice that, contrary to the results of full short-run shifting, if the tax is fully shifted in the long-run, a stock price reaction would still be expected to occur. This is because the owners of capital will bear the burden of the tax until the adjustment process is complete. Even given

[40]D represents the obligation for future benefit payments as reported on the December 31, 1958 financial statements.

the conservative estimate of 30 years to reach long-run equilibrium, the predicted stock price decline is 5.02 percent. Therefore, the methodology applied in this study should be sensitive enough to distinguish between 100 percent short-run shifting and 100 percent long-run shifting.

Research Design and Related Accounting Literature

The stock price reaction to a regulatory change announcement will be the product of the revision in the market's probability assessment that the change will be implemented and the expected magnitude of the present value of the cash flow effect. If the researcher is able to determine all of the relevant event dates, the market reaction will represent the entire stockholder wealth effect of the legislative action. In terms of tax incidence, the price reaction will show the market's assessment of the amount of the tax burden remaining on the stockholders of the company. Shifting will have occurred to the extent that the expected present value of federal tax revenues differs from the observed stockholder wealth effect.

Since tax law changes are the result of a political process, the isolation of relevant event dates is extremely difficult. A lengthy deliberation period, in which the market may assess the economic impact of the legislation, invariably precedes enactment. However, recent

methodological refinements by Madeo and Pincus [1985] and Manegold and Karlinsky [1988] have greatly improved the ability to measure the stockholder wealth effects of tax law changes.

Madeo and Pincus examined the market's reaction to the Internal Revenue Services' issuance of Revenue Procedure 80-55. The regulatory action, which was retroactively applied, eliminated the deductibility of interest paid on government time deposits which were collateralized by tax exempt securities. Extending a methodology developed in Shipper and Thompson [1983], the authors used the seemingly unrelated regression (SUR) approach to confirm an expected negative market reaction to the disallowance of the interest deduction. No attempt was made to address the possibility of shifting in that only the retroactive portion of the change was examined.

Manegold and Karlinsky [1988] also applied the SUR approach in their study of the market's reaction to certain possessions corporation tax changes included in the Tax Equity and Responsibility Act of 1982. The major contribution of their study was the separate identification of a deliberation effect and an announcement date effect related to the regulatory change. Although not addressing the question of shifting, the authors did compare a market-based revenue estimate with that provided by the Treasury. The market-based estimate was smaller than that of the Treasury. However, the sample did not include all of the

companies affected by the change and the market-based estimate included only three announcement dates.

Due to the differing focus of this research, two additional issues need to be addressed. First, a major reason that the 1959 Act was chosen for study was that it did not contain other tax policy changes that might produce confounding effects on stock prices. However, the 1959 Act was expected to shift a portion of the relative federal tax burden from mutual companies to stock companies [Joint Conferences Committee Report, 1959]. As a result, not only will stock companies be facing an increasing tax burden, but it will be greater than that incurred by their competitors. At first glance, it would seem that stock company stock prices would decline for two reasons: (1) an increased tax burden, and (2) a loss in competitive position to the mutual companies. Nevertheless, it is argued that any decline in stock company prices is still a direct result of the inability to shift the tax burden. The reasoning is as follows:

First, if neither group of companies responds to the tax increase, their relative market share will remain unchanged. However, the failure to shift the tax will cause after-tax profits to decline and stock prices to fall. Alternatively, stock companies might try to recover the tax by raising their premium prices. If mutual companies follow suit, and demand does not fall, after-tax profits will be unaffected by the increased tax and no stock price response

would be expected. If mutual companies do not raise their prices, stock companies will lose market share and profits will fall. The result will be a decrease in stock company stock prices. Therefore, all stock price reactions to the tax law change are driven by the ability, or lack thereof, of the insurance companies to shift the tax burden (either through increased premium prices or through reduced wage rates).

The second issue stems from the fact that all of the firms in the sample are Over-The-Counter (OTC) stocks. Although market efficiency in the semi-strong form is well established for the New York Stock Exchange (NYSE), some question may be raised as to the efficiency of smaller exchanges [Dyckman and Morse, 1975].

Research to date has generated conflicting results on this issue. In a study covering the period from 1973 to 1976, Morse [1981] detected significant price adjustments on days following quarterly earnings announcements. Although not testing for the existence of a trading strategy that could obtain abnormal returns, he concluded that it takes the market several days to process the information: a result inconsistent with semi-strong form market efficiency. In another study, Brown [1988] examined the stock price reaction to firms changing their depreciation policies. In assessing market efficiency, he concluded that the American Stock Exchange (AMEX) and the OTC markets were not as efficient as the NYSE.

On the other hand, the empirical results of Grant [1980], Osborne [1982], and Foster [1975] are generally consistent with the semi-strong form of market efficiency for the OTC market.[41] The most important of these studies, with respect to this research, is that performed by Foster [1975]. Foster examined the price reactions of insurance stocks to annual earnings announcements for the period from 1965 to 1971. In assessing market efficiency, he concluded that the OTC market appears to be semi-strong form efficient for insurance stocks.

Sample Selection and Confounding Events

Sample Selection. The following data availability requirements were necessary for inclusion in the sample. First, only those stock companies listed in the 1960 Best's Flitcraft Compend were selected for study. The 1960 Compend contained a listing of 256 life insurance companies (stock and mutual) which, taken together, wrote over 99 percent of the life insurance in force in the United States. Of the companies listed in Best's, 96 were eliminated from the sample because they were mutuals and 36 were eliminated because they were wholly-owned subsidiaries. This left 124 companies meeting requirement one.

The second requirement was that complete data on stock prices, dividends and capital changes had to be available

---

[41]Hagerman and Richmond [1973], Mampe [1974] and Reilly and Slaughter [1973] have reported results consistent with weak-form efficiency for the OTC market.

for the entire period under study. During this period, life insurance companies were traded almost exclusively on the OTC market. As a result, stock price data could only be obtained from two sources: the National Underwriter (NU) and the Wall Street Journal (WSJ). Complete weekly (Friday's closing price) stock price data were obtained for 32 companies from the WSJ. The WSJ published stock prices for the National, Eastern and Weekly OTC listings. Tuesday stock price data were obtained for an additional 7 companies from the NU. The NU reported weekly prices on 30 life insurance stocks which they consider to be of widespread interest to their readers.

Confounding Events. The Wall Street Journal, National Underwriters, and The Weekly Underwriter were the sources used to identify confounding events. Significant confounding events took the form of large mergers and the issuance of substantial blocks of stock. From the group of companies meeting the data availability requirements, two were eliminated from the sample due to large mergers (greater than 5% of total assets) and one was eliminated from the sample due to the issuance of a large block of new shares. This left a final sample of 36 insurance companies (see Table II) of which Friday returns were obtained for 29 companies and Tuesday returns for 7 companies.

TABLE II

LIST OF SAMPLE FIRMS

No.	Company Name
1	Aetna Life Insurance Company
2	American National Insurance Company
3	Bankers National Life Insurance Company
4	Beneficial Standard Life Insurance Company
5	Business Mens Assurance
6	California Western States Life Insurance Company
7	Commonwealth Life Insurance Company
8	Connecticut General Life Insurance Company
9	Continental Assurance Company
10	Franklin Life Insurance Company
11	Government Employees Life Insurance Company
12	Great Southern Life Insurance Company
13	Gulf Life Insurance Company
14	Jefferson Standard Life Insurance Company
15	Kansas City Life Insurance Company
16	Liberty National Life Insurance Company
17	Life & Casualty Insurance Company of Tennessee
18	Life Companies
19	Life Insurance Company of Virginia
20	Lincoln National Life Insurance Company
21	Monumental Life Insurance Company
22	National Life and Accident Insurance Company
23	National Security Life Insurance Company
24	North American Life Insurance Company of Illinois
25	Northwest National Life Insurance Company
26	Ohio State Life Insurance Company
27	Philadelphia Life Insurance Company
28	Republic National Life Insurance Company
29	Skyland Life Insurance Company
30	Southwestern Life Insurance Company
31	Standard Union Life Insurance Company
32	The Old Line Life Insurance Company of America
33	The United States Life Insurance Company of New York
34	Travelers Life Insurance Company
35	United Insurance Company of America
36	Wisconsin National Life Insurance Company

At this point, a note as to the external validity of the study should be made. Random sampling is generally considered a necessary condition for extension of the results beyond the specific sample of the study. However, due to data availability requirements, randomization was not practical. As a result, the companies included in the sample tend to be much larger and more widely held than the population of life insurance companies as a whole. Consequently, extension of the results of this study to the entire industry and generalization to the companies not included in the study should be cautiously applied.

