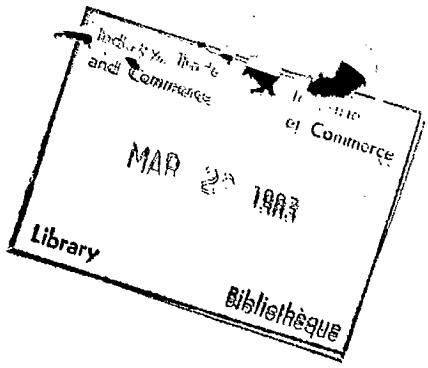

GOVERNMENT BORROWING AND THE RESPONSE OF CONSUMER CREDIT IN CANADA

by

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INTRODUCTION

Consumer credit totals approximately 19% of all assets of financial institutions in Canada while government debt in private hands represents close to 30%*. Yet to date the effect of changes in government borrowing on the demand for consumer credit has not been analyzed as an issue of fiscal policy or as a component of the social opportunity cost of public funds in Canada.

Previous estimates of the social opportunity cost of public funds have included changes in consumer credit in the measure of saving and have derived a social opportunity cost of saving for the combined total. This study of the demand for consumer credit in Canada indicates that the effect of increased sales of government securities and loans to the private sector will decrease consumer credit demand by 7.5% of these increased sales. It also attempts to isolate the social opportunity costs which arise from a reduction in consumer credit.

In Chapter One, the established measure of the social opportunity cost of public funds is explained as well as the basis for separating consumer credit from positive saving when using this measure. In Chapter Two, the discussion

*Calculated from Bank of Canada, Bank of Canada Review, 1969 and 1979.

shifts to the Canadian consumer credit market and the model of consumer credit demand in Canada. In Chapter Three, we derive the implications of the results on the social discount rate for Canadian public sector projects.

CHAPTER ONE: THEORETICAL ASPECTS OF THE SOCIAL OPPORTUNITY COST OF FUNDS AND CONSUMER CREDIT MARKETS

1.1 INTRODUCTION

The established method* of measuring the social opportunity cost of public funds has conventionally used the capital market as a plausible marginal source of funds for government-financed investment projects. The social opportunity cost (SOC) of such funds reflects the costs incurred by the private sector when an increase in interest rates is caused by government sourcing.

In a closed economy two types of private sector activities are recognized to be affected and to give rise to opportunity costs. Private investors are induced to curtail investments and forgo future income streams and consumers are induced to save a greater amount of their incomes at the expense of current consumption. In an open economy, foreign borrowing is recognized to be affected by a change in the interest rates and the opportunity costs which arise from this effect are taken into account.

Consumer credit, which is part of negative savings, is included in the standard approach in that it is incorporated in the measure of total personal saving.

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*The version referred to in this study is that expounded by Professor Arnold C. Harberger in Project Evaluation: Collected Papers (Chicago, Ill.: University of Chicago Press, 1976).

Consumer credit is another important source of funds in the domestic capital markets. It has a different interest rate elasticity and a different SOC than positive savings due to a different market structure and market distortions. A measure combining positive saving and consumer credit would not reflect their differences. Hence a measurement of the social opportunity cost of public funds that does not treat consumer credit as a separate source of funds for public projects will be biased.

A reconciliation with established theory is possible if the SOC associated with a dollar of total personal saving were a weighted average of the SOC of a dollar of consumer credit and a dollar of positive saving. The weights should represent the respective shares in the amount of funds forthcoming due to the rise in interest rates.

1.2 DERIVATION OF THE SOCIAL OPPORTUNITY COST OF OF PUBLIC FUNDS

A major problem project evaluators face is determining the appropriate discount rate with which to discount the multiperiod costs and benefits generated by the project. For private sector projects the appropriate discount rate is the marginal productivity of capital which can best be approximated by the private market-determined cost of capital. However, government financed projects require a different treatment since the social discount rate should reflect the marginal productivity of capital in the economy

as a whole. The difference in the two approaches arises when there are externalities not perceived by the individual investor.

