

**A Critical Analysis of the Post-Keynesian Model of  
Firm Pricing Behaviour in Determining Business Fixed Investment**

by

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Major Paper presented to the  
Department of Economics of the University of Ottawa  
in partial fulfillment of the requirements of the M.A. Degree

Supervisor: Professor Mario Seccareccia

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## INTRODUCTION

Many economists have recently begun to examine the connections between a firm's pricing and investment decisions despite the traditional theory of the firm. Prices are seen as linked to potential output, rather than current output, as in the traditional theory. Perfectly competitive firms are deemed price takers and choose the optimal output, while in imperfect markets, firms take the demand curve as given and choose the optimal combination of price and current output. The first type of model underlies the Walrasian model, while the second model is more readily encompassed by the Marshallian model.

Leon Walras developed a general equilibrium model which dealt with total economic activity of an economy, where the equilibrium positions of all markets were solved simultaneously. Walras used the fiction of an "invisible auctioneer" to explain how market-clearing prices are established. Marshall's model, unlike Walras', was not a perfect competition model with a Walrasian auctioneer who precluded any false trading. Instead Marshall concentrated much of his analysis on partial rather than general equilibrium analysis. In his model of imperfect competition, prices are determined by supply and demand as commodities moved through manufacturer-wholesaler-retailer channels of distribution. Agents in the Marshallian model of firm behaviour optimize given their knowledge, but false trading in one interpretation occurs until finally the equilibrium price is achieved. Together, the two models constitute the microfoundation of traditional neoclassical theory. Based on either version of the neoclassical model of a firm, it will be

shown that any margin above cost will be eliminated over time, so that price equals the firm's average cost of production. Given that retained earnings are eliminated over time, neoclassical models appear to be inappropriate in analyzing firm investment behaviour. The problem of self-financing is not an issue in an environment that is stationary. What we are concerned with is a growing economy where investment takes place and needs to be financed. The neoclassical model of firm behaviour has little to say about how investment is financed and how it grows.

Kaleckian and post-Keynesian economists recognise that all markets are not perfectly competitive. Unlike the neoclassical theory of the firm, post-Keynesian theory refers to an oligopolistic model in which prices reflect both production costs and the demand for retained earnings to finance capital outlays. By means of market power and the conditions of supply for their goods and services, the constituent firms are able to set prices so as to generate sufficient retained profits from expected sales to be able to finance their planned investment expenditure. More importantly, post-Keynesian theory suggests the sequence in which the set of essential, interrelated factors needs to be dealt with. Determining the rate and composition of investment is the first requirement of the corporate firms prior to establishing their pricing policies. Investment plans will be based upon the firm's projections as to the future growth of market demand and the estimated profitability of various alternative investment projects (Harcourt and Keynon, 1976, p.38).

Still to be determined in this process of investment and pricing is the manner by which these capital expenditures are financed, especially when the economy is proceeding along a growth path marked by pronounced cyclical movements.

Post-Keynesian theorists argue that the mark-up, and hence the profit margin, is likely to have been set so as to enable at least the dominant firm within each oligopolistic industry to finance all of its capital outlays from internal sources (Eichner, 1987, p.471). It is only when sales fall short of expectations that the dominant firm will have to seek additional funding from external sources. Thus, assuming that there is a necessitous demand for credit, it becomes important to understand the link between bank loans to nonfinancial corporations and the factors that may influence them. Although the corporate business sector can raise external funds through a number of sources, they rely primarily on the commercial banks for their short-term finances.

Implicitly, I have assumed that the source of investment funds is relevant to the investment decision of the firm. The pricing mechanism plays a central role in providing investment funds for business and in determining income shares. The distribution of income illustrates the allocation of income shares going to workers (households) and enterprises or what Kalecki describes as 'capitalists'. The negative correlation between household savings and business savings will leave implications on firms' behaviour, as they seek to maximize their profits and sales revenue in order to finance further investment projects. In maximizing profits,

which are taken as a residual (after payment of dividends and interest costs), firms must take into account the interest rate policy of the central bank. As this paper will address later, the presence of rising interest rates will have a direct impact on the net rate of return and costs of financing for corporate firms.

#### **AIM OF RESEARCH PAPER**

The aim of this research is to specify an empirical relation based on the post-Keynesian model for business fixed investment that can be used for analytical and policy purposes. A specification of the equation for business lending to nonfinancial corporations will also be incorporated into the model, in order to determine the firm's method of funding investments. Finally, the fundamental macroeconomic link between investment activity and price changes will be examined within the post-Keynesian framework of firm behaviour. These models must be robust and stable enough to allow for testing the effects of the officially postulated reasons for determining investment expenditures- as the literature review will show, these reasons are virtually 'post-Keynesian' in nature.

## STRUCTURE OF RESEARCH PAPER

This paper is divided into four parts:

### Part I Review of the Literature

The review of the literature can be divided into five parts:  
(a) The Neoclassical model of pricing behaviour in a competitive market and non-competitive structure. The existence of a stationary environment within these models will be examined prior to the discussion of the oligopolistic model.

(b) The post-Keynesian or oligopolistic pricing model of firm behaviour.

(c) The function of the savings rate in validating investment or growth.

(d) The importance of interest rate policy in influencing investment expenditure.

(e) An analysis of the link between investment activity and price changes within the post-Keynesian framework of firm behaviour.

### Part II Specification of the Model

The model to be used here will be based on the theoretical background established within post-Keynesian literature. A separate model of bank loans to nonfinancial corporations will also be implemented in an effort to determine the firm's policy for financing business fixed investments. An additional model on price determination and investment financing will be included in order to test the post-Keynesian hypothesis on inflation and the mark-up within an oligopolistic market.

### Part III Empirical Testing and Results

The data base consists of yearly data covering the period 1962 to 1987. Using this data base:

-Causality tests are run to investigate whether the postulated factors actually cause business fixed investment; for bank loans to corporations further tests are run to investigate the factors that may influence the decisions of financial institutions to extend credit. Accordingly the relative importance of the "mark-up" will be tested in order to explore the fundamental relationship between investment and price changes.

### PART IV Policy recommendations and Conclusions

This follows logically from the results. The aim will be to provide insights into business fixed investment and the likelihood of financing such activities.

## PART I Review of the Literature

### Neoclassical Theory of Perfect Competition

Leon Walras developed a general equilibrium model of a multi-market economy which will be referred to here as the Walrasian Model. The model of the firm centres around the existence of an industry with plenty of small producers. The Walrasian model makes several important assumptions. Firstly, the model assumes that there is no product differentiation in the market. Secondly, firms are assumed to maximize profits, since compensation is based solely on whatever residual revenue that is earned. Thirdly, each firm is assumed to be a price taker, meaning that the individual firm has no price discretion. According to Eichner (1987, p.394), prices are determined at the individual level by the balance between demand and supply factors, with the individual firm then having to take this market-determined industry price as a given in deciding how much to produce (the only decision left to the firm). After each firm has determined their ideal output target at the given price, they will then place their production goods on the market at a price consumers are willing to buy.

In order to maximize their net rate of return, firms must produce at an output where their marginal cost of production equals price. At this point, the quantity demanded by the industry equals the quantity being supplied. As the demand for industry output varies over time, the net rate of return maximizing level will also vary via the market-determined industry price. Individual corporations adjust output over time, based on their individual

marginal cost curves. When aggregated for all the firms, the marginal cost curves constitute what is known as the industry supply curve.

With the balance of demand and supply (equilibrium) at the industrial level, Eichner (1987, p.396) argues that such a position may enable prospective firms within the industry to earn a net rate of return in the short run. However, there is the possibility of new firms entering the market, thus eliminating the profits above cost in the long run. According to Steindl (1976, p.40), for the lowest size class we may assume 'normal profits' as long as it is composed of 'small firms', which require a modest amount of capital. Similarly, if the market-determined price was not adequate enough to cover a firm's cost of production, it may prompt the exit of many high cost or inefficient firms from the industry.

As new firms enter the industry seeking to attain the short-run profits, the increase in output would force the industry supply curve to shift over time to where it intersects with the industry demand curve. At this new long-run equilibrium point, the price of output is adequate enough to cover firms' average total cost, thus eliminating any margin above production cost. Eichner (1987) describes this process as the dynamic adjustment process in which the change in price serves to restore supply and demand back to a long-run equilibrium position. Walras uses the fiction of an "invisible auctioneer" or "tatonnement" process to explain how market-clearing prices are established.

## Neoclassical Theory of Imperfect Competition

Alfred Marshall, Professor of Political Economy at the University of Cambridge, was a major figure of neoclassical economics, whose *Principles of Economics* was first published in 1890 (Sawyer, 1989, p.7). Marshall's model, unlike Walras', was not a perfect competition model that employed the use of an auctioneer who prevented any false trading. In the Marshallian model, firms are price setters rather than price takers (Eichner, 1987, p.399).<sup>1</sup> The Marshallian model indicates economic environments in which prices are set by corporations which only change irregularly in response to changes in market demand or supply conditions. Following Eichner's argument, the firm has the choice of setting its own price, or merely becoming a price follower (match the same price being charged by other enterprises). Another alternative available to firms would be to set a price that just covers its average total cost. Thus, the firm may be able to attain what Eichner refers to as the "break even" point. It is assumed that a firm will choose this strategy when offering a relatively new product and lacks adequate sales experience. Once a firm becomes more established within its particular product market, it can replace the break-even strategy with the more advantageous mark-up policy. Assuming firms are price-setters, a mark-up policy requires the firm to establish a price for its product that will yield residual earnings above the total average

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<sup>1</sup> This is a view held by post-Keynesians such as Eichner and Robinson.

costs of production if successful. The price is determined by adding a certain mark-up to the material and labour costs of production (Eichner, 1987, p.405). In this way, the Marshallian model mirrors the oligopolistic model. In comparing both models, the critical elements that differentiate the two will be addressed.