Event Dates

If the entire economic effect of the 1959 Act is to be determined, identification of relevant event dates will be of critical importance. To this end, the Wall Street Journal Index, Prentice-Hall Weekly Tax Reports, The Weekly Underwriter and the National Underwriters were examined. The National Underwriters and The Weekly Underwriter are weekly trade journals which give detailed coverage of the life insurance industry. Included in these publications were reports from the joint tax committee of the American Life Convention and the Life Insurance Association of America (ALC-LIAA).[42] Presumably, the tax committee had the best access to information concerning the probability of

---

[42]The ALC-LIAA is comprised of chief executives of most of the U.S. based life insurance companies.

passage of any legislation and the ultimate tax burden that would be imposed.

The relevant legislative dates related to the passage of The Life Insurance Company Tax Act of 1959 are presented in Table III.

TABLE III

LEGISLATIVE EVENT DATES[1]

Event Dates	Description
11/17/58 - 11/20/58	House Ways and Means Deliberation Hearings
3/ 3/59 - 3/ 5/59 3/17/59 - 3/19/59	Senate Finance Deliberation Hearings
5/19/59	Senate Floor Debate and Passage
6/ 9/59 - 6/10/59	Joint Conference Committee Report and House and Senate Acceptance of Report

[1]Congressional Record, 1958 and 1959.

Certain legislative dates were eliminated from the model because either: (1) they had been made publicly available at an earlier date, or (2) no significant change

in the probability of passage or the amount of the burden to be imposed was expected to occur.

During the period noted above, daily legislative updates were reported by the Bureau of National Affairs, Inc. in its Daily Tax Report (BNA Tax Report).[43] Although unable to obtain access to these reports, it is assumed that the contents of the above meetings and reports were made publicly available on a timely basis.

Significant news announcements from the various journals are presented in Table IV. The information from the weekly trade journals was considered to be made publicly available on the Monday and Tuesday following the publication date. Discussions with both circulation departments revealed that the publications were mailed on Fridays and only sold by subscription. A review of these news releases highlights the importance of examining alternative sources in determining appropriate event dates. For example, the National Underwriter reported the details of Treasury Release A-13 a full ten days prior to its official public release. Only those releases that were considered to convey new information to investors were included in Table IV.

---

[43]The BNA Tax Report reflects the previous day's news events [Madeo and Pincus, 1985].

TABLE IV

NEWS RELEASE EVENT DATES

Event Week	Description
9/16/57 - 9/17/57	NU - Reported that Treasury has a new formula for taxing LIC's. No details known and not expected to affect 1957.
10/ 7/57 - 10/11/57	ALC Annual Meeting - Current rumors are that a permanent tax plan will be proposed early next year and will be based on the general corporate formula where a 52% rate prevails.
11/10/57 - 11/14/57	LIAMA Annual Meeting - Indications are that a reversion to the 1942 law is possible and that Treasury is working on a permanent method for the industry.
12/17/57 - 12/18/57	NU - Treasury has presented its permanent proposal to HW&M. Reported that tax base will be total income approach.
1/ 9/58 - 1/10/58	WSJ - Treasury is said to be ready to unveil a full income approach.
3/31/58 - 4/ 1/58	NU - Reported that the Treasury plan would use net gain from operations after dividends as the tax base. Probably would be a 3 to 5 year transition period. ALC-LIAA held a special meeting to consider strategy in reaction to the Treasury's proposal.
4/14/58 - 4/15/58	NU[1] - A very general description of the alternatives being considered by the Treasury. General feeling is that the importance of the life insurance industry to the general economy should prevent any drastic changes by Treasury [ALC-LIAA Special Tax Committee]. However, it is possible that the tax liability could rise to $500 million.

TABLE IV (Continued)

Event Week	Description
10/20/58 - 10/21/58	NU - Discussions with HW&M tax writers in the previous week indicate that they favor a total income approach. May face 52% of operating income.
11/25/58 - 11/26/58	WSJ - HW&M agrees to last minute Treasury compromise; estimated 1958 revenues are between $400 and $450 million.
12/ 8/58 - 12/ 9/58	NU - Leaks from the tax writing committee indicate a tax liability between $425 and $475 million. Total income approach is likely.
1/26/59 - 1/27/59	NU - HW&M is reported to have completed work and will recommend a bill generating $500 million in revenues. WU - Joint tax committee of the ALC-LIAA sent a draft of HW&M report to members.
2/ 2/59 - 2/ 3/59	NU - Only thing that seems certain is the intent to collect $500 million in revenues.
2/ 4/59 - 2/ 5/59	WSJ - HW&M tentatively approved part of proposal. Several LIC's reported to have set aside substantial reserves for new tax.
2/ 6/59 - 2/ 7/59	WSJ - HW&M approves increase to $540 million.
2/ 9/59 - 2/10/59	NU[1] - Senate may increase tax liability to $600 million annually. WSJ - HW&M formally approves bill. PH - Details of HW&M's proposal are given.

TABLE IV (Continued)

Event Week	Description
4/13/59 - 4/14/59	WSJ - SFC reduces liability to $500 million. Companies average investment rate will be used to calculate reserve deductions.
4/20/59 - 4/24/59	SFC - Ordered bill reported with amendments. Not available for two weeks but major changes are disclosed.
5/25/59 - 5/26/59	NU - Joint Conferences Committee not expected to make major changes to Senate passed bill.

NU - National Underwriter
WSJ - Wall Street Journal
PH - Prentice Hall Federal Tax Report Bulletin
WU - The Weekly Underwriter

[1]Also reported in The Weekly Underwriter.

Return Generating Process

The model used to determine the economic effect of the 1959 Act (and the extent of shifting) is developed in the following section. Unlike the traditional market model approach (Fama, et al, 1969; Brown and Warner, 1980), this study uses a model which combines the estimation period and event period into a single run. Therefore, the focus of the analysis is on parameter estimates rather than abnormal returns.

Firm Specific Variables. Parameter estimates for firm specific variables were obtained from a multi-index version of the market model [Sharpe, 1970]. This model is a description of the stochastic process generating security returns in the life insurance industry. The relationship can be written as

$$R_{it} = A_i + B_{1t}R_{mt} + \delta I_t + U_{it} \quad (3)$$

where:

R_{it} = return on stock of firm i in week t;

R_{mt} = market return in week t;

I_t = industry return in week t;

A_i = intercept for firm i.

The returns are operationally defined as:

$R_{it} = [(P_{it} + D_{it})/P_{it-1}] - 1$ and

$R_{mt} = (M_t/M_{t-1})-1$;

where:

P_{it} = price of stock[44] of firm i in week t adjusted for stock splits and stock dividends;

D_{it} = the dividend for firm i in week t;

M_t = the Standard and Poors 500 Composite Stock Price Index.

In addition to controlling for economy-wide commonalities (R_{mt}), a control variable for industry-wide commonalities (I_t) was added to the traditional market

---

[44]Consistent with most prior research, the closing bid price will be used to calculate individual stock returns [Morse, 1981; Brown, 1988; Grant, 1980; Osborne, 1982; Foster, 1975].

model. The industry index was included in the study in light of the results of Foster [1975]. Unlike prior studies [King, 1966 and Meyers, 1972], Foster found that the industry index explained a large portion of the variance of insurance company returns.

The industry index was calculated in the same manner as Foster's industry index. This was done by first regressing an industry return (R_{It}) on the market return (R_{mt}) for the period covered by the study. The industry return was calculated (assuming equal weighting) from the firms in the sample. The residuals (e_t) from the first-stage regression were then used as the industry index in equation (3). The model was as follows:

$$R_{It} = A + B_t R_{mt} + U_t \tag{4}$$

$$e_t = R_{It} - A - B_t R_{mt} \tag{5}$$

This method of orthogonalization guaranteed that the industry index was not capturing any of the market-wide commonalities (R_{mt}). Separate indexes were constructed for the subsamples of Friday and Tuesday returns.

Common Variable. In order to isolate the economic effect of the 1959 Act, a common variable was added to model (3). This common variable was designed to capture the legislative period effects and the news release period effects described in Tables II and III, respectively. It was as follows:

$ECON_t$ = dummy variable for legislative events and news announcement events.