To incorporate all externalities, the measure of the social discount rate includes all social costs related to the marginal sourcing of funds to finance public sector projects: That is, the marginal costs to society of providing these funds. In most economies, governments obtain their funds from a variety of sources including taxes, the sale of services, and borrowing. Because of its high degree of flexibility and the actual practice of governments, it is government borrowing from the country's capital market that represents the marginal source of funds. Likewise if a project is not undertaken and surplus funds exist in the budget, they are injected into the capital market through the retirement of public sector debt. This leads us to the conclusion that the social value of funds in the capital market reflects the marginal SOC of public funds.

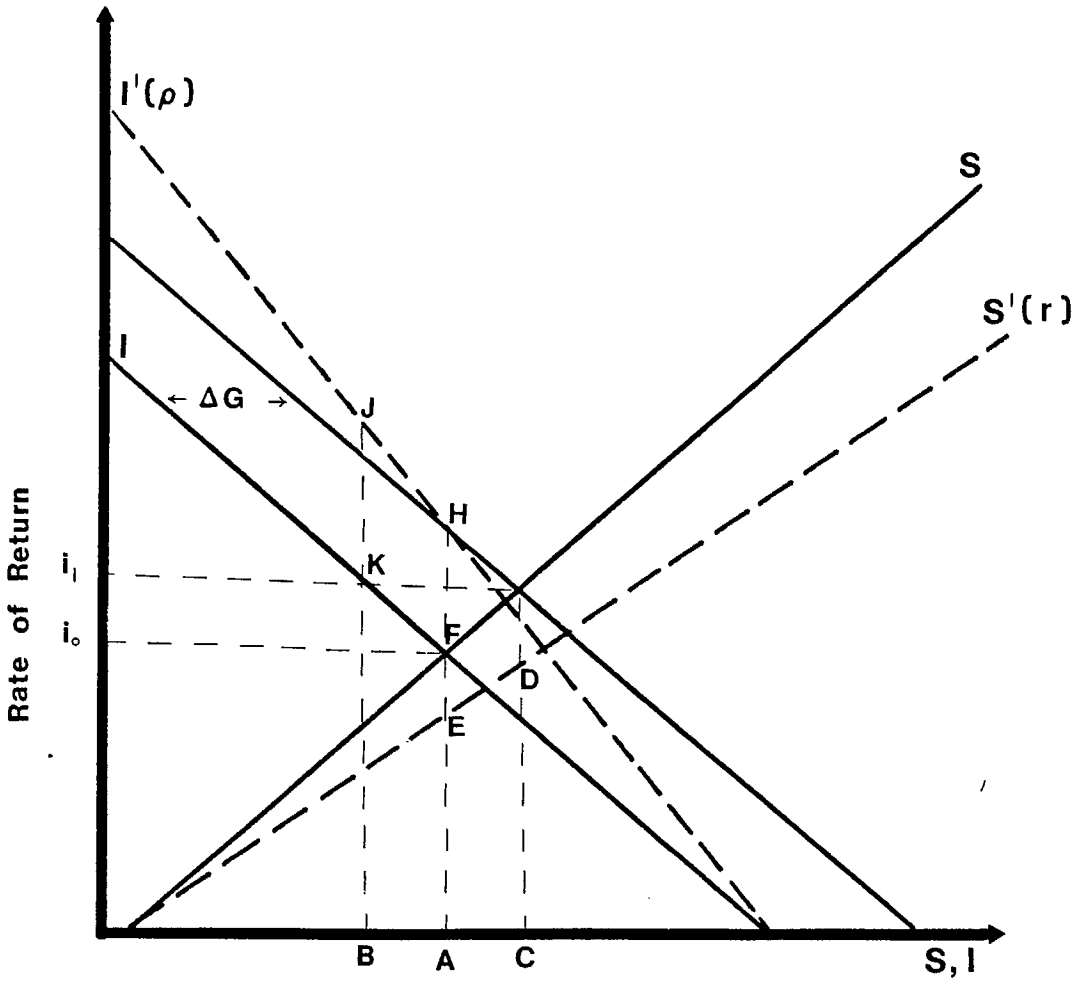
When the government extracts funds from the private capital market, the extra demand for funds will raise the interest rates in all segments of the market. In reaction to increases in the interest rates, funds are made available by increased private sources and decreased private uses. The traditional analysis aggregates all sources into private saving and all uses into private investment. The SOC of public funds then includes the SOC of forgone consumption