The Marshallian model, unlike the oligopolistic model, does not maintain strict barriers to entry. As a result, the mark-up in the non oligopolistic industry will be smaller than the mark-up established in the oligopolistic industry. Eichner (1987, p.405) states: The lower the cost disadvantage which a new entrant must overcome, the less protected will be the market position of the firms in that industry and the lower will be the mark-up upon which the list price is based. The extreme case, in which the mark-up is close to nil, would be comparable to the perfectly competitive model (i.e. Walrasian model), where there are no barriers to entry (see Eichner, 1987, p.405-407). The industries within the Marshallian model produce non-homogeneous products which are readily distinguishable from those supplied by other enterprises. The ability of firms to differentiate their products allows them to set a price above average total cost within the same product market. Thus, in the short-run, firms will be able to offset their vulnerability by increasing the size of the mark-up to realize any residual profit. In the long-run, as more firms duplicate the distinctive features of the differentiated product, and the entry of rivals producing similar products, the mark-up along with the residual profit will be significantly reduced. In an industry with

the absence of a dominant firm(s), where enterprises are producing homogeneous goods, the possibility of interfirm competition must be taken into account. This interfirm competition, according to Steindl (1976), may take the form of price shaving, discounting of the list price, and marketing strategies, which will lead to the reduction of the mark-up and profit margin.

In the non oligopolistic sector, then, the rivalry among firms, both those waiting to enter the industry and those already members, is the principal factor determining the size of the margin above costs within each industry and hence the level of prices in the short period (Eichner, 1987, p.412). Eichner goes on to argue that the competition among firms within the industry and potential entrants determines the prices in the short-run. This is so, even though it is the potential entrant of new firms that solely determines the size of the mark-up over time. The size of the mark-up may be entirely reduced to zero in the extreme case, hence reducing average revenues to the approximate level of total average costs.

Thus, based on either the Walrasian or Marshallian model of firm behaviour, it is evident that residual profit margins generated in the short-run will, in the long-run, be eliminated. However this conclusion raises questions about the stability of the neoclassical models of pricing behaviour by firms.

## THE NEOCLASSICAL FRAMEWORK: A STATIONARY ENVIRONMENT

The critical issue facing the neoclassical framework is the problem of self-financing. The neoclassical model pertains to a stationary environment, and does not properly address the issue of investment growth and financing. The real world out there does grow in a way where investment plays a central role and capital accumulation takes place. As capital accumulates, the issue of self-financing becomes a crucial element. Indeed, as we will discover, internal finance within the growing economy is not properly dealt with in the traditional neoclassical model.

The neoclassical model of pricing behaviour by firms argues that the existence of greater than zero profit margins above cost would be eliminated by entry of firms and interfirm competition. Therefore, the given price in the industry would be insufficient to cover the costs of expansion, forcing enterprises to abandon future investment activities. According to Eichner (1987), the margins above costs would be inadequate to finance new investment projects to increase capacity in correspondence with industry growth. The desire of firms to grow cannot be achieved unless they borrow funds from financial institutions. The neoclassical model does not elaborate sufficiently on the method of financing by firms in an effort to expand in a growing economy. The problem of financing investment, and more specifically of self-financing, is not an issue in a stationary environment. It is within a growing economy that the issue becomes of critical importance.

With firms unable to finance the required investment in new plant and equipment, the rate of expansion of the industry will not be matched by a corresponding increase in productive capacity, with the result being that the essential supply condition for continuous expansion will not be satisfied either. Following Eichner's (1987) argument, periods during which firms are earning increased profits above cost to finance the necessary expansion of capacity because the system is in disequilibrium will be followed by periods in which investment will have to be reduced. Investment expenditure is abated in this period because new entry by firms will eliminate those profit margins, bringing the system to a long run equilibrium. This is the essential problem of the neoclassical model in that it does not deal with internal finance, investment behaviour and growth. Since the model pertains to a stationary or static environment, the issue of capital accumulation and how it is financed is not addressed very well. Firms within the stationary environment can only grow if they borrow funds from financial institutions.

For neoclassical theorists, a typical firm in a competitive market is concerned primarily with maximizing the present value of its earnings, more specifically short-run profits. Larger firms, which operate in imperfect markets, generally aim to maximize rates of growth. Lavoie (1992) argues that the objectives of the firm are the same, irrespective of their size and of their type of control, and that these objectives are not profit maximization. It

is assumed that the ultimate objective of the firm, regardless of size, is to gain power over its environment.

The firm wants power over its suppliers of materials, over its customers, over the government, over the kind of technology to be put in use. The firm, whether it be a megacorp or a small family firm, would like to have control over future events, its financial requirements, the quality of its labour force, the prices of the industry and the possibility of takeovers. (Lavoie, 1992, p.99)

Moreover, firms seek to gain more power in order to guarantee their existence as an organization in the long-run. This form of power extends from the confines of the market structure (i.e. product differentiation, marketing) to the political and the social spheres (i.e. lobbying public authorities and formation of social norms).

As all types of firms seek to achieve power over their environment, what must be determined is how this goal is realized. Post-Keynesians have consistently insisted that in order for firms to achieve this objective, they must maximize their rate of growth. A fundamental assumption of the present theory is that the goal of those in charge of the firm is to cause its sales revenue to grow as rapidly as possible, subject to certain constraints (Wood, 1971, p.62). Lavoie (1992, p.104) has argued that to acquire power, the ultimate objective, the decision makers of the modern megacorp try to expand as quickly as is reasonably possible. The objective of growth, rather than the consumption of profit, is predominant.

The main criticism of the neoclassical model of the firm is that profit maximization is not possible because of the lack of pertinent information as a result of the unpredictability within the environment. Financial institutions lack relevant information

about the proficiency of business managers in directing their firms, and about the profitability of investment projects that are undertaken. The uncertainty about future movements in the capitalist economy presents many problems for bankers who must rely on other rules of thumb to judge a corporation's performance. Lavoie argues that firms are assumed to set minimum levels of profits in order that shareholders may receive benefits in the form of dividends. Thus, profit satisficing must be reexamined in the context of growth maximization. Profits, which are connected directly to investment, enable a firm to grow over time. The growth objectives set by the decision makers are constrained by the financial requirements of profitability, past and future. The criticism with the neoclassical view of finance lies with its inability to establish a link between current investment and current profits. According to the neoclassical view, current investment is related only to future or expected profits for financing of investment projects (Wood, 1975, p.9).

Financial institutions are more willing to provide loans to those firms that demonstrate the ability to generate profits in the past. Lavoie (1992, p.106) contends that corporations will maintain their financial independence by generating savings in the form of retained earnings to finance investment projects, or by staying within the borrowing guidelines set by the financial institutions. Thus, firms see profits as a means to an end to realize the objective of growth. Rather than maximizing present value of earnings, firms see profits as a way to achieve growth,

and increase their market shares. The issue of firms trying to attain market share, growth, and sales maximization does not necessarily coincide with short run profit maximization in the neoclassical model.

Both Baumol (1967) and Wood (1975) argue that the primary goal of the firm is to maximize the growth of its sales subject to a minimum constraint. This minimum constraint is a self-imposed limit set by the management of the firm. As a result, firms are permitted to borrow the funds they required, restricted only by some multiple of their generated internal revenues. The notion that firms are willing to borrow funds based on their self-imposed limits is known by post-Keynesians as Kalecki's *principle of increasing risk*.<sup>2</sup> To summarize this principle, Lavoie (1992, p.117) presents a graphical analysis of the maximum rate of profit versus the maximum rate of growth. In this analysis, it is discovered that firms that attempt to maximize profits avoid becoming engaged in investment or advertising expenditures that have low rates of return, although they could obtain loans from financial institutions to fund these expenditures. On the other hand growth-maximizing firms are involved in all expansion activities, provided these activities produce a rate of profit that is sufficient to provide the necessary internal and external finance. Lavoie sums up this point in the following quote:

We see that, even though the profit rate plays an important constraining role both in the short run and the long run, it

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<sup>2</sup> Refer to Lavoie (1992, p.109-118) for a complete explanation of Kalecki's *principle of increasing risk*.

is still worthwhile analytically to define the firm as a growth-maximizing institution, attempting constantly to enlarge its power and control over its socioeconomic environment. (Lavoie, 1992, p.117)

The oligopolistic pricing model, as opposed to the neoclassical model, does defines the firm as a growth maximizer. The goal of firms within the post-Keynesian framework is to attempt to maximize growth, relative market shares, and sales. These goals do not necessarily coincide with the neoclassical framework in which firms attempt to maximize short run profits. The difference in behaviour between a short run profit maximizer and growth maximizer leads to the emergence of an oligopolistic market structure. The notion of firms maximizing growth rather than short run profits will produce some principles of the oligopolistic pricing model. The oligopolistic sector exists within a growing economy and does deal with the issue of internal finance, investment and growth as we shall discover.

#### The Oligopolistic Pricing Model

Kaleckian and post-Keynesian economists recognise that all markets are not perfectly competitive. The most important feature of these models is that a link is derived between the pricing and investment decisions (Reynolds, 1987, p.37). Post-Keynesian literature, based on the analysis of pricing, places its emphasis on the important connection between pricing and investment. Post-Keynesian economists argue that the dominant firm or firms within each oligopolistic industry (an industry that contains two or more firms, at least one of which produces a significant portion of the

industry's total output) sets a mark-up, and hence the profit margin, to finance investment expenditure from internal sources. The evidence shows that between 75 percent and 90 percent of gross fixed capital expenditures in U.S. manufacturing industry is financed from retained profits (Eichner and Robinson, 1979, p.38). Thus, oligopolistic firms have some discretionary power to maintain the necessary mark-up above costs, so that they can generate sufficient internal funds or retained profits to finance investment undertakings. That is, movements in prices depend upon the requirements of firms for internally generated investment funds and upon movements in normal production costs. The mark-up is linked directly with the need to finance planned investment expenditure (Eichner 1979, p.39). If the oligopolistic firms generate insufficient funds internally, they would be required to obtain additional funds from external sources. A firm that resorts to external funds to finance investment payments or expenditures will add to the amount of debt held by outside parties (such as commercial banks, individual investors), and increase the cost of servicing the debt.

According to Eichner, the primary goal of the oligopolistic firm is to maximize "net revenue" or retained earnings. Eichner also contends that firms (which are most likely to survive in the long-run) attempt to grow at the highest possible rate by continual diversifying and expanding into newer, more rapidly growing industries. It is this need to survive, that dictates the goal of growth maximization in the model of oligopolistic pricing.