The ECON variable consisted of a set of dummy variables which were turned on during the week containing any event date. Values were set to zero during non-event date weeks.

The following model was applied in stage one of the analysis. The model was estimated for the 36 companies in the sample for the period between July 12, 1957 and June 12, 1959, 100 trading weeks. The estimates of the parameters of equation (6) were derived from a time-series OLS regression.

$$Rit = A_i + B_{1t}R_{mt} + \delta I_i + \gamma ECON + u_{it}. \qquad (6)$$

The focus of the analysis was on the coefficient of the ECON variable. If full short-run shifting had occurred, the coefficient should not have been significantly different from zero. In the absence of full short-run shifting, the sign of γ should have been negative and a one tail test appropriate.

The second stage of the analysis would have been performed if the null hypothesis of full short-run shifting had been rejected (i.e., a statistically significant negative γ). Stage two would have required an estimate of the decline in firm value caused by the 1959 Act. This estimate could then have been compared to the predicted declines in firm value under the various shifting and time frame assumptions detailed in Table I.

Statistical Assumptions

Results of the cross-sectional regression model described in the previous section will be used to draw inferences about the economic burden of the corporate income tax in the life insurance industry. For the conclusions to be valid, certain assumptions underlying the OLS estimation technique need to be satisfied. Although the OLS estimation technique is generally considered robust to deviations in the underlying assumptions, both contemporaneous correlation and autocorrelation have been identified as possibly having serious effects on hypothesis testing in events studies (Brown and Warner, 1985).

In the current study, as with most regulatory change studies, event time and calender time were identical for all firms in the sample. In addition, the entire sample was clustered within a single industry. As a result, significant interdependencies (contemporaneous correlation) are likely to exist between the unexpected returns of the firms in the sample [Collins and Dent, 1984]. When contemporaneous correlation is present, the ordinary-least-squares (OLS) estimator will not yield reliable parameter estimates. To account for this condition, prior regulatory impact studies have used the SUR technique to obtain parameter estimates. However, when the SUR technique is applied, only asymptotic properties are available. In addition, OLS estimators are more efficient than SUR estimators in the absence of significant contemporaneous correlation.

To determine the appropriate estimator, a Lagrangian Multiplier (LM) statistic was calculated to test for the existence of significant contemporaneous correlation. The LM statistic indicated that contemporaneous correlation was not a problem. Therefore, the OLS estimation technique was applied in this study.

To test for the presence of autocorrelation, a Durbin-Watson (DW) statistic for first order auto correlation of the error terms was calculated for each company in the sample. Although some autocorrelation was indicated, alternative estimation techniques which account for the autocorrelation yielded results nearly identical with those obtained using OLS. Summary statistics are presented in the following chapter.

Summary

In this chapter, the methodology for exploring the extent of the shifting of the corporate income tax of life insurance companies in an efficient capital markets has been described. The hypothesis which relates the passage of The Life Insurance Company Income Tax Act of 1959 with security returns, was tested using a modified multi-index version of the market model. The results are presented in Chapter VI.

CHAPTER VI

DATA ANALYSIS AND RESEARCH RESULTS

This chapter reports the results of the data analysis. After discussing some diagnostics, the results of the stock return tests using equation (4) are presented. In addition, alternative models are employed as a method of validating the results from the initial test.

Data Analysis

Diagnostics

To draw inferences from regression results, the assumptions underlying the estimation technique should be satisfied. Recall that the OLS estimator is fully efficient when the variance/covariance matrix is diagonal (no contemporaneous correlation). However, when event dates are clustered and when there exists a significant degree of industry concentration, the assumption of independence of error terms may be violated.

To test for the existence of significant contemporaneous correlation, the Lagrangian Multiplier test was performed. The LM statistic for testing the null hypothesis of a diagonal variance/covariance matrix (i.e., no contemporaneous correlation) is given by

$$\lambda_{LM} = T \sum_{i=1}^{M} \sum_{j=1}^{i-1} r^2_{ij} \qquad (7)$$

where $r_{ij} = \dfrac{\hat{\sigma}_{ij}}{\sqrt{\hat{\sigma}_{ii}\,\hat{\sigma}_{jj}}}$

and $\hat{\sigma}_{ij} = (y_i - X_i b_i)'(y_j - X_j b_j)$. Under the null hypothesis, λ_{LM} has an asymptotic χ^2 [M(M-1)/2] distribution. Note that M(M - 1)/2 is half the number of off-diagonal elements in Σ and is equal to the number of firms in the sample. Σ is the covariance matrix of the joint disturbance vector. [Judge, et al, 1985].

The results of the Lagrangian Multiplier Test indicate that no significant correlation existed between the unexpected returns of the firms in the sample. Using a 10 percent significance level, the LM test statistic (27.9689) was not sufficiently large to reject the null hypothesis of a diagonal variance/covariance matrix. Therefore, the OLS estimation technique was used to obtain the parameter estimates for equation (6).

Another potential problem with time-series data is the existence of autocorrelation. Autocorrelation exists when the disturbance terms corresponding to different observations are correlated [Judge, et al, 1985]. Under this condition, OLS parameter estimates are not efficient and the standard errors used for hypothesis testing are biased. To test for significant first-order autocorrelation, the Durbin-Watson statistic was calculated for each regression run. The null hypothesis of no positive

autocorrelation was rejected for 3 companies and inconclusive for an additional 6 companies. The null hypothesis of no negative autocorrelation was rejected for 2 companies and was inconclusive for 1 more.

To insure that the autocorrelation was not driving the initial test results, alternative estimation techniques were applied to the 12 companies just mentioned. These results are reported in a later section of this chapter. However, there were no major differences in the results between the OLS estimators and the estimators which adjusted for the autocorrelation.

Regression Estimates

To test for the existence of full short-run shifting, OLS regressions were run for the 36 companies in the sample using equation (6). Cross sectional statistics are presented in Table V. Consistent with the Foster (1974) study, the industry variable explains a large portion of the variation of a company's weekly security rate of return. The average R^2 increases from 5.1 percent to 20.7 percent when the industry variable is included in the model. However, in the Foster study, a much larger portion of the company's variation in rate of return was explained when the industry variable was added to the standard market model (47.7% vs. 20.7%). In addition, the average Beta reported by Foster (1.056) was much larger than that estimated during the time period of this study (.4562).

TABLE V

CROSS-SECTIONAL DISTRIBUTION OF PRICE REGRESSION STATISTICS

	A	β	σ	Adj. R^2 (including industry variable)	Adj. R^2 (industry variable suppressed)
Mean	0.0014	0.4562	0.9834	0.2065	0.0513
Std. Error	0.0019	0.3025	0.4116	0.1144	0.0257

In Table VI, parameter estimates of the intercept and control variables for each company in the sample are presented. In addition, the DW statistic for each regression run is included in Table VI. Adjustments for significant first-order autocorrelation are reported later in this chapter. Note that nearly all of the estimated Betas are below 1.00. This indicates that insurance stocks are less risky than stocks on average. Given the market setting in which insurance companies operate, the low beta is not surprising.