due to increased saving and the SOC of forgone claims to future income streams due to curtailed investment. These opportunity costs in turn are determined by weighting each activity's share of total funds forthcoming by its social rate of return. The social rate of return on saving is the marginal rate of time preference, measured by the net of personal tax yield on saving. The social rate of return on investment is the social marginal productivity of capital, measured by the gross of tax cost of capital.

Figure 1 summarizes this analysis. I and S are the tax-distorted investment and saving schedules intersecting at the market interest rate, i_0. I' is investment as a function of the social marginal productivity of capital, ρ, which differs from the market interest rate by capital market distortions the most important of which are taxes, τ. Therefore $\rho \simeq i /(1 - \tau_C)$. S' is saving as a function of the marginal rate of time preference, r, which also differs from the market rate of interest due to distortions the most important of which are personal taxes. Therefore $r \simeq i(1 - \tau_P)$. The tax-distorted equilibrium is depicted by H and E.

The capital market is represented by the demand for funds schedule, the investment schedule, I; and the supply of funds schedule, the saving schedule, S. As the government enters the market with an extra demand for funds ΔG, the market interest rate is pushed up from i_0 to i_1 to accomodate it. The funds forthcoming are represented by BC.

Figure 1



Forgone consumption will have contributed AC and postponed investment, BA. The opportunity cost of increased saving is the cost of forgone consumption which is measured by the area under the marginal rate of time preference schedule, ACDE. The opportunity cost of forgone investment is the sum of forgone tax payments which that investment would have yielded to the government, area FHJK, and the net of tax yield to the private investor, area BAFK. The total social opportunity cost of curtailed investment is then the area under the marginal productivity schedule, area BAHJ. Therefore the total opportunity cost can be expressed in continuous terms as:

$$SOC = r \frac{\partial S}{\partial r} \cdot \frac{\partial r}{\partial G} - \frac{\partial I}{\partial \rho} \cdot \frac{\partial \rho}{\partial G}$$

The social discount rate is the SOC per unit, or:*

$$\omega = \frac{r \frac{\partial S}{\partial r} \cdot \frac{\partial r}{\partial G} - \rho \frac{\partial I}{\partial \rho} \cdot \frac{\partial \rho}{\partial G}}{\frac{\partial S}{\partial r} \cdot \frac{\partial r}{\partial G} - \frac{\partial I}{\partial \rho} \cdot \frac{\partial \rho}{\partial G}}$$

With an open capital market, a third source of funds is recognized. Foreign borrowing or international capital flows are also affected by the increased demand for funds.

*This can be refined further by determining $\partial r / \partial i$ and $\partial \rho / \partial i$ and expressing the formula in terms of ∂i. If all distortions could be expressed as linear adjustments to i such as $r = i(1 - \tau_p)$ and $\rho = i/(1 - \tau_c)$ then it would be possible to conclude that an increase in government debt will raise both social rates of return by the same percentage, however since we will be applying this theory to empirical analysis, this cannot be assumed and it is preferable to discuss the opportunity cost of funds using the different social rates of return, r and ρ.

Assuming that the country is large enough such that it faces a rising supply schedule of external funds, then government sourcing will raise interest rates and cause an inflow of foreign capital. These extra funds, weighted by their social rate of return, which are measured by the net of withholding tax international cost of capital, are added to the opportunity costs of saving and investment.

This briefly describes the established approach at deriving the social opportunity cost of public funds. For simplicity it categorizes all sources of funds as either saving, investment or foreign borrowing.