Oligopolistic firms measure this growth via their rate of internal cash flow or retained earnings. As the firm increases its rate of internal cash flow, it will maintain adequate resources to finance future investment and expansion. Therefore, growth will be maximized over time as the firm expands and diversifies into newer industries.

In pursuing a growth maximizing strategy, the firm will attempt at the very least to maintain, if not actually to increase its current market share while simultaneously acting to minimize its costs of production (Eichner, 1987, p.362). A firm that wishes to exclude rivals from the market has to implement a strategy, consisting of tactics such as lowering the price of its product, improving quality, marketing and advertising widely and so on. Oligopolistic firms that pursue growth maximization also attempt to expand into new and thriving industries, while departing from declining industries. In this way, firms can ensure further increases in their cash flow over time. To quote Eichner (1987, p.362):

"The simultaneous expansion into newer, more rapidly growing industries and the withdrawal from older, stagnant industries is what enables the megacorp to maximize its own growth, as measured by the increased cash flow, or discretionary funds, over time."

According to Harcourt and Keynon (1976), the firms that occupy the position of industry price leader must make a decision on what size mark-up to apply to their costs of production, as well as a decision about its future investment expenditures. The decision about future investment plans is based on the observed rate of

capacity utilization and some desired rate. This is illustrated by the acceleration principle, which postulates that the capacity utilization goes through wide swings. For example, when the economy is booming, high utilization rates make new investments both necessary and profitable. Desired plant capacity will be such that a firm will be able to accommodate an increase in demand for its output during upward cyclical swings in the economy, or a reduction during contractionary periods.

Each firm, given its own expansion plans and the role it plays as the price leader in the industry as a whole, will try to achieve a target rate of return by setting prices at a mark-up over full costs at normal levels of output. Another way to view the mark-up is that it is equal to a gross profit margin to cover fixed costs and yield a "residual" profit in relation to unit labour costs (Bober, 1992, p.95). The established price of its output will be set in an attempt to cover its given labour and material costs while generating the necessary cash flow to meet long-term investment expenditures. There are thus two types of costs which determine the long-period price in an oligopolistic industry that is part of an expanding economy. There are (1) the costs of producing the current level of output, and (2) the costs of expansion, both within the industry itself and into other, more rapidly growing industries (Eichner, 1987, p.371).

Kenyon (1976) argues that each corporate firm chooses a specific mark-up policy based on the general state of business confidence in the industry. This same state of confidence or

expectations also determines the firm's investment plans. If the firms believe that demand for their commodities are going to fall, they will most likely not undertake new investment projects. On the other hand, if they have optimistic expectations about the demand for their products, they are likely to increase their capital outlays and invest in inventories in order to satisfy the expected high level of demand. Thus, actual prices do not reflect current demand conditions; rather they reflect the fund requirements for the planned investment expenditure that the firm considers necessary if it is to adjust its capacity sufficiently to meet expected future demand (Kenyon, 1976).

The industry price leaders have the option of financing capital outlays by generating a flow of funds internally. As was described earlier, the firm would choose a mark-up that will yield the required level of retained earnings (internal funds) to finance investment expenditures. According to Kaleckian theory, the oligopolistic firms possess some degree of monopoly, which allows them to set their margins above normal production costs, so as to generate sufficient cash flow to finance any investment undertakings. The firms may decide later to increase the size of the mark-up and the price itself, in the instance that the existing mark-up is insufficient in generating the discretionary funds required to finance current capital expansion programs. Unlike the neoclassical approach, representative firms of the oligopolistic model possess the 'degree of monopoly' that enable them to maintain mark-ups above cost, and hence profit margins. Despite the

discriminatory power of the price leaders, there is a limit to the size of the mark-up. If not, firms would have the freedom to gain additional funds from a higher mark-up to finance greater levels of investment, increase the payrolls of top executives, and raise the dividend payout rate. Ideally, firms would like to raise their mark-up when faced with shortfalls in cash flow. However in the short-run, their ability to do so may be insufficient. This implies that they should be able to cover the cost of any discretionary expenditures out of the retained earnings being generated by the mark-up which has been established in each industry. In addition to retained earnings, the firm has the option of financing investment activities from external sources by taking a loan from the bank or by issuing corporate debt.

Still to be analyzed is the process by which discretionary expenditures are financed particularly when the economy is advancing along a growth path targeted with pronounced cyclical movements. The business cycle theory depicts these movements in the economy as expansionary cycles (i.e. booms) and contractionary cycles (i.e. slumps or recession). According to Eichner (1987 p.472), the problem of finance is likely to arise for the dominant corporate firms in the oligopolistic sector insofar as the economy is temporarily experiencing cyclical swings. This short-term displacement of the economy from its "secular growth path", in terms of a downward swing, will cause a short-period gap between desired capital expenditure on the one hand and the retained earnings being generated internally on the other hand. As a result

of these short-term economic disturbances, the dominant firms will be faced with shortfalls in their cash flows and thus, prevented from increasing their investment expenditures for reasons of expansion. On the other hand, a positive expansionary swing in the economy will provide the oligopolistic firms with a surplus of cash flows. The availability of adequate internal financing will eliminate the need to acquire additional funds from the banking sector.

As already pointed out, the mark-up which permits firms in the oligopolistic sector to cover all their production costs, and the cost of capital outlays, will have been set on the assumption that, on the average over the business cycle, they will be able to generate sufficient funds to cover discretionary expenditures. This assumption holds as long as the industry continues to grow at the anticipated secular growth rate. However, when the economy is experiencing pronounced cyclical shocks, production and sales will vary over the cycle. Thus, the cash flow of oligopolistic firms will rise and fall at a more rapid rate. When sales are increasing, requiring a higher rate of capacity utilization, the cash flow of the dominant firms will be on the rise and will increase more rapidly than either sales or output. Conversely, when sales are declining, leading to a lower rate of capacity utilization within the oligopolistic sector, the cash flow will fall and will decline more rapidly than sales or output (Eichner, 1987, p.474). The rate at which internal funds are being generated

are therefore quite sensitive to the demand for goods and services within the industry.

Oligopolistic firms can thus expect to find themselves in several possible situations insofar as their finances are concerned. In the first situation, the oligopolistic sector is experiencing increasing sales and greater than anticipated growth. In this situation, the corporate firms will have no problem of finance, and are likely to have a surplus of discretionary funds. The opposite situation is when sales fall below the operating ratio of a firm, and continue to decline. In this situation, representing a downturn in the secular growth path of the economy, the dominant firms will face a problem of finance. As a result, the rate of internally generated funds will be below the level needed to cover current outlays but, in addition, the shortfall in cash is becoming worse. In that event, the oligopolistic firms will be forced to acquire external funds.

Under ordinary circumstances, oligopolistic firms will have little trouble in borrowing funds from external sources. They are likely to have a close relationship with any number of financial institutions which are prepared to supply them with short-term loans. It is likely that such firms will possess strong credit ratings and an arranged line of credit at a number of financial institutions, which they can draw upon during periods of shortfalls in cash flow. The ability of oligopolistic firms to protect their rates of return by increasing their mark-ups (assuming that the central banks wish to mitigate domestic demand by increasing the

cost of lending to chartered banks) will ensure a line of credit from financial institutions, which encourage lending to profitable firms capable of repaying loans. Firms, therefore, have an incentive to increase their mark-ups in order to accumulate funds and give the appearance of being good credit risks to the banks. Because of its favoured access to credit institutions, the corporate firms will have little difficulty in coping with any shortfall, due to a cyclical downturn of the economy. When the firms acquire the external funds (i.e loans from chartered banks), they temporarily increase the cost of debt service. Thus, in the face of a cyclical downturn, the corporate firms will be forced to add to its short-term debt beyond the desired optimal level. However, when the economy experiences an upswing in the business cycle, the firms will find that the cash flow being generated will be greater than was anticipated when the mark-up was established. The firms will therefore, be able to reduce the short-term debt to a preferential level. Thus, the question of cyclical finance is addressed within the framework of the oligopolistic pricing model.

#### **THE FUNCTION OF THE SAVINGS RATE IN VALIDATING INVESTMENT**

Post-Keynesian literature starts with the fundamental recognition of two classes in the theory of savings and distribution, which for ease of exposition are usually referred to as capitalists and labourers (Reynolds, 1987, p.42). Based on the Kaleckian theory of income distribution, workers receive income derived solely from wages and salaries. These workers are assumed

to spend their incomes entirely on personal consumption (savings in terms of corporate and government bonds will be introduced later into the model). In addition to workers, there are capitalists or "pure capitalists", who receive income consisting solely of profits (as a result of ownership of capital). The other group of 'pure capitalists' exercise direct control over the savings and investment decisions of the large corporations that occupy the core sector of the economy (Reynolds, 1987, p.42). Having specified a simple two-class model, it remains to be shown whether the distribution of income between classes has fundamental implications for the analysis of business investment in terms of future growth. In the following discussion, I hope to address this statement by examining the importance of the composition of household savings to business savings (retained earnings), and what impact this relationship has on the investment side. Given that retained earnings or undistributed profits act as a residual for business firms (after payment of interest costs and dividends), the discussion will first try to address the determinants of retained earnings within the scope of the monetary circuit. I refer to both Minsky (1980) and Seccareccia and Sharpe (1994) to present this argument.

#### DETERMINANTS OF PROFIT

According to Minsky (1980, p.515), if we assume that workers consume all their wage income on consumption goods and capitalists do not consume, the following results:

$$C = W_c N_c + W_i N_i; \quad (1)$$

where  $C$ =consumption,  $W_c$ ,  $W_i$ = wages in consumption and investment production, and  $N_c$ ,  $N_i$ = employment in consumption and investment production. In Kalecki's analysis, under the assumption that workers do not save, the level of profits is determined by the level of investment (determined by decisions taken in the past) and by capitalists' consumption (Reynolds, 1987, p.45). If we introduce an open economy with a government sector, and allow consumption out of profits and savings out of wages, we have

$$\Pi = I + D + C_{\Pi}\Pi - S_wW + BPS \quad (2)$$

where  $D$ =government deficit,  $C_{\Pi}\Pi$ =consumption out of total profits,  $S_wW$ =savings out of total wages. From Seccareccia and Sharpe (1994), total household savings ( $S_wW$ ) is equal to the sum of savings that went towards purchasing corporate bonds and securities, and the purchase of government bonds. The term referred to as  $BPS$  represents a country's balance of payment surplus or net exports. What follows from equation (2) that  $D$  and  $BPS$  or net exports are both independent determinants of business profit,  $\Pi$ , and are not themselves directly related as is assumed in the conventional neoclassical model (Seccareccia and Sharpe, 1994, p.283).