TABLE VI

COMPANY SPECIFIC PARAMETER ESTIMATES OF CONTROL VARIABLES

Company No.	A	Std. Error	β	Std. Error	δ	Std. Error	DW Stat.
1	-0.0021	0.003	0.98771[a]	0.202	0.76251[a]	0.223	1.797
2	-0.0005	0.003	0.14170	0.205	1.19522[a]	0.227	1.699[d]
3	-0.0015	0.003	0.42941[a]	0.218	0.72620[a]	0.241	1.886
4	-0.0000	0.003	0.18723	0.228	1.52989[a]	0.252	2.148
5	0.0044[a]	0.001	0.19528[a]	0.111	0.41617[a]	0.123	1.797
6	0.0028	0.002	0.17152	0.115	0.57336[a]	0.132	2.250
7	0.0027	0.003	0.73859[a]	0.206	1.19380[a]	0.228	2.148
8	0.0015	0.002	0.77705[a]	0.167	1.24867[a]	0.185	2.078
9	0.0018	0.003	0.91444[a]	0.211	1.15368[a]	0.233	1.885
10	0.0010	0.003	0.82208[a]	0.223	1.33494[a]	0.247	1.957
11	0.0012	0.004	0.81357[a]	0.264	0.89988[a]	0.292	1.914
12	0.0016	0.002	0.11911	0.102	0.33077[a]	0.116	1.956
13	-0.0030	0.003	1.04614[a]	0.218	1.44840[a]	0.242	1.639[d]
14	-0.0032	0.002	0.62653[a]	0.166	0.78809[a]	0.183	1.902
15	-0.0000	0.002	0.39699[a]	0.148	0.90131[a]	0.164	1.397[b]
16	0.0049	0.004	0.34161	0.224	1.11843[a]	0.248	1.603[b]
17	0.0010	0.003	0.32741	0.209	1.44235[a]	0.231	1.918
18	0.0033	0.005	0.45949	0.286	1.50646[a]	0.316	1.757
19	0.0009	0.003	0.47237[a]	0.179	0.78292[a]	0.198	2.097
20	-0.0034	0.003	0.97126[a]	0.161	1.28051[a]	0.178	1.740[d]
21	0.0003	0.003	0.38237[a]	0.157	0.55183[a]	0.173	1.487[b]
22	0.0001	0.003	0.46877[a]	0.181	0.94959[a]	0.199	1.881
23	0.0058	0.005	0.05130	0.343	0.84431[a]	0.379	2.449[c]
24	-0.0021	0.004	0.19848	0.173	0.88207[a]	0.199	2.056
25	0.0029	0.002	0.12130	0.151	0.38637[a]	0.167	2.158
26	0.0041	0.004	0.47455[a]	0.201	1.49870[a]	0.230	1.860
27	0.0058	0.005	0.51143[a]	0.309	0.90858[a]	0.342	2.047
28	0.0078[a]	0.003	0.26514	0.169	0.64107[a]	0.187	1.645[d]
29	0.0042	0.004	0.23593	0.296	0.46004	0.296	1.740[d]
30	0.0028	0.002	0.27265[a]	0.119	0.34308[a]	0.131	2.010
31	-0.0050	0.005	0.22558	0.302	1.09285[a]	0.335	2.648[c]
32	0.0015	0.003	0.14114	0.142	0.80791[a]	0.163	2.209
33	0.0030	0.004	1.10214[a]	0.242	1.59009[a]	0.268	1.721[d]
34	-0.0000	0.002	0.66065[a]	0.138	0.90379[a]	0.152	2.307[d]
35	0.0053	0.005	0.08914	0.263	2.17892[a]	0.301	1.894
36	0.0001	0.004	0.28121	0.196	0.72875[a]	0.225	2.086

[a]Significant at the .05 level, one-tailed test.
[b]Significant positive autocorrelation, .05 level.
[c]Significant negative autocorrelation, .05 level.
[d]DW test inconclusive.

Analysis of Full Short-run Shifting

The first hypothesis tests for the existence of full short-run shifting of the increased federal corporate tax burden levied under The Life Insurance Company Income Tax Act of 1959. If the tax is fully shifted in the short-run, life insurance company after-tax cash flows should be unaffected by the 1959 Act. Consequently, no stock price reaction would be expected in response to the legislative action. In terms of equation (6), the coefficient for the ECON variable (γ) should not be statistically significantly different from zero. If full short-run shifting has not occurred, there should be a negative stock price reaction to the 1959 Act and γ should be negative and statistically significant. The results of the short-run shifting test are reported in Table VII.

TABLE VII

RESULTS OF SHORT-RUN SHIFTING TEST

	γ
Mean	-0.00031
Standard Deviation	0.007
t-Statistic	-0.044
Approximate p	.48

After controlling for market-wide and industry-wide movements, no significant reaction to the passage of The Life Insurance Company Income Tax Act of 1959 was detected. Although the coefficient was negative, it was not statistically significant. This result suggests among previously mentioned possibilities that, in spite of a significant increase in the corporate tax liability of life insurance companies, the market expected that there would be no decline in the after-tax rate of return on capital. In terms of tax incidence, the increased tax liability was simply shifted to consumers by way of higher premium prices and/or to labor by way of lower commissions.

An examination of individual company estimates reinforces the results indicated from the cross-sectional averages. Parameter estimates by company are presented in Table VIII. Again, if the tax is not fully shifted in the short-run the coefficient for the ECON variable should be negative and statistically significant. However, only eight companies in the sample had statistically significant coefficients (10 percent level). In addition, exactly one-half of these companies had a positive coefficient: the opposite of that predicted under no short-run shifting hypothesis. Given these results, there is no reason to believe that the cross-sectional averages are being driven by a few observations.

TABLE VIII

COMPANY SPECIFIC PARAMETER ESTIMATES OF THE COMMON VARIABLE

Co. No.	ECON	Std.Dev.	T-Stat	P Value
1	0.0084	0.0070	1.212	0.2286
2	-0.0028	0.0071	-0.396	0.6933
3	0.0123	0.0075	1.628	0.1067
4	-0.0044	0.0078	-0.559	0.5776
5	-0.0018	0.0038	-0.462	0.6455
6	0.0030	0.0045	0.653	0.5155
7	-0.0113	0.0071	-1.588	0.1157
8	-0.0068	0.0058	-1.171	0.2447
9	0.0076	0.0073	1.039	0.3012
10	0.0052	0.0077	0.37	0.5046
11	0.0131	0.0091	1.433	0.1551
12	-0.0007	0.0040	-0.169	0.8661
13	0.0044	0.0075	0.584	0.5607
14	0.0102	0.0057	1.764	0.081
15	-0.0011	0.0051	-0.231	0.8177
16	0.0026	0.0077	0.346	0.7302
17	0.0014	0.0072	0.201	0.841
18	0.0010	0.0098	0.106	0.9158
19	-0.0013	0.0062	-0.214	0.8309
20	0.0074	0.0055	1.335	0.1852
21	-0.0012	0.0054	-0.223	0.8242
22	0.0038	0.0062	0.61	0.5436
23	-0.0322	0.0118	-2.721	0.0077
24	0.0006	0.0068	0.095	0.9249
25	0.0026	0.0052	0.51	0.6115
26	-0.0157	0.0079	-1.974	0.0512
27	-0.0060	0.0106	-0.567	0.5718
28	-0.0081	0.0058	-1.386	0.169
29	-0.0035	0.0092	-0.0385	0.701
30	0.0003	0.0041	0.081	0.9359
31	-0.0073	0.0104	-0.703	0.4839
32	-0.0016	0.0056	-0.294	0.7693
33	-0.0001	0.0083	-0.013	0.9893
34	-0.0034	0.0047	-0.728	0.4687
35	0.0061	0.0104	0.59	0.5565
36	0.0083	0.0078	1.062	0.291

As noted in Chapter V, Friday stock price data were unavailable for seven companies in the sample. As a result, Tuesday return data were used. Since the Tuesday companies may be traded less frequently than the Friday companies, a comparison of parameter estimates between the two subsets of firms is provided in Table IX. However, as can be seen, the coefficient for the ECON variable is not statistically significant in either subset of firms. Therefore, trading infrequency does not appear to have any impact on the overall results reported in Table VII.

TABLE IX

COMMON VARIABLE PARAMETER ESTIMATES: SUBSETS OF TUESDAY COMPANIES VERSUS FRIDAY COMPANIES

	Tuesday (7 Companies)	Friday (29 Companies)
Mean	-.0000003	-.0003848
Standard Error	.0067	.0071
t-Statistic	-.00004	-.0542
Approximate p	.495	.485

Other Validation Procedures

Two additional procedures were used in the data analysis phase of this research as a method of validating the previously discussed results. First, an alternative estimation technique was used for the 12 companies for which significant autocorrelation was indicated. Second, the possible impact of imprecise event date specification was examined. Reasons for these procedures, along with the results, are reported next.

Autocorrelation Adjustments. As noted earlier in this chapter, significant first-order autocorrelation was indicated for 5 companies in the sample. In addition, the DW test was inconclusive on 7 other companies. Although OLS will generate unbiased coefficient estimates under this condition, the estimates are generally not efficient. More importantly, autocorrelation may cause the estimate of the variance to be biased and the usual OLS test statistic may be invalid [Judge, et al, 1985].

To assess the impact of autocorrelation on the OLS results reported earlier, estimated generalized least squares (EGLS) estimators were calculated for the 12 companies. The EGLS estimator specifically takes into account the correlation in error terms when deriving parameter estimates. As a result, the EGLS estimator provides unbiased and asymptotically efficient coefficient and variance estimates. The coefficient estimate for the ECON variable, the standard error and the t-statistic for

the 12 companies are shown in Table X. As can be seen, neither model indicates a statistically significant negative coefficient for the ECON variable.