An important point that emerges from equation (2) is that an increase in the government deficit results in an increase in retained earnings accruing to the enterprises. The reverse may be true in the case of a declining government deficit which reduces private sector surpluses. The increase in private sector surpluses can be thought of as the amount of endogenous new money created

that takes place during that specific time interval. In an effort to help finance government expenditures during a specific time period, the central bank produces external funds as part of this endogenous monetary creation. This source of external money, referred to as the "**accommodation effect**" (see Seccareccia, and Sharpe, 1994, p.283), is the difference between the budget deficit and the portion of household savings used to purchase government bonds. In addition, endogenous money creation occurs when commercial banks purchase government bonds.

In effect, by assisting the government in financing its expenditure requirements, *ceteris paribus*, the central bank is contributing to creating a source of growth to private sector enterprises. From this statement, it is clear that the volume of household savings used to purchase government bonds need not be falling, in order that private sector retained earnings rise. Consequently, a government deficit may not influence growth of private investment when changes in the budget deficit merely reflect changes in the servicing cost of the public debt due to the interest rate policy of the central bank. The change in the public sector deficit may result in the redistribution of rentier income from one person to another. An anti-inflationary policy by the monetary authorities would put upward pressure on the budget deficit, as households are faced with trying to earn higher rentier income from interest-bearing assets. Households have no choice or control in a closed system and must accept decisions undertaken by the monetary authorities and commercial banks. Hence, a higher

share of households having a high propensity to save will have negative consequences on business savings, resulting in lower business investments. Firms that are less exuberant about future profits may reduce their future investment expenditures for expansion. On account of the surge in aggregate demand, Seccareccia and Sharpe (1994) argue that firms may experience a rise in future earnings. Firms may also enjoy growth in investment as a consequence of an increase in the budget deficit, other things being equal.<sup>3</sup>

Public sector deficits are primarily dependent on the flow of household savings. In the event that households reduce their purchases of corporate and government bonds and securities and increase consumption, everything being equal, then the reduction in household savings would result in increasing business profit. Equation (2) illustrates this effect with savings out of wages (SW) on the right hand side which determines the retained earnings of a firm. A rise in undistributed profits accumulating towards business savings may result in a further rise in expected future earnings and the growth of investment. When investment increases, profits increase as well, unless other elements, such as a higher rate of savings by households or a deficient trade balance, induce reduced profits (Lavoie, 1992, p.199).

Hence, when household savings rise, a greater portion of income received through wages and salaries is used to purchase government and corporate bonds and securities. Household savings

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<sup>3</sup> See Seccareccia and Sharpe, (1994, p.284-285).

may rise in the event that the central bank initiates a high interest rate policy to tighten credit controls within the banking sector. According to Seccareccia and Sharpe (1994, p.287), adopting such a policy would favour high income earners having a stronger propensity to save, with the effect of bringing down aggregate demand and engendering public sector deficits.

#### THE IMPACT OF INTEREST RATE POLICY ON THE NET RATE OF RETURN

Post-Keynesian analysis suggests that the change in the money supply might operate, if offsetting conditions did not exist, by supplying firms with the necessary "endogenous" funds at the beginning of the monetary "circuit". In the short-term, firms will experience a limit or constraint to expansion of short-term debt as the flow of cash balances declines. Minsky (1980) contends that the "financial fragility of the economy" will result in rising interest rates. As we will discover, rising interest rates may offset the accumulation of retained earnings generated by firms during a boom period in the economy. Lower profitability, on account of higher financing costs, may reduce future expected profits, and with it the rate of investment. Spurred on by the reduction in their internal revenues, firms may be required to seek external finance in the form of loans from financial institutions to fund their planned investment expenditures. Given this relationship between the net rate of return for firms relative to cost of financing, the following section seeks to emphasize the

importance of interest rate policy in influencing the rate of investment or growth.

Contemporary work in post-Keynesian theory suggests that both the money stock and money base are endogenous in nature. There is also a true causal sequence of events that occurs in the real-world credit money economies. This causal sequence is summarized in the following. Firms make production plans according to their expectations; they demand advances from the banking system to implement these production plans. The demand for loans generates the creation of a flow of money identical to the flow of income. The portfolio decisions of the households lead to residual stocks of credit and of money (Lavoie, 1992, p.169). The central bank then steps in to supply the required base money coinciding with the outstanding money stock at a rate of discount set by the bank. The Post-Keynesian school states that the supply of money is endogenous because it is determined by demand, where the main determinant is the finance motive, related to the income generated by the initial flow of loans. The first step in the economic process is the decision taken by banks of granting credit to firms in order to enable them to start production (Graziani, 1990, p.12). This view of endogenous money is essential in explaining the negative influence that interest rates have on the rate of investment or growth within the economy. To further this argument, some elements of the theory of financial instability as presented by Minsky will be addressed.

Amid his theory of financial crisis, Minsky (1980) is concerned with the systematic changes that take place during business cycle expansions. He argues that these cyclical expansions are inherently unstable, and lend to a fragile structure that will ultimately collapse. In his theory of financial fragility, Minsky introduces three determinants of the fragility of the financial system: hedge, speculative, and Ponzi finance (see Wolfson, 1986, p.21). Minsky begins by stressing the importance of debt financing during the expansion phase of the business cycle. In the early stages of economic expansion, supply of finance is relatively elastic since banks are much more liquid (ie. at bottom of a recession). The use of debt financing by enterprises during this stage increases business profits. Even as investing units and their bankers attempt to increase debt financing, greater than expected profits will result in a shortfall of realized as compared to anticipated debts. During business cycle expansions, the "unused" or "open" borrowing capacity of business and owners' wealth increases (Minsky, 1980, p.517).

At the same time, Minsky contends that debt financing makes a firm more vulnerable to conditions of interest rates in the credit market. As the amount of external financing for investment grows, so too does the fragility of the whole system. As the weight of short-term debt in the business financial structure increases, the weight of cash in portfolios declines. Even if interest rates on financial contracts do not increase, the ratio of payment commitments profits increases (Minsky, 1980, p.517). From the

previous equation (2), we can see that an increase in consumer savings out of wages ( $S_wW$ ) will have the effect of reducing firms profit ( $\Pi$ ). As a result, firms would require greater external finance in the form of short-term loans. The greater debt burden of firms will make the system more fragile and susceptible to financial crisis. Thus, in the short-term, there is a limit or constraint to expansion without leading to a rise in interest rates.

As the fragility of the system expands, Minsky contends that the rate of interest will rise, independent of whether or not the central bank tries to implement monetary policy (anti-inflation policy). According to Minsky, interest rates rise regardless of a tight monetary policy, due to the assumption of a relatively inelastic supply of funds (see Wolfson, 1986, p.22-23). Because investment decisions lead to a sequence of investment demands, a run of tranquil behaviour leads to a rising inelastic demand for financing for the production of investment goods. Given this inelasticity, any emerging inelasticity in the supply of finance will lead to a sharp rise in interest rates (Minsky, 1980, p.517). The inelastic nature of the supply of finance reflects lenders risk as the desired leveraged ratio (external finance ratio) of firms rises. The idea being that it is more risky to lend to someone who is already indebted, therefore adding a premium to the indebted firm.

According to Minsky, such a rise in the interest rate will trigger accumulated 'debt deflation,' since the market value of

assets fall relative to their liabilities. An increase in the interest rate also has the effect of increasing the number of firms falling into speculative and especially Ponzi finance (where units continually increase their borrowing to meet payment commitments) from hedge finance. Thus, this increases the proportion of external financing on the part of the firms to fund current investment. In essence, rising interest rates reduces investment as some banks are unwilling to undertake the increase in perceived risk in financing some investment projects. Accordingly, investment is also reduced because their expected future yields may appear unattainable, due to a rise in the costs of financing (interest rate). The decline in investment eventually leads to the fall in profits or retained earnings, and the cumulative deflation of assets. As emphasized by the earlier Kalecki relation, the causal relationship runs from investment to retained earnings: business earnings are determined by investment.

Minsky's argument rests on the importance of the interest rate effect in influencing the level of investment. From his theory of financial fragility, the central bank's policy of high interest rates will have negative effects. The most crucial consequence of higher interest rates is the reduction of investment, which consequently decreases retained earnings. As a result, firms with lower internal finance must rely more on external finance (ie. nonfinancial bank loans) to fund their current investment projects.

## PRICE DETERMINATION AND INVESTMENT FINANCING

Missing from this discussion is the fundamental macroeconomic link between investment activity and price changes. According to the neoclassical theory of firm behaviour, prices are determined at the individual level by the balance between demand and supply factors. In competitive markets, Seccareccia (1984, p.186) argues that actual prices were seen to be derived through competitive bidding on the part of consumers for an output which was determined by producers on the basis of their expectations. In an oligopolistic market, firms are assumed to set prices so as to generate sufficient net revenue to finance some of their planned investment. Thus, the following section tries to determine the basis on which firms in the oligopolistic market can set prices *ex ante*, as opposed to prices determined by the balance between demand and supply prices of consumer goods in a competitive market.

As was presented earlier, Eichner (1987) posited that oligopolistic firms possess some degree of price discrimination, which allows them to set their margins above normal production costs. In this way, firms are able to generate sufficient cash flow to finance investment activities. Steindl (1976) stated that an increase in the profit margin, unless compensated by an increase in capital intensity, will lead to an increase in the rate of internal accumulation. Eichner (1987) refers to this rate of internal accumulation as "the corporate levy". The corporate levy is set so as to obtain internally generated funds to finance investment (Reynolds, 1987, p.68). The degree of monopoly or

pricing discrimination maintained by oligopolistic firms facilitates this cash flow. As Seccareccia (1984) points out, firms cannot much affect the value of quantity of output demanded over the cycle (unless they first increase their own spending). As a result, the mark-up available to oligopolistic firms is the principal factor which influences cash flow.

Adrian Wood (1975) sets out a model where oligopolistic firms seek to maximize profits subject to their "opportunity frontier". Wood's model suggests that the relationship between required profits and planned investment expenditure depends on three ratios: the gross retention ratio,  $R$ , the external finance ratio,  $X$ , and the financial assets ratio,  $F$ . The gross retention ratio represents the ratio of internal finance to profit. Wood suggests that dividend policy rather than retention policy is the decision variable. The external finance ratio gives the proportion of investment funds financed through external borrowing, which is determined by the firm's chosen gearing ratio. The financial assets ratio is the ratio of the acquisition of financial assets to investment expenditure, which is based on a target liquidity ratio (Reynolds, 1987, p.71). Thus we conclude that in an oligopolistic pricing model, the mark-up is determined by the following constraints:

$$\epsilon = f(R, F, X) \quad (3)$$

where  $\epsilon$  is the mark-up,  $R$  is the dividend payout ratio,  $F$  is the money flow of planned investment or financial assets ratio, and  $X$  is the external finance ratio. Seccareccia (1984) demonstrated

that a rise in investment expenditure would be associated with an increase in quantity of output demanded and prices. This would eventually lead to an unexpected growth in the cash flow.<sup>4</sup> Hence, changes in the price of firms' output (inflation) can be viewed as a consequence of the firm's decision to expand or reduce productive capacity. Assuming that there exists a close association between investment and firm output prices, we can stipulate that:

$$\Delta P = f(\Delta ULC, \Delta RM, \Delta INV/INV) \quad (4)$$

where  $\Delta P$ =change in price,  $\Delta ULC$ =change in unit labour costs,  $\Delta RM$ =change in raw material costs, and  $\Delta INV/INV$ =the rate of change of investment. Hence, this empirical relationship will be tested by utilizing data obtained from Statistics Canada's industry indexes for all manufacturing industries during the period 1946-1975. Alternative specifications will also be examined with the ratio of investment to gross domestic product in manufacturing ( $INV/GDP$ ), and the first difference of investment expenditure. However, before actually setting out to test this relationship empirically, we must first test the model specifications of investment spending and business lending. These two specifications will be presented in the following section.

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<sup>4</sup> Seccareccia (1984, p.190-191) presents a graphical analysis of the Kalecki-Steindl approach. This approach illustrates the effect that a change in investment would have on both price and quantity demanded.

## PART II Specification of the Model

### PART A: INVESTMENT SPENDING

Investment is an important element in the theory of income determination. Investment refers to expenditure on the production of goods not for present consumption including machinery and equipment; residential and non-residential construction, and inventories. Residential construction, non-residential construction, and machinery and equipment constitute gross fixed capital formation. Machinery and equipment include tools, and the various types of machines that are acquired by business enterprises.

Many post-Keynesian theorists have posited a number of factors influencing the level of investment spending over the years. However, the most notable factors that exert significant influence on the level of investment include the prime interest rate, retained earnings, the rate of change of national income, and the capital-output ratio. Among these factors, the model of investment expenditure will also incorporate the change in sales, an 2% ^^

'U\*' ( capacity utilization. The tests on the investment equation will also examine the influence that certain factors have on the rate of change of investment ( $\Delta I/I$ ).

When investment spending is expressed as a function of these determinants, we obtain the investment function. The investment function is the relation between investment spending and all the factors that determine it. Using functional notation, the investment function can be expressed as

$$I = f(RA, \Delta Y, \Delta SA), \quad \Delta I/I = f(RA, \Delta Y, \Delta SA) \quad (5)$$

$$I = f(RA, C/O, \Delta SA), \quad \Delta I/I = f(RA, C/O, \Delta SA) \quad (6)$$

$$I = f(RS, CAP), \quad \Delta I/I = f(RS, CAP) \quad (7)$$

$$I = f(RA, CAP), \quad \Delta I/I = f(RA, CAP) \quad (8)$$

where  $I$  = investment,  $\Delta I/I$  = the rate of change of investment,  $RA$  = ratio of retained earnings/ value of assets minus the prime rate ,  $RS$  = ratio of retained earnings/total sales minus the prime rate,  $\Delta Y$  = the change in national income,  $C/O$  = capital-output ratio,  $\Delta SA$  = change in sales, and  $CAP$  = rate of capacity utilization. Each of these factors will be discussed in turn.

#### The Retained Earnings/Value of Assets Ratio

Retained Earnings has been defined as the cumulative total of annual earnings retained by a company after payment of all expenses and dividends. Investment spending was expressed as a function of retained earnings to illustrate the dependence on loans by the corporate sector for investment funds, during periods when profits are low. Likewise, firms that generate greater amounts of

undistributed profits will not rely so heavily on loans for investment funds. Investment spending can be undertaken with retained earnings. The greater the amount of retained earnings, the greater the level of investment is likely to be. The value of assets refers to the worth of the company's assets as stated on the corporate balance sheet. This ratio expresses the revenue generated by the firm as a proportion of total assets.

The prime lending rate is the rate charged by chartered banks to their most credit worthy borrowers. Other things being equal, the higher the prime rate of interest, the higher the cost of borrowing money for investment purposes. Thus, a low level of investment expenditure is associated with a high rate of interest. On the other hand, low prime rates charged by the chartered banks will encourage investment spending as firms find it more profitable to invest. It is for this reason that the prime rate is subtracted from the ratio of retained earnings to the value of total assets. The difference will reflect the margin in which retained earnings as a proportion of assets are net of interest costs.

#### The Retained Earnings/Total Sales Ratio

This ratio is similar to the previous relationship, except that the value of total assets is replaced by the total sales of the firm. When sales are increasing from a position of full capacity, both net investment and replacement investment will be required. When sales are falling, there will be a tendency to reduce replacement investment. Likewise, the prime rate is

subtracted from this ratio in order to reflect the direction in which the retained earnings/total sales ratio is heading.

### The Change in National Income

Eichner (1987) has postulated that the relationship between investment expenditure and national income is what is traditionally known as the "Accelerator Theory of Investment". According to the accelerator theory, investment is related to the change of national income. An increase in national income leads to an increase in demand for goods and services. When income is increased, it is necessary to invest in order to increase the capacity to produce more goods and services to satisfy this greater demand. Investment expenditure in plant and equipment will result from changes in income.

### Capital-Output Ratio

The capital-output ratio is defined as the ratio of the value of capital to total output. This ratio is based on the firm's judgement of its competitive situation, its need for investment spending to keep up with advances in technology, and on its expectations of the long-term development of its markets (Knell, 1992, p.430). The accelerator model creates the potential for investment spending to fluctuate a good deal. It asserts that the rate of investment is proportional to the change in the economy's Gross National Product (GNP). If investment expenditure is proportional to the change in output, then when the economy is in

a recovery, investment expenditure is positive, and when the economy is in a recession, investment will be negative.

#### Change in Sales

The sales of a prospective firm represents the amount of revenue resulting from sales other than services, after deducting sales and excise taxes, discounts, rebates, refunds, and intra-company sales (Corporation financial statistics, 1987, p.xxvii). The level of sales could be interpreted as affecting expectations of future output and thus affecting the rate of investment expenditure.

#### Capacity Utilization

Capacity utilization is a measure of a firm's ability to produce the largest output without encountering rising marginal cost. This variable measures the observed changes in the rates of capacity utilization in the preceding time periods specified by the model. By including this explanatory variable in my investment function, I hope to improve on alternative models of investment such as the accelerator or Kalecki model of business fixed investment. Rates of capacity utilization can highlight the demand for additional plant and equipment, as distinct from the availability of funds to finance that investment (Eichner, 1987, p.443).

## PART B: BUSINESS LENDING

Given the foregoing relationship between the corporation's projected growth in sales, its prices, and investment expenditures, the company's next problem must be to ensure adequate financing to underwrite future investments in order to ensure further growth and expansion. The company will have a policy based on the burden of debt it wishes to assume relative to its equity. For the corporate business sector, there are many sources of credit such as the commercial paper market. However, the corporations have come to rely on the commercial banks for their credit requirements for investment expenditures. Given this policy, the funds available to a corporation over the expansion period will consist of internal funds (profits) plus external funds (bank loans). These funds will be used to cover expenditure on plant and equipment, organizing sales and distribution networks, and meeting all operating costs. Thus,

$$R + B = I + OC \quad (9)$$

where the symbols stand, respectively, for revenue, bank lending, investments, and operating costs (i.e. labour costs, raw materials). Here bank lending, B, is represented in my model as the dependent variable, otherwise known as Nonfinancial Corporate Bank Loans (NFCBLs).

NFCBLs are defined as bank loans to nonfinancial corporations (eg. manufacturing sector) as a percentage of total credit market debt. The bank loans of nonfinancial corporations can be found in the current liabilities section of the corporate balance sheet.

The reason for specifying this variable is to highlight the direct link between business lending and other exogenous factors that may influence the lending decisions of many financial institutions. Factors that exert significant influence on the level of bank lending include retained earnings, the prime rate, commercial paper rate, the wage bill, and investment spending. When bank lending is expressed as a function of these determinants, we obtained the relation between NFCBLs and all the factors that determine it. Using functional notation, the bank lending function can be expressed as

$$\text{NFCBLs} = f(\text{RET}, \text{PR}, \text{W}, \text{INV}) \quad (10)$$

$$\text{NFCBLs} = f(\text{RET}, \text{CPR}, \text{W}, \text{INV}) \quad (11)$$

where NFCBLs = Nonfinancial Corporate Bank Loans, RE = retained earnings, PR = prime rate of interest, CPR = commercial paper rate, W = wage bill, and INV = investment spending. Each of these factors will be discussed in turn.

#### RETAINED EARNINGS

Retained earnings are defined as the cumulative total of annual earnings retained by a company after payment of all expenses and dividends. The Retained Earnings Statement of a corporation shows the amount of earnings which have been kept in the business either as cash or reinvested in new assets. The reason for including this variable in this model is to highlight the dependence of bank loans by the corporations (as a percentage of total market debt) during periods of declining earnings.