TABLE X

OLS AND EGLS PARAMETER ESTIMATES FOR THE COMMON VARIABLE
(12 Companies Only)

	Y	
	OLS	EGLS
Mean	-0.00256	-0.00379
Standard Error	.00656	.00743
t-Statistic	-0.3902	-0.51
Approximate p	.347	.306

Imprecise Prior Information. Earlier research into security price performance indicated that prior information as to the event date was important in specifying the power of the test [Brown and Warner, 1980]. In the current study, an attempt was made to isolate both the dates on which the market revised its probability assessments that the 1959 Act would be implemented and the dates on which the market revised its estimate of the ultimate tax burden to be imposed. However, if towards this end a significant number of "non-event" dates are included in the model, the results

could be biased towards finding no stock price reaction to the 1959 Act (i.e., consistent with full short-run shifting).

To test for the effect of possible imprecise event dates, an alternative model was estimated using OLS. The purpose of this model was to isolate certain event dates on which there was a very high probability that the market would be making revisions in its estimate of the economic impact of the 1959 Act. If no stock price reaction was detected on these dates, it would be unlikely that imprecise event date specification was driving the results.

The model used to test for the impact of possible imprecise event dates is similar to that described in equation (6) except that the ECON variable is now disaggregated into 5 common variables.

Common Variables. The first four common variables are designed to capture the various deliberation period effects. They are:

HWC_t, SFC_t, $SDEB_t$ and JCC_t = dummy variables for deliberation periods;

where HWC refers to the House Ways and Means Committee hearings, SFC refers to the Senate Finance Committee hearings, SDEB refers to the Senate floor debate on H.R. 4245, and JCC refers to the Joint Conference Committee Report and passage in both the House and Senate.

The HWC variable includes the returns for the week prior to the public hearing, the week of the committee

hearing and the week on which the House Ways and Means publically announced their final position on the proposed tax reform. This included a 540 million dollar estimate of the tax liability to be imposed on the life insurance industry as a whole. The HWC variable should capture an increase in the probability of passage of the 1959 Act as well as an increase in the estimated tax burden of life insurance companies. As a result, in the absence of full short-run shifting, the coefficient for the HWC variable should be negative and significantly different from zero. A one-tailed test is considered appropriate.

In addition to being an event date on which changes in probability assessments occur, it is highly unlikely that the HW&M position would have been anticipated by investors. For example, it was reported in the National Underwriter that the life insurance industry seemed to be caught totally by surprise by the HW&M's switch to the 1950 formula and the magnitude of the tax burden to be imposed.

The SFC variable includes the returns for the three week period surrounding the committee hearings and the week on which the Senate Finance Committee announced its official position. It is difficult to specify an a priori sign for the coefficient for the SFC variable. The SFC position can be seen as both good news and bad news for the industry. From a positive standpoint, the SFC reduce the expected tax burden from 540 million to 500 million. However, the Senate hearings also greatly increased the probability of passage

of the 1959 Act. Consequently, a two-tailed test seems most appropriate.

The coefficients for the SDEB and JCC variables should both be negative. Under both cases, the probability of passage of the 1959 Act were increased. Therefore, a one-tailed test is appropriate.

The final common variable relates to important news announcement dates. It is as follows:

$NEWS_t$ = dummy variable for news announcement events not included in the deliberation period variables outlined above.

Since the NEWS variable may include both upward and downward revisions in probability assessments, no a priori expectation of the sign of the coefficient is possible. Therefore, a two-tailed test will be appropriate.

The following set of 36 equations was estimated for the period between July 12, 1957 and June 12, 1959.

$$Rit = A_i + B_{it}R_{mt} + \delta I_i + dHWM + eSFC + fSDEB + gJCC + hNEWS + u_{it}. \quad (8)$$

The results of equation (8) are reported in Table XI. Consistent with the hypothesis of full short-run shifting and the results reported in Table XI, none of the coefficients were significantly different from zero. Therefore, imprecision of the event dates does not appear to be a problem in evaluating the results of the original analysis.

TABLE XI

OLS PARAMETER ESTIMATES OF DISAGGREGATE COMMON VARIABLES

	HWC	SFC	SDEB	JCC	NEWS
Mean	-0.00370	-0.00005	-0.00039	0.00352	0.00004
Std. Dev.	0.01689	0.01344	0.02879	0.02709	0.00948
t-stat.	-0.219	-0.004	-0.014	0.13	0.004
Approx p	.415	.99	.49	.44	.99

Summary. This chapter reported the results of the tests for shifting of the corporate income tax of life insurance companies. The empirical evidence examined for this study indicate that there was no significant stock price reaction to the passage of The Life Insurance Company Income Tax Act of 1959. This result suggests that, in spite of a ninety percent increase in the statutory tax liability of life insurance companies, the capital markets expected that after-tax cash flows would remain virtually unaffected by the 1959 Act. Alternatively stated, the market expected life insurance companies to fully shift the increased corporate tax burden to consumers and/or labor. Presumably, these companies are able to rapidly adjust their operations in response to tax law changes so as to maintain cash flows that would have existed in the absence of the legislative action.

CHAPTER VII

SUMMARY AND CONCLUSIONS, LIMITATIONS, EXTENSIONS AND IMPLICATIONS

This chapter first reports a summary of the results and the conclusions based thereon. Finally, limitations of the study and possible tax policy implications and extensions are discussed.

Summary and Conclusions

The purpose of this study was to provide empirical evidence as to the economic burden of the corporate income tax of life insurance companies. Specifically, this research applied an events study methodology to estimate the economic effect of the increased tax liability imposed under The Life Insurance Company Income Tax Act of 1959. Based on the hypothesized relationship between the stock price reaction to the 1959 Act and the economic burden of the corporate shareholder, the results of this study provide evidence that the market believes that life insurance companies were able to successfully engage in short-run shifting behavior.

The general topic of inquiry addressed by this research has been the subject of extensive debate and empirical investigation.

Although the traditional tax incidence theory described in Chapter III generally posits a position of no short-run shifting, there is reason to doubt the applicability of that abstract conclusion. Certain modifications to the assumptions underlying the theoretical results may lead to behavior which intends to shift the corporate income tax. However, whether or not these attempts are successful must ultimately be determined empirically.

A detailed description of the empirical research into corporate tax incidence was provided in Chapter IV. The early periods of this research were dominated by rather simple descriptive studies. Concerted efforts to address the methodological problems of the early research eventually led to the development of complex econometric profit behavior models. Although these models were more rigorous than the early empirical works, their ability to isolate a tax effect has been subject to much criticism. Consequently, the contribution of further research applying profit behavior models has been seriously questioned.

From a methodological perspective, the approach taken in this research sets it apart from prior empirical research. First, it is the only application of an events study methodology specifically addressing the question of corporate tax shifting. More importantly, this research seems immune to the major criticism of the prior econometric studies. These studies have been criticized for their failure to isolate the tax effect from other factors which

bear on the determination of corporate rate of return. By using narrow event windows, the current study has greatly reduced the problem of mistaking correlation with causation.

Therefore, this thesis can be seen as a form of triangulation with respect to the study of corporate tax incidence. Prior to this research, there were two econometric tax incidence studies which yielded results consistent with a full short-run shifting of the corporate income tax in the life insurance industry. Although a completely different methodology was applied, the results of this thesis are virtually identical to those obtained from the earlier econometric tax incidence studies. These results, coupled with the evidence from prior econometric research, yield strong evidence that life insurance companies have been able to completely avoid the economic burden of the corporate income tax.

Limitations of the Study

As with any empirical research, there are limitations which may affect the reported results and the ability to generalize the results beyond the specific sample of the study. The most important limitations with respect to this research are the problems associated with identification of relevant event dates and the lack of data for many of the companies in the industry.

Specification of event dates poses a two-fold problem. First, due to the political nature of the event,

identification of all dates on which revisions in either probability assessments or revisions in the magnitude of the tax burden is a difficult process. Consequently, failure to identify all of the relevant event dates could lead to results which are biased in an unknown direction. On the other hand, as more event dates are added to the model, the problem of confounding events is greatly increased.