## WAGE BILL

The factors of production must be rewarded for the services that they provide. Labour is compensated by the payment of wages and salaries made to the many hundreds of thousands of workers employed in the private and public sectors of the economy. Supplementary labour income includes other payroll costs such as unemployment insurance contributions, and pension funds that employers pay on behalf of their employees. Thus, wages, salaries, and supplementary labour income make up what is known as the wage bill. The wage bill is included within the model in order to examine the direct links between business lending and changes that occur in the workers' labour income.

## Investment

When firms wish to undertake future investment projects and activities, they must obtain funds, either from internal revenues or from external sources (i.e. financial institutions). Firms that desire to acquire funds externally may approach the banking sector and receive loans at the given prime rate of interest. Therefore, the demand for loans by nonfinancial corporations may rise as a result of the need to finance their investment expenditures.

## Data Source

Data on capital expenditure in the manufacturing sub-industries was obtained from the Investment Statistics for Capital and Repair Expenditures, and Public and Private Investment in

## PART III - EMPIRICAL TESTING AND RESULTS

### INVESTMENT SPENDING

As discussed earlier, the importance of the composition of the household savings rate to the business savings rate may have implications in the movement of investments within a firm. It was argued that a higher household savings rate, other things equal, would reduce business profit, meaning that workers have a higher propensity to save. Given that retained earnings or undistributed profits act as a residual for business firms (after payment of interest costs and dividends), household savings play a causal role. Lower profitability by firms would reduce the rate of investment and future growth.

The way of capturing this effect is to estimate directly the statistical contribution of the various factors influencing the level of investment spending, and the rate of change of investment. Using double log transformations of the various model specifications outlined earlier, the dependent variable is regressed on the independent variables until all relevant variables have been specified. Employing Canadian annual data series for the period 1962-1987 led to the following results:

third refers to the t-ratios. In the first specification, the variable RA is the difference between the ratio of retained earnings to total value of assets and the prime interest rate. In the second specification, the variable RS represents the difference between the ratio of retained earnings to sales and the prime lending rate. The variable CAP represents the first difference of the capacity utilization rate in the manufacturing industry. The variables RA and RS are inserted into the specifications as levels, whereas the variable CAP represents the change in capacity utilization with a lag of one period.

The results of both specifications (1,2), particularly the second column where the constant term was suppressed, seem to support some of the ideals of post-Keynesian theory discussed earlier. The results of the third regression (rate of change of investment- I/GDP) in both specifications do to some extent support post-Keynesian theory. Despite this, the analysis will proceed with examining the more significant results of the second regression.

Firstly, there appears to be a strong positive relationship between the explanatory variable for capacity utilization and the level of investment spending. This relationship suggests that when sales are increasing, higher rates of capacity utilization are required to meet the increasing demand for output. As a result of higher sales, the cash flow of the firm will increase as output and sales receipt rise. In addition, further investments will result from the higher expectations of entrepreneurs for future profit.

According to Robinson (1978), once investment has been undertaken, a certain rate of profit will be realised which, in turn, determines the rate of profit expected on further investment. Investment depends on expectations of future profits and these are formed to a large extent on the basis of current and recent profits. On the other hand, the level of current profit depends on the investments that have already been undertaken (Reynolds, 1987, p.192). Conversely, a fall in sales revenue will lead to a lower rate of capacity utilization in the oligopolistic sector. The reduction in capacity rate is required to match the lower demand for output within the sector. Thus, the oligopolistic firms will generate much lower business savings or retained earnings. A reduction in realised retained earnings will translate into lower expected future corporate earnings, meaning less business investments and future growth within the industry. The rate at which discretionary funds are being generated is therefore quite sensitive to demand conditions, as reflected by the level of industry sales and/or the rate of capacity utilization (Eichner, 1987, p.474).

The "demand conditions" to which Eichner refers to is the demand for production goods by the household sector and rentiers, as defined in the Kaleckian theory of income distribution. The household sector, as discussed earlier, may either spend their income on consumption goods, or save their income by purchasing government or corporate bonds and securities, as well as savings deposits. In this case, if households increase their level of

savings (other things being equal), meaning lower demand for industry output, many oligopolistic firms will experience a lower rate of industry sales. Thus, a fall in sales revenue will lead to a reduction in capacity utilization within the oligopolistic firm.

Secondly, firms will experience a reduction in the private savings or 'discretionary funds' being generated. The presence of lower retained earnings feeds back into the ratios as described in column-2 of both specifications (1) and (2). In column-2 of specification (1), there is a positive correlation between the variable RA (retained earnings/total value of assets minus prime rate) and investment spending. Thus, a reduction in retained earnings would have the effect of reducing the ratio specified by the variable RA, while lessening future expected earnings. In column-2 of specification (2), the variable RS (retained earnings/total sales ratio minus prime rate) is positively related to investment expenditure. A fall in retained earnings will have a similar effect on the variable RS, in terms of declining total sales and future expected earnings. The Durbin-Watson results of suggest very little evidence of autocorrelation within the model.

An alternative specification will also be tested in Appendix A, where we introduce the ratio of investment to gross domestic product in manufacturing (INV/GDP).

The above results emphasize the function of the household savings rate in validating business investment and future expansion. If the household savings rate is increasing, other things being equal, retained earnings may also be increasing but at

a decreasing rate. The idea being that total savings as a whole may be rising which may reflect these changes. Therefore, the public savings to output ratio (S/Y) may be rising, while the business component of the ratio may be falling. At the same time, the changes in household savings may feed back on investment spending via this compositional component. Another way of capturing this effect is to present a graphical analysis illustrating the correlation between household and private savings rate.

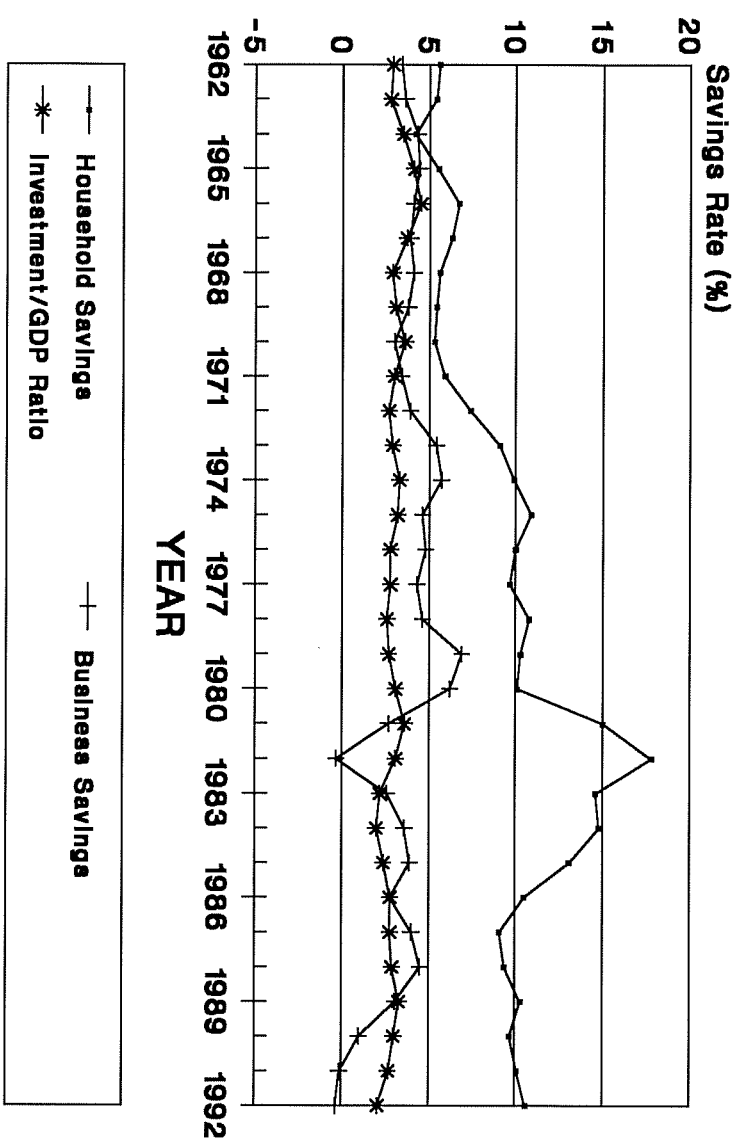
The graphical analysis of household vs business savings rate in **chart 1** provides an interesting look at the importance of the household savings rate in validating investment expenditure. More specifically, the impact that the household savings rate has on the compositional component of savings to output (S/Y). The graph modestly depicts the changes in the ratio of investment to GDP in response to fluctuations in business savings. The data utilized here covers the period from 1962 to 1992. The regression in **table 1** depicts the net correlation between household and business savings. By regressing business savings rate (BS) on the household savings rate (HHS), we are left with the following result:

**Table 1**

VARIABLE	CO-EFFICIENT	STANDARD ERROR	T-RATIO
HHS	-0.15115	0.8986E-01	-1.682
CONSTANT	5.0192	0.8886	5.648
R <sup>2</sup> = 0.0889	ADJ R <sup>2</sup> = 0.0575		
DW = 0.5649	F-STAT = 76.03		

# BUSINESS VS HOUSEHOLD SAVINGS RATE

Chart 1



Statistics Canada: National Accounts

Chart 1

During Canada's recession in 1982, the household savings rate peaked at 17.8%. During the same period, the business savings rate dropped to a low of -0.3%. In light of the recessionary periods in Canada, many firms experienced very little growth and investment. In 1982, the level of investment spending fell from just over 12 billion in 1981 to 11.4 billion (in constant dollars). This reduction in investment expenditure was reflected in a decline in the INV/GDP ratio from 3.6% in 1981 to 2.2% in 1983. At the same time, capacity utilization declined from a high of 79.9% in 1981 to 68.2% in 1982 (Corporate Financial Statistics, 1987). Concurrently, in 1987, the household savings rate fell to 9.1%, and the business savings rate rose to 4.0%. During this period, investment spending rose to just over 15 billion in constant dollars, and capacity utilization remained at 83.3%. Accordingly, the INV/GDP ratio increased from approximately 2.0% in 1984 to just over 2.8% in 1987.

The trend between household savings, business savings and investment seemed to continue during the recessionary period between 1990 and 1992. In 1992, the household savings rate rose to 10.6% whereas the business rate fell to -0.3%, from -0.1% in 1991. Investment spending declined from 21.1 billion to 14.3 billion (in constant dollars) between 1989 and 1992. The INV/GDP ratio fell from a high of 3.3% in 1989 to 2.1% in 1992. Capacity utilization fell from 81.1% to 74.8% during the same time period. By tracing graphically household savings versus business savings, we can see

the connection between this relationship and the level of growth and investment in Canada.

Two important points emerge from the graphical analysis presented above. Firstly, it indicates an inverse relationship between household savings and private or business savings. When one rate appears to be increasing, other things being equal, the other rate demonstrates a declining or falling trend, as evidenced by chart(1). Secondly, we can see the function of household savings in validating investment in the oligopolistic sector. A high level of household savings (declining business savings) appears to be associated with lower investment and growth, whereas a lower level of household savings implies higher corporate savings being generated by oligopolistic enterprises. As firms realise increasing profits, their expectations for future earnings are elevated by their current earnings. As a result, further investment and expansion may occur based on expected future profit rates.

#### BUSINESS LENDING

According to Seccareccia and Sharpe (1994, p.285), for macroeconomic profits,  $\Pi$ , to emerge and growth to take place, individual units must be prepared to spend in excess of their sectoral receipts and go into debt vis-a-vis the banking system. It was postulated earlier from Minsky's theory of financial crisis that the use of debt financing to increase profits may make a firm more vulnerable to conditions of interest rates in the credit market. In essence, rising interest rates may offset the

accumulation of retained earnings generated by firms during a boom period in the economy. Lower profitability, on account of higher financing costs, may reduce future expected profits, and with it the rate of investment. Spurred on by the reduction in their internal revenues, firms may be required to seek external finance in the form of loans from financial institutions to fund their planned investment expenditures. Given this relationship between the net rate of return for firms relative to the cost of financing, the following empirical results seek to emphasize the negative correlation between bank lending and financing investment through internally generated funds.

The way of capturing this effect is to estimate directly the statistical contribution of the various factors influencing the level of business lending. Using double log transformations of the various model specifications outlined earlier, the dependent variable is regressed on the independent variables until all relevant variables have been specified. Employing Canadian annual data series for the period 1962-1987 led to the following results:

DOUBLE-LOG REGRESSION III

SPECIFICATION 1

VARIABLE	CO-EFFICIENT	STANDARD ERROR	T-RATIO
RET(-1)	-0.47410-04	0.6100E-05	-7.772
PR	0.28844E-01	0.1155E-01	2.496
W	1.6588	0.1997	8.306
INV	0.36711	0.1889	1.943
CONSTANT	-9.8026	1.225	-8.005

R<sup>2</sup> = 0.9828      ADJ R<sup>2</sup> = 0.9788  
 DW = 1.7919      F-STATISTIC = 285.69

DOUBLE-LOG REGRESSION IV

SPECIFICATION 2

VARIABLE	CO-EFFICIENT	STANDARD ERROR	T-RATIO
RET(-1)	-0.46107-04	0.6329E-05	-7.285
CPR	0.27305E-01	0.1182E-01	2.310
W	1.6667	0.2034	8.195
INV	0.34286	0.1985	1.727
CONSTANT	-9.6666	1.273	-7.594

R<sup>2</sup> = 0.9828      ADJ R<sup>2</sup> = 0.9788  
 DW = 1.7885      F-STATISTIC = 285.69

where the dependent variable, NFCBLs = nonfinancial corporate bank loans. In the first specification, the variable PR represents the level of the prime interest rate. In the second specification, the variable CPR represents the 3 month commercial paper rate. It also acts as a proxy for the prime lending rate. The variable RET (lagged one period) represents retained earnings, W, the level of wages, and INV, the level of investment spending.

The outcome of the regression analyses seems to focus on the relationship between the undistributed profits of the business enterprises, and the amount of nonfinancial bank loans they receive. The results of regressions (III) and (IV) suggest a negative relationship between NFCBLs and retained earnings. Thus, during a boom period in the economy in which firms enjoy rising

internal funds, there is less demand for external finance (loans) from the banking sector. Similarly, firms increase their debt financing during periods of falling demand for their production goods within the economy. The corporate sector seeks to borrow funds in an effort to finance their current production activities and payment obligations, with the full intention of repayment of principal and interest at a future specified date.

The wage variable,  $W$ , appears to exhibit a strong positive relationship with business loans, NFCBLs. The wage variable is the more influential of the four variables, since it has the higher  $t$  value. Thus, a rise in the wage bill will have the effect of raising a firm's cost of production. In order to finance the higher costs of production, the firm will increase its demand for business loans. The evidence presented from regression (III) and (IV) appear to support the idea that an increase in financing costs will ultimately lead to more firms borrowing funds to finance their expenditures.

The investment variable exhibits a weak albeit, positive relationship with business loans, NFCBLs. This tells us that firms may finance a portion of their investment projects from loans acquired from bank lenders. This may explain why investment expenditure exhibits a somewhat positive relationship with the demand for business loans. The results of both Durbin Watson tests indicate no signs of positive or negative autocorrelation.

The prime rate and commercial paper rate appear to exhibit a positive relationship with the demand for business loans. Both the

prime and commercial rates appear to be influential as evidenced by their high  $t$  values. The results of the regression suggest that as interest rates increase, all other things being equal, demand for loans, will increase. According to Wray (1990), when banks make loans they check their own level of liquidity, that is the ratio of loans, to equity and the ratio of loans to safe assets such as government bonds and reserves. These ratios rise in boom times (Lavoie, 1992, p.200). Thus, banks of the same size rely on these ratios and prudent guidelines to extend credit money to satisfy business expenditures. Lavoie (1992, p.201) asserts that the norms to follow are if all banks are expanding in step, all banks will experience similar transformations of their balance sheet. As a result, banks wishing to make additional loans which carry comparable degrees of risk as previous loans may require higher rates of interest to compensate for more vulnerable leverage ratios. This influence, of course, operates from the side of supply, not demand.

Wray (1992) claims that an increase in spending by itself need not have any impact on interest rates. This is the case if banks are willing to accommodate by expanding their balance sheets, and thereby take more illiquid positions, without requiring interest rates to rise. In other words, it is the liquidity preference which determines interest rates, and not the demand for loans. However, since the supply of credit is also related to profit expectations, money demand and LP are interdependent. When profit expectations are low, liquidity preference increases and, at the

same time, credit rationing replaces accommodative behaviour since bankers become increasingly unwilling to meet the demand for credit.

The positive correlation between the demand for business loans and both the prime and commercial paper rates are also supported by Minsky's (1982) theory of financial crisis. As the weight of debt financing (NFCBLs) in the business financial structure increases, the weight of discretionary funds in corporate portfolios declines. As was discussed earlier, interest rates may rise regardless of a tight monetary policy, due to the assumption of a relatively inelastic supply of funds (see Wolfson, 1986, p.22-23). An increase in the interest rate, followed by rising firm demands for bank loans, also has the effect of increasing the number of firms falling into speculative and Ponzi finance. Firms that find themselves in either of these economic units must continually expand their borrowing to meet payment commitments. As more firms seek out financial loans to finance their debt obligations, investment expenditure will decline. This is because rising interest rates reduce investment as some banks are unwilling to undertake the increase in perceived risk in financing some investment projects. Accordingly, investment is also reduced because their expected future yields may appear unattainable, due to a rise in the costs of financing (interest rate). The decline in investment eventually leads to the fall in retained earnings. Thus, there appears to be a significant relationship between the net rate of return (RET) for firms and the cost of financing

investment. As long as interest rates do not increase (i.e. central bank anti-inflation policy) to offset retained earnings, the corporate firms will enjoy high investment or growth.

The interest rate variables, albeit positive and insignificant, are somewhat volatile and do show a high degree of sensitivity to the specification of the model. In Appendix A, the model on business lending is presented in an alternative specification which does lead to a reversal of the sign. The implications of this specification demonstrate the questionable nature of the interest rate variable.

#### **PART C: INFLATION AND INVESTMENT FINANCING**

The most important single variable needed to test the post-Keynesian hypothesis on inflation is the series on the level of investment spending in the manufacturing sector (INV). A second series which was thought to be useful as a possible indicator is the series on unit labour costs (wage rate divided by average productivity). Annual data on indexes of unit labour costs are published by Statistics Canada for the period 1946-1975. Finally the series on raw and partly manufactured materials was included to enhance further the explanatory power of the relationship. According to Kalecki (1990), changes in the price of raw materials may indeed affect the cost side leading to changes in commodity prices. This series was found in the Statistics Canada's price index for all manufacturing industries for the period 1946-1975.

Specifically, using double log transformations, the consumer price index (P) for the period 1946-1975 was regressed on the changes in unit labour costs (ULC), raw and partly manufactured materials (RM), and the rate of change of investment. With the constant term suppressed, we arrived at the following results:

DOUBLE LOG REGRESSION V

VARIABLE	CO-EFFICIENT	STANDARD ERROR	T-RATIO
$\Delta$ ULC	0.49306	0.1021	4.831
$\Delta$ RM	0.29491	0.5712E-01	5.163
$\Delta$ INV/INV	47.274	19.42	2.434
CONSTANT	0.55641E-02	0.5228E-02	1.064

R<sup>2</sup> = 0.9988      ADJ R<sup>2</sup> = 0.9987  
 DW = 2.1767      F-STAT = 7546.24

The results of the regression appear to support our theoretical analysis we derived earlier. The coefficient of each independent variable in the empirical relationship has been shown to exhibit a positive relationship to changes in the consumer price index. This implies that any increases in either one of the three independent variables may be an additional factor on the cost side leading to a rise in the price of consumption goods (inflation). More specifically, all three variables are significantly related to the consumer price index. The variables for unit labour costs and raw and partly manufactured materials appear to be the more influential as illustrated by their higher t values. Thus, increases in the

price of consumption goods would be directly influenced by the additional factors on the cost side.

The results from regression (V) illustrate that all the coefficients of our variables turned out to be very significant. In fact, over 95 percent of the variation in industrial product prices was explained by these three variables alone. The results of the Durbin Watson test reveal no evidence of autocorrelation. Thus, the empirical evidence for the period 1946-1975 provides ample support for the post-Keynesian hypothesis as to inflation.