Another potential limitation of the study stems from the inability to obtain stock price data for many of the smaller companies in the industry. Since the companies included in the sample tend to be larger and more widely held than the population of insurance companies as a whole, caution should applied in extending the results beyond the companies within the sample. Along the same line, due to the methodology applied, mutual insurance companies were entirely excluded from the sample. Therefore, no attempt should be made to assess the extent of shifting for such companies.

Tax Policy Implications and Extensions

As was discussed in Chapter I, the corporate income tax is seen as influencing a variety of economic activities. Although tax policy assessments are beyond the scope of this research, it may useful to highlight the types of questions and problems that are generated by a full shifting of the corporate income tax of life insurance companies.

In spite of substantial changes to the 1959 Act, the area of life insurance taxation continues to be one of the most complex calculations in the Internal Revenue Code. Given the results of this study, the need for a special tax structure for life insurance companies should be considered. If substantially all of the corporate tax burden of life insurance companies is shifted, it would appear that the intricate provisions related to life insurance company taxation may be unnecessary. Given the current rhetoric toward tax simplification, a major tax revision in this area would seem appropriate.

In assessing the overall distribution of the tax burden, it is generally concluded that a non-shifted corporate tax has progressive redistributional effects. Therefore, to the extent that the tax is shifted forward to consumers, it may have many of the regressive effects that are normally associated with a sales tax. In addition, substituting the "shifted" corporate tax with an equal yield excise tax would appear to be administratively easier and the incidence of the tax would be known well in advance.

Finally, the implications of this study extend far beyond the narrow topic addressed in this thesis. Tax policy decisions are often based on very restrictive assumptions about the market setting in which United States industries operate. For example, the large scale simulation analysis discussed in Chapter IV assumed that the short-run burden of the corporate income tax is borne by capital in

all industries. This assumption must be seriously questioned in light of the results of this study.

Although the results of this study provide concrete evidence that the corporate income tax has been shifted by life insurance companies, the direction of the shifting has yet to be determined. An obvious extension of this research would be to attempt to assess whether consumers or labor is ultimately bearing the economic burden of the corporate income tax levied on life insurance companies.

At a more fundamental level, it is hoped that the research completed for this thesis will stimulate a more careful consideration and evaluation of the types of market imperfections that lead to a shifting of the corporate income tax. The potential benefit of such an analysis includes, but is not limited to, a more intelligent solution to the revenue generation problems currently facing Congress.

BIBLIOGRAPHY

Abelle, B., "An Evaluation of the Life Insurance Company Income Tax Act of 1959," Journal of Insurance, XXX, September, 1963, 403-422.

Adelman, M.A., "The Corporate Income Tax in the Long Run," Journal of Political Economy, April 1957, pp. 151-157.

Aharony, J., and Itzhak, S., "Quarterly Dividend and Earnings Announcements and Stockholders' Returns: An Empirical Analysis," Journal of Finance, March 1980, pp. 1-12.

Altman, E. and Brenner, M., "Information Effects and Stock Market Response to Signs of Firm Deterioration," Journal of Finance and Quantitative Analysis, March 1981, pp. 35-51.

Auerbach, A. and Feldstein, M., Handbook of Public Economics Vol. II, North Holland, 1987.

Ball, R. and Brown, P., "An Empirical Evaluation of Accounting Income Numbers," Journal of Accounting Research, Autumn 1968, pp. 159-178.

Ballard, C.L., Shoven, J.B. and Whalley, J., "General Equilibrium Computations of the Marginal Welfare Costs of Taxation in the United States," American Economic Review, 1985, pp. 128-138.

Banz, R., "The Relationship Between Return and Market Value of Common Stocks," Journal of Financial Economics, March 1981, pp. 3-18.

Basu, S., "The Investment Performance of Common Stocks in Relation to Their Price-Earnings Ratios: A Test of the Efficient Market Hypothesis," Journal of Finance, June 1977, pp. 663-682.

Baumol, W.J., Business Behavior, Value and Growth, Harcourt, Brace and World, 1967.

_____, Economic Theory and Operations Analysis, 4th Ed., Prentice-Hall, Englewood Cliffs, NJ, 1977.

Bayer, A., "Shifting the Burden of the Corporation Income Tax: A Disaggregated Analysis," Social Science Quarterly, Sept. 1970, pp. 285-294.

Beaver, W., Financial Reporting: An Accounting Revolution, Prentise-Hall, Inc., Englewood Cliffs, New Jersey, NY, 1981.

Beck, M. "Ability to Shift the Corporation Income Tax: Seven Industry Groups," National Tax Journal, Sept. 1950, pp. 248-256.

Belth, J., The Retail Price Structure in American Life Insurance, Bureau of Business Research, Graduate School of Business, Indiana University, Bloomington, IN, 1966.

1960 Best's Flitcraft Compend, A.M. Best Company, Inc., Morristown, N.J., 1960.

Berry, R., Short-run Shifting and Incidence of the Corporate Income Tax for U.S. Manufacturing, Unpublished Ph.D. Dissertation, George Washington University, 1978.

Boulding, K.E., The Organizational Revolution, Harper, 1953, pp. 271-282.

Brown, R., "A Comparison of Market Efficiency Among Stock Exchanges," Journal of Business, Finance and Accounting, Autumn 1988, pp. 373-384.

Brown, S. and Warner, J., "Measuring Security Price Performance," Journal of Financial Economics, 1980, pp. 207-257.

Bruno, S., "Corporation Income Tax, Oligopolistic Markets and Immediate Tax Shifting: A Suggested Theoretical Approach," Public Finance, 1970, pp. 363-378.

Bulow, J.T. and Summers, L.H., "The Taxation of Risky Assets," Journal of Political Economy, 1984, pp. 20-39.

Cohen, K. and Cyert, R., Theory of the Firm: Resource Allocation in the Market Economy, Prentice-Hall, Inc., 1965.

Collins, D. and Dent, W., "A Comparison of Alternative Testing Methodologies Used in Capital Market Research," Journal of Accounting Research, Spring 1984, pp. 48-84.

Cragg, J., Harberger, A., and Mieszkowski, P., "Empirical Evidence on the Incidence of the Corporation Income Tax," Journal of Political Economy, Dec. 1967, pp. 811-821.

Cyert, R. and March, J., A Behavioral Theory of the Firm, Prentice-Hall, Inc., 1964.

Cummins, J., Denenberg, H. and Scheel, W., "Concentration in the U.S. Life Insurance Industry," Journal of Risk and Insurance, June 1972, pp. 177-199.

Dalton, H., Principles of Public Finance, 4th Ed., Routledge & Kegan Paul Ltd., London, 1954.

Davidson, C. and Martin, L.W., "General Equilibrium Tax Incidence Under Imperfect Competition: A Quantity Setting Supergame Analysis," Journal of Political Economy, 1985, pp. 1212-1223.

Due, J.F. and Frielander, A.F, Government Finance: Economics of the Public Sector, 6th Ed., Richard D. Irwin, Inc., Homewood, IL, 1977.

Dyckman, T. and Morse, D., Efficient Capital Markets and Accounting: A Critical Analysis, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, NJ, 1986.

Fama, E., "Efficient Capital Markets: A Review of Theory and Empirical Work," Journal of Finance, May 1970, pp. 383-417.

_____, Fisher, L., Jensen, M., and Roll, R., "The Adjustment of Stock Prices to New Information," International Economic Review, Feb. 1969, pp. 1-21.

Feldstein, M.S., "Tax Incidence in a Growing Economy with Variable Factor Supply," Quarterly Journal of Economics, 1974, pp. 551-573.

Feldstein, M.S. and Slemrod, J., "Personal Taxation, Portfolio Choice, and the Effect of the Corporate Income Tax," Journal of Political Economy, 1980, pp. 854-866.

Flannery, M. and James, C., "The Effect of Interest Rate Changes on the Common Stock Returns of Financial Institutions," Journal of Finance, Sept. 1984, pp. 1141-1153.

Foster, G., "Accounting Earnings and Stock Prices of Insurance companies," The Accounting Review, October 1975, pp. 686-98.

_____, Olsen, C. and Shevlin, T., "Earnings Releases, Anomalies and the Behavior of Security Returns," Accounting Review, October 1984, pp. 574-603.

Foster, T. and Vickrey, D., "The Information Content of Stock Dividend Announcements," The Accounting Review, April 1978, pp. 360-370.

Galbraith, J., The New Industrial State, Houghton Mifflin, 1967.

Goode, R., The Corporate Income Tax, John Wiley & Sons, Inc., New York, NY, 1951.