Appendix A presents an alternative specification which examines the influence that the ratio of investment to GDP in the manufacturing sector (I/GDP) has on the price of consumption goods. Other factors contained in this regression include unit labour costs and raw and partly manufactured materials.

#### **PART IV Policy recommendations and Conclusions**

The results of the preceding empirical relations based on post-Keynesian theory highlight three critical points. Firstly, the significance of household savings in validating investment expenditure. When households or workers reduce their consumption of firms' output (higher proportion to save), much of the savings may be in the form of corporate or government bonds or securities. A higher household savings, other things being equal, implies a reduction in the flow of undistributed profits to corporate firms. A higher proportion to save out of disposable income, ceteris paribus, will reduce the level of sales, capacity utilization

rates, and retained earnings. Lower realised profits will reduce the expectations of future profits, and further investment and growth.

Secondly, we have learned that increasing interest rates (i.e. central banks' anti-inflation policies) will offset the accumulation of retained earnings flowing to the firms. Thus, as households purchase an increasing amount of interest bearing financial assets (attracted by high rates of return), the business savings generated from higher profit will decline. In addition, firms that are unable to generate sufficient revenue internally will have to resort to increasing their demand for nonfinancial corporate loans to finance further investment activities.<sup>5</sup>

Thirdly, we were able to examine the link between investment activity and inflation within an oligopolistic market structure. We discovered that factors such as unit labour costs and raw and partly manufactured materials, which are highly cyclically sensitive, contributed to the rise in inflation. In addition, an increase in the flow of investment in relation to current levels of production of consumption goods was associated with the emergence of inflation. The results of the empirical research using Canadian observations for the period 1946-1975 were quite positive. Thus, increases in the price of consumption goods would be directly influenced by the factors on the cost side.

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<sup>5</sup> This sequence was analyzed within the framework of the "monetary circuit" discussed earlier in Part I of this paper.

The analysis of the empirical relations presented earlier was made possible through the adoption of the post-Keynesian or oligopolistic pricing model of firm behaviour. The ability of the oligopolistic model to avoid the pitfalls faced by both the Walrasian and Marshallian models (refer to Part I) make it a much more practical method in observing firm pricing behaviour in a market economy.

Appendix A

Investment Spending

In this section we test the investment equation by introduce the ratio of investment to gross domestic product in manufacturing (INV/GDP).

DOUBLE LOG REGRESSION i

SPECIFICATION 1

$I = f(RA, \Delta CAP)$	$I = f(RA, \Delta CAP)$	$I/GDP = f(RA, \Delta CAP)$
RA      -0.001 (0.64E-02) [-0.1567]	0.4595E-02 (0.1846E-02) [2.489]	0.39949E-06 (0.1294E-05) [0.3034]
$\Delta CAP$ 1.608 (0.04566) [35.22]	1.5968 (0.4386E-01) [36.41]	0.46438E-04 (0.9239E-06) [50.27]
CONST 0.1167 (0.1277) [0.9143]	-----	0.80009E-06 (0.2583E-05) [0.3098]
R <sup>2</sup> .9838	.9832	.9920
Adj R     .9823	.9825	.9913
DW       1.5633	1.5734	1.7339
F-stat    499.04	753.29	1007.90

$\Delta$ INV	0.15868	0.1458	1.088
CONSTANT	0.17131	0.6291E-01	2.723
$R^2 = 0.9955$	$ADJ R^2 = 0.9946$		
DW= 1.9595	F-STATISTIC = 1106.11		

DOUBLE-LOG REGRESSION iii

SPECIFICATION 2

VARIABLE	CO-EFFICIENT	STANDARD ERROR	T-RATIO
RET(-1)	-0.2064E-05	0.1940E-05	-1.064
CPR	-0.98698E-02	0.8876E-02	-1.112
$\Delta$ W	0.69455	0.1221	5.690
$\Delta$ INV	0.15647	0.1489	1.051
CONSTANT	0.15084	0.5891E-01	2.561

$R^2 = 0.9953$        $ADJ R^2 = 0.9945$   
 DW = 1.9527      F-STATISTIC = 1058.83

The results of the regression analysis reveal some similarities concerning the signs of the independent variables. The negative coefficient for retained earnings obtained in regressions 1A and 1B reflect the earlier results obtained from regression III and IV. These results suggested that a rise in the accumulation of retained earnings will reduce the demand for business loans. Accordingly, the variables for investment and wages in regressions 1A and 1B exhibit a positive relationship with the demand for business loans. As both the level of wages and investment increase, so too does each firm's demand for loans to finance those expenditures. A similar outcome was obtained from regressions III and IV concerning

the independent variables for wages and investment. The results of both Durbin Watson tests indicate no signs of positive or negative autocorrelation.

The dissimilarity with both sets of regression equations lies with the significance of the t values. The t values obtained from regressions 1A and 1B (double-log transformation of changes) illustrate variables that are less influential as evidenced by the lower t values. The t values obtained from regressions III and IV (double-log transformations of levels) are much higher and appear to be more influential. In addition, the positive constant terms obtained from regressions 1A and 1B are opposite of those obtained from regressions III and IV. These results highlight the fact that the interest rate variables are highly sensitive to specification in the worst case, and must be handled with care. They also suggest the volatile nature of the prime and commercial rate variables as they are incorporated into our model for business lending.

#### Inflation Model

This section tests the influence that the ratio of investment to GDP (I/GDP), along with the other specified factors, have on the price of consumption goods. The regression yielded the following results:

<u>DOUBLE LOG REGRESSION iv</u>			
VARIABLE	CO-EFFICIENT	STANDARD ERROR	T-RATIO
ΔULC	0.71448	0.9389E-01	7.610

$\Delta RM$	0.32338	0.5853E-01	5.525
I/GDP	-0.58301E-01	0.3694E-01	-1.578
CONSTANT	-0.20181	0.1283	-1.572
$R^2 = 0.9986$	$ADJ R^2 = 0.9985$		
$DW = 1.6096$	$F-STAT = 5075.292$		

## BIBLIOGRAPHY

Bank of Canada Review (1962-1992)

W.J. Baumol, Behaviour, Value and Growth, Rev. Ed., Harcourt, New York, 1967.

S. Bober, Pricing and Growth; a neo-Ricardian Approach, M.E. Sharpe, New York, 1992.

G.F. Boreham and R.G. Bodkin, Money Banking and Finance: The Canadian Context, Fourth Edition, Holt, Rinehart and Winston of Canada, Toronto, 1993.

D.P. Broer, Neoclassical Theory and Empirical Models of Aggregate Firm Behaviour, Kluwer Academic Publishers, Boston, 1987.

A.S. Eichner, The Macrodynamics of Advanced Market Economies, M.E. Sharpe, Inc, New York, 1987.

A.S. Eichner, A Guide to Post-Keynesian Economics, M.E. Sharpe, Inc, New York, 1979.

A. Graziani, "Keynes's Finance Motive", Economies et societes, 21(9), septembre 1987.

A. Graziani, "The Theory of the Monetary Circuit", Economies et societes, 24 (6), juin 1990.

G.C. Harcourt and P. Kenyon, Pricing and the Investment Decision, University Press, Cambridge, 1976.

M. Kalecki, Capitalism: Business Cycles and Full Employment, Clarendon Press, Oxford, 1990.

M. Knell, Socialist Economies in Transition: Appraisals of the Market Mechanism, Aldershot, England, 1992.

C. Kurdas, Macroeconomic Theory: Diversity and Convergence, University Press, Cambridge, 1992, pp.167-188.

M. Lavoie, Foundations of Post-Keynesian Economic Analysis, Aldershot: Edward Elgar, 1992.

R. Marris and A. Wood, The Corporate Economy, MacMillan and Co Ltd, 1971.

H.P. Minsky, "Capitalist Financial Processes and the Instability of Capitalism", Journal of Economic Issues, 14(2), June 1980.

B.J. Moore, Horizontalists and Verticalists, The Macroeconomics of Credit Money, Cambridge University Press, Cambridge, 1988.

National Income and Expenditure Accounts, annual estimates  
(1962-1992)

A. Parguez, "L'inflation zéro: un état idéal ou l'objectif impossible", Economies et sociétés, 25 (111-12), novembre-décembre 1991.

G.C. Reid, Classical Economic Growth: An Analysis in the Tradition of Adam Smith, Basil Blackwell Ltd, New York, 1989.

P.J. Reynolds, Political Economy, St. Martin's Press Inc, New York, 1987.

J. Robinson, Contributions to Modern Economics, Basil Blackwell Ltd, Oxford, 1978.

J.A. Sawyer, Macroeconomic Theory: Keynesian and Neo-Walrasian Models, Harvester Wheatsheaf, New York, 1989.

M. Seccareccia, "The Fundamental Macroeconomic link between Investment Activity, the Structure of Employment and Price Changes: A Theoretical and Empirical Analysis", Economies et sociétés, p.165-219, Serie MP no. 1, April 1984.

M. Seccareccia and A. Sharpe, "Canada's Competitiveness: beyond the Budget Deficit", Economies et sociétés, p.275-300, janvier-fevrier 1994.

J. Selody, "The Goal of Price Stability: A Review of the Issues", Technical Report No. 54, Bank of Canada, May 1990.

B. Stanley, Pricing and Growth: A Neo-Ricardian Approach, M.E. Sharpe, Inc, Armonk, 1992.

Statistics Canada, Corporate Financial Statistics (1962-1987)

Statistics Canada, Canadian Economic Observer (1962-1992)

Statistics Canada, Capital and Repair Expenditures: Manufacturing Sub-Industries (1962-1992)

Statistics Canada, Industry indexes for all Manufacturing Industries, (1976-1992)

J. Steindl, Maturity and Stagnation in American Capitalism, Monthly Review Press, New York, 1976.

M. Wolfson, Financial Crises, Armonk: M.E. Sharpe, 1986, Chapters 2-3, 10-12.

A. Wood, A Theory of Profits, Cambridge University Press, London, 1975.

L.R. Wray, "Alternative Theories of the Rate of Interest",  
Cambridge Journal of Economics, 16(1), March 1992.

L.R. Wray, Money and Credit in Capitalist Economies: The Endogenous  
Money Approach, Aldershot: Edward Elgar, 1990.