_____, Corporate Tax Incidence," in Effects of Corporation Income Tax, ed. M. Kryzyzniak, Wayne State University Press, pp. 207-245.

Gordon, R., "The Incidence of the Corporation Income Tax in Manufacturing, 1919-1962," American Economic Review, Sept. 1967, pp. 731-758.

Grant, E., "Market Implications of Differential Amounts of Interim Information," Journal of Accounting Research, Spring 1980, pp. 255-68.

Hagerman, R. and Richmond, R., "Random Walks, Martingales, and the OTC," Journal of Finance, September 1973, pp. 897-909.

Hall, C.A., "Direct Shifting of the Corporation Income Tax in Manufacturing," American Economic Review, LIV May 1964, pp. 258-271.

Harberger, A., "The Incidence of the Corporate Income Tax," Journal of Political Economy, 1962, pp. 215-240.

Hogg, R., "Federal Income Taxation of Life Insurance Companies." The Journal of Insurance, XXVI, Spring 1959, pp. 20-30.

Hopewell, M. and Schwartz, A., "Stock Price Movement Associated with Temporary Trading Suspensions: Bear Market vs. Bull Market," Journal of Financial and Quantitative Analysis, Nov. 1976, pp. 577-590.

_____, "Temporary Trading Suspensions in Individual NYSE Securities," Journal of Finance, Dec. 1978, pp. 1355-1373.

Houston, D. and Simon, R., "Economics of Scale in Financial Institutions: A Study in Life Insurance," Econometrica, XXXVIII, Nov. 1970, 856-864.

Huebner, S., Life Insurance, 4th ed., Appleton-Century-Crofts, Inc., New York, NY, 1950.

Hughes, J. and Ricks, W., "Accounting for Retail Land Sales: Analysis of a Mandated Change," Journal of Accounting and Economics, Aug. 1984, pp. 101-132.

Judge, G., Griffiths, W., Hill, R., Lutkepohl, H. and Lee, T., The Theory and Practice of Econometrics, Wiley, 1985.

Kalecki, M., Selected Essays on the Dynamics of the Capitalistic Economy, 1933-1970, Cambridge University Press, Cambridge, 1971.

Kaufman, S., "The Life Insurance Company Income Tax Act of 1959: An Appraisal of the Effects Upon the Life Insurance Industry, Part II," National Tax Journal, XVII, March 1964, pp. 40-56.

Kimmel, L., "Taxes and Economic Incentives," Washington, D.C., Brookings Institute, 1950.

Kilpatrick, R., "The Forward Shifting of the Corporate Income Tax," Yale Economic Essays, Fall 1965, pp. 355-422.

King, B., "Market and Industry Factors in Stock Price Behavior," Journal of Business, January 1966.

Kraus, A. and Stoll, H., "Price Impacts of Block Trading on the NYSE," Journal of Finance, June 1972, pp. 569-588.

Kryzanowski, L., "The Efficacy of Trading Suspensions: A Regulatory Action Designed to Prevent the Exploitation of Monopoly Information," Journal of Finance, Dec. 1979, pp. 1187-1200.

Krzyzaniak, M., Effects of the Corporate Income Tax, Wayne State Press, Detroit, MI, 1966.

Krzyzaniak, M. and Musgrave, R., The Shifting of the Corporate Income Tax, John Hopkins Press, 1963.

_____, "Corporate Tax Shifting: A Response," Journal of Political Economy, July-August 1970, pp. 768-773.

Launie, J., "Price Differentials in Life Insurance," Journal of Risk and Insurance, XXXV, June 1968, pp. 283-288.

_____, "Shifting of the Life Insurance Company Income Tax," Journal of Risk and Insurance, XXXVIII, March 1971, 81-92.

_____, "The Cost of Capital of Insurance Companies," Journal of Risk and Insurance, June 1971, pp. 263-268.

Layard, P. and Walters, A., Micro-Economic Theory, McGraw-Hill Book Company, New York, NY, 1978.

Lent, G., "A More Permanent Formula for the Taxation of Life Insurance," Journal of Insurance, XXVII, Dec. 1960, pp. 63-74.

Lerner, E. and Hendriksen, E., "Federal Taxes on Corporate Income and the Rate of Return on Investment in Manufacturing, 1927 to 1952," National Tax Journal, Sept. 1956, pp. 193-202.

Levesgue, R., The Shifting of the Corporate Income Tax in the Short Run, Studies of the Royal Commission on Taxation, No. 18, Queen's Printer, Ottawa, 1965.

Life Insurance Fact Book 1968, Institute of Life Insurance, New York, NY, 1968.

MacLean, J., Life Insurance, 8th ed., McGraw-Hill Book Company, 1957.

Madeo, S. and Pincus, M., "Stock Market Behavior and Tax Rule Changes: The Case of the Disallowance of Certain Interest Deductions Claimed by Banks," The Accounting Review, July 1985, pp. 407-29.

Mampe, E., "Third Market Efficiency and NASDAQ: Some Preliminary Results," Paper presented at the Tenth Annual Meeting of Western Finance Association, June 1974.

Manegold, J. and Karlinsky, S., "The Security Market Impact of a Tax Law Change: Possessions Corporation Revisions," Journal of the American Taxation Association, Spring 1988, pp. 65-83.

Mansfield, E., Macroeconomics: Theory and Application, 3rd Ed., W.W. Norton & Co. Inc., New York, NY, 1979.

McLure, C.E., "General Equilibrium Incidence Analysis: The Harberger Model After Ten Years," Journal of Public Economics, Vol 4, February 1975.

McLure, C.E. and Thirsk, W.R., "A Simplified Exposition of the Harberger Model, II: Tax Incidence," National Tax Journal, March 1975.

McLure, C.E. and Ture, N.B., Value Added Tax: Two Views, American Enterprise Institute for Public Policy Research, Inc., Washington, DC, 1972.

Meyers, S., "A Re-Examination of Market and Industry Factors in Stock Price Behavior," Journal of Finance, June 1973.

Mieszkowski, P., "On the Theory of Tax Incidence," Journal of Political Economy, Vol 75, June 1967, pp. 250-262.

_____, "Tax Incidence Theory: The Effects of Taxes on the Distribution of Income," Journal of Economic Literature, December 1969, pp. 1103-1124.

Miller, M. and Modigliani, F., "Taxes and the Cost of Capital: A Correction," American Economic Review, June 1963, pp. 433-443.

Morse, D., "Price and Trading Volume Reaction Surrounding Earnings Announcements: A Closer Examination," Journal of Accounting Research, Autumn 1981, pp. 374-83.

Musgrave, R., The Theory of Public Finance, McGraw Hill, New York, NY, 1959.

Musgrave, A. and Musgrave, B, Public Finance in Theory and Practice, 5th Ed., McGraw Hill Book Co., New York, NY, 1989.

National Industrial Conference Board, The Shifting and Effects of the Federal Corporation Income Tax I, New York, NY, 1930.

Oakland, W., "Corporate Earnings and Tax Shifting in U.S. Manufacturing, 1930-1968," Review of Economics and Statistics, August 1972, 235-244.

Osborn, M., "The Life Insurance Company Tax Act of 1959," Journal of the American Society of Chartered Life Underwriters, XVI Winter 1962, pp. 74-93.

Osborne, A., "Rule 144 Volume Limitations and the Sale of Restricted Stock in the O-T-C Market," Journal of Finance, May 1982, pp. 505-17.

Peacock, A.T., Quantitative Analysis in Public Finance, Praeger Special Studies in International Economics and Development, 1969.

Pechman, J.A., Federal Tax Policy, 5th Ed., Washington, D.C., 1985a.

_____, Who Paid the Taxes 1966-1985, Brookings Institute, Washington, D.C., 1985b.

Penner, R., "Uncertainty and the Short-run Shifting of the Corporate Income Tax," Oxford Economic Paper, March 1967, pp. 99-110.

Petit, R., "Dividend Announcements, Security Performance and Capital Market Efficiency," Journal of Finance, Dec. 1972, pp. 993-1007.

Prest, A.R., Public Finance: Theory and Practice, Quadrangle Books, Inc., Chicago, IL, 1960.

Ratchford, B. and Hahn, P., "The Burden of the Corporate Income Tax," National Tax Journal, Dec. 1957, pp. 310-324.

Reilly, F. and Slaughter, W., "The Effect of Dual Markets on Common Stock Market Making," Journal of Financial and Quantitative Analysis, March 1973, pp. 167-182.

Rolph, E., The Theory of Fiscal Economics, University of California Press, 1954.

Rolph, E. and Break, G., Public Finance, Ronald Press Company, New York, NY, 1961.

Roskamp, K., "The Shifting of Taxes on Business Income: The Case of the West German Corporation," National Tax Journal, Sept. 1965, pp. 247-257.

Rosen, H.S., Public Finance, 2nd Ed., Irwin, Homewood, IL, 1988.

Sato, R., "Fiscal Policy in a Neoclassical Growth Model: An Analysis of Time Required for Equilibrating Adjustment," Review of Economic Stuidies, XXX, Feb. 1963, pp. 16-23.

Scarf, H. and Shoven, J., Applied General Equilibrium Analysis, Cambridge University Press, New York, NY, 1984.

Scitovsky, T., Welfare and Competition, Richard D. Irwin, Homewood, IL, 1951.

Sebold, F., "Short Run Tax Responses in a Utility Maximization Framework," National Tax Journal, Dec. 1970, pp. 365-372.

Seligman, E.R., The Shifting and Incidence of Taxation, Columbia University Press, New York, NY, 1926.

Sharpe, W., Portfolio Theory and Capital Markets, McGraw-Hill, 1970.

Shipper, K. and Thompson, "The Impact of Merger-Related Regulations on the Shareholders of Acquiring Firms," Journal of Accounting Research, Spring 1983, pp. 184-221.

Shoven, J.B., "The Incidence and Efficiency Effects of Taxes on Income from Capital," Journal of Political Economy, 1976, pp. 1261-1284.

Shoven, J.B. and Whalley, J., "A General Equilibrium Calculation of the Effects of Differential Taxation of Income from Capital in the U.S.," Journal of Public Economics, 1972, pp. 281-321.

Silverman, H.A., Taxation: Its Incidence and Effects, Macmillan & Co. Limited, London, 1931.

Simon, H., "Theories of Decision-Making in Economic and Behavioral Science," American Economic Review, 1959. pp. 253-283.

Singer, N.M., Public Macroeconomics, Little, Brown & Co., Boston, MA, 1972.

Slitor, R., "Corporate Tax Incidence," in Effects of Corporation Income Tax, ed. M. Kryzyzniak, Wayne State University Press, pp. 136-206.

Song, H., An Econometric Study of the Shifting of the Corporate Income Tax in U.S. Manufacturing, 1934-1971, Unpublished Ph.D. Dissertation, Wayne State University, 1976.

Spencer, B., "The Shifting of the Corporate Income Tax in Canada," Canadian Journal of Economics, Feb. 1969, pp. 21-34.

Stagliano, A., Federal Corporate Taxation of Life Insurance Companies: An Empirical Investigation, Ph.D. Dissertation, University of Illinois, 1977.

Stiglitz, J.E., Economics of the Public Sector, 2nd Ed., W.W. Norton & Co., New York, NY, 1988.

_____, "Taxation, Corporate Financial Policy, and the Cost of Capital," Journal of Public Economics, 1973, pp. 1-34.

Stockfisch, J.A., "On Obsolescence of Incidence," Public Finance, XIV, No. 2, 1959.

Thurow, L., The Impact of Taxes on the American Economy, Praeger Publishers, Inc. New York, NY, 1971.

Turek, J., "Short-run Shifting of the Corporate Income Tax in Manufacturing, 1935-1965," Yale Economic Essays, Spring, 1970.

Valenti, R., "Theoretical Approaches to Taxing Life Insurance Companies for Federal Income Tax Purposes," The Journal of Insurance, XXIV, November 1957, pp. 59-70.

Walter, J., The Investment Process as Characterized by Leading Life Insurance Companies, Division of Research, Graduate School of Business Administration, Harvard University, Boston, MA, 1962.

Watts, R., "Systematic 'Abnormal' Returns After Quarterly Earnings Announcment," Journal of Financial Economics, June/Sept. 1978, pp. 127-150.

Weinrel, E., "Appraising Life Insurance Stocks," The Analysts Journal, November 1958, pp. 63-69.

Weston, J., "The Incidence and Effects of the Corporate Income Tax," National Tax Journal, Dec. 1949, pp. 300-315.

Whitman, A. and Thompson, H., "The Impact of the 1959 Income Tax Act on Stock and Mutual Companies: A Simulation Study," Journal of Risk and Insurance, XXXIV, June 1967, 215-229.

_____, "Impact of Alternative Forms of Life Insurance Company Tax Legislation," Journal of Risk and Insurance, V35, March 1968, pp. 107-117.

Woolridge, R., "Ex-Date Stock Price Adjustment to Stock Dividends: A Note," Journal of Finance, March 1983, pp. 247-255.

APPENDIX

CORPORATE TAX SHIFTING: SALES MAXIMIATION BEHAHIOR

Baumol's [1973] model may be formalized by considering a firm that produces only a single product. The firm seeks to maximize total revenue

$$R = P \cdot X \tag{1}$$

subject to the profit constraint

$$\pi = (1 - t)\ (R - C - A) = \pi_0 \tag{2}$$

where R = total sales, A = advertising expenditures, and π_0 is the minimum profit level. The two decision variables are output (X) and advertising expenditures (A). By forming the Lagrangian function (L) and setting the partial derivatives of L with respect to X and A equal to zero, the necessary conditions for revenue maximization are determined:

$$L = R + \lambda[(1 - t)\ (R - C - A) - \pi_0]; \tag{3}$$

$$\partial L/\partial X = \partial R/\partial X + \lambda(1 - t)\ (\partial R/\partial X - \partial C/\partial X) = 0; \tag{4}$$

$$\partial L/\partial A = \partial R/\partial A + \lambda(1 - t)\ (\partial R/\partial A - \partial C/\partial A) = 0. \tag{5}$$

Solving (4) and (5) for $\partial R/\partial X$ and $\partial R/\partial A$ yields

$$\partial R/\partial X = \frac{(1 - t)}{1 + \lambda(1 - t)} (\partial C/\partial X), \text{ and} \tag{6}$$

$$\partial R/\partial A = \frac{(1 - t)}{1 + \lambda(1 - t)} . \tag{7}$$

Since the term (1 - t) does not cancel, there will be a tax effect. To determine the implications of the first-order optimality conditions for sales maximization, it must be shown that $\partial R/\partial A < 1$ and that $\partial R/\partial X < \partial C/\partial X$.

The proof that $\partial R/\partial A < 1$ is given by the assumption of sales maximization. If $\partial R/\partial A \geq 1$, then increasing advertising expenditures would increase revenues without reducing profits. Therefore, $\partial R/\partial A < 1$ must hold for the firm to operating at the maximal level.

The proof that $\partial R/\partial X < \partial C/\partial X$ can be shown from equations (6) and (7). Substituting equation (7) into equation (6) yields:

$$\partial R/\partial X = (\partial R/\partial A)\ (\partial R/\partial C) \tag{8}$$

Since $\partial R/\partial A < 1$, then $\partial R/\partial X < \partial R/\partial C$. That is, marginal revenue will be less than marginal cost. Therefore, the sales maximizing firm will be leaving some profits unrealized. The implication for shifting is that a firm will raise its price (reduce output) in response to a tax increase in order to maintain a minimum level of profits.

VITA

Scott Randall Fouch

Candidate for the Degree of

Doctor of Philosophy

Thesis: EMPIRICAL RESEARCH INTO THE SHIFTING OF THE CORPORATE INCOME TAX OF LIFE INSURANCE COMPANIES

Major Field: Business Administration

Biographical:

Personal Data: Born in Oskaloosa, Iowa, May 31, 1956, the son of Darrell L. and Sara B. Fouch.

Education: Graduated from LaPlata High School, LaPlata, Missouri, in May 1974; received Bachelor of Science Degree in Accounting from Northeast Missouri State University in May 1982; received Master of Accounting Science degree at University of Illinois in May 1986; completed requirements for the Doctor of Philosophy degree at Oklahoma State University in December 1990.

Professional Experience: Certified Public Accountant, Missouri; Price Waterhouse, June, 1982 to August, 1984; Teaching Assistant, Department of Accounting, University of Illinois, August, 1984 to May, 1985; Assistant Professor, Northeast Missouri State University, August, 1985 to August, 1987; Teaching Assistant, Oklahoma State University, August, 1987 to May, 1990.