1.3 CONSUMER CREDIT AS ANOTHER SOURCE OF FUNDS

Consumer credit represents approximately 19% of financial institutions' assets and can be regarded as a major use of funds in the private capital market in Canada where the consumer credit market is one of the most developed in the world.

Previous methods of measuring the SOC of funds do in fact include consumer credit but do not consider it as a separate source of funds for government sourcing, with a unique SOC. Additions to consumer credit are included in the statistical measurement of personal saving and is weighted by the marginal rate of time preference, which is measured by the net of tax yield on saving.

As measured in the National Accounts in Canada, the personal sector is the residual sector of the economy once industry, commerce and agriculture sectors have been taken into account in measuring national income.* It includes such activities as non-commercial institutions, and unincorporated businesses. Personal saving is defined as personal disposable income less personal consumption expenditures, less transfers to other sectors. Personal savings thus contains not only an unidentifiable amount of business retained earnings, but also any domestic or foreign amount of personal borrowing. Contractual saving in the form of private pension plans are also included in this measure. By far the greatest non-positive personal saving item included in the measure of saving is consumer credit. In Canada, the net increase in consumer credit outstanding averaged 5.3% of net personal saving in real terms during the period 1962 to 1980. We can safely assume that the measurement of saving is actually the sum of positive saving and consumer credit.

Due to the presence of financial intermediaries which must bear certain transaction costs, taxes, risk premia and earn normal profits, the borrowing rate is higher than the lending rate. This disparity causes a disparity between the marginal rate of time preference and the valuation placed on consumer credit by borrowers. The part of this disparity

*Statistics Canada, National Income and Expenditures Accounts, Vol. 3, Catalogue No. 13-549E.

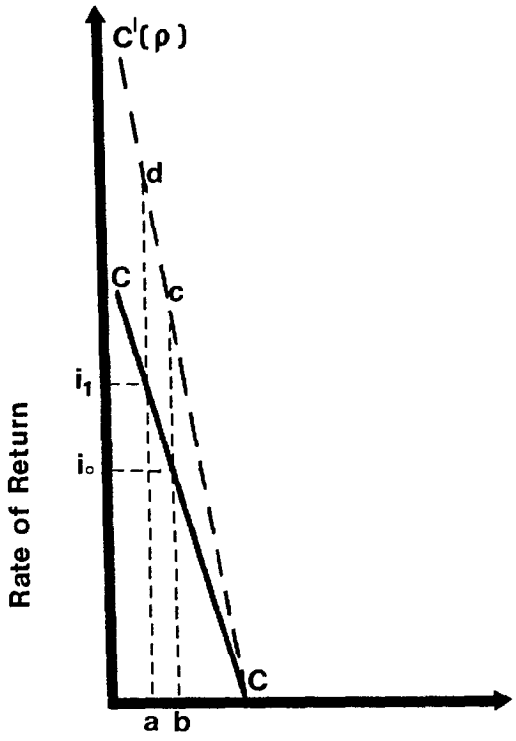
due to taxation of financial institutions will cause a disparity between the social opportunity costs of saving and of consumer credit. The rate of return on consumer credit which reflects only those distortions is ρ .

Figures 2a, 2b, and 2c depict the analysis of the SOC of saving. The total saving supply schedule, TT, is the difference between the positive saving supply schedule, SS, and the consumer credit demand schedule, CC. The distorted equilibrium given the market rate of interest, i , is depicted by c , j , and n . TT´ , SS´ , and CC´ are the total saving, positive saving and consumer credit schedules as functions of their respective rates of return, $\bar{r}$, r , and ρ .

As government borrowing increases all interest rates, the social opportunity cost of total saving can be measured by the opportunity cost associated with its two components. The SOC of positive saving is the area under the SS´ curve, representing the marginal rate of time preference for each increment of saving forthcoming, area fghj . The SOC of consumer credit demand forgone is the area abcd , the area under the CC´ curve representing the rate of return ρ on each dollar of consumer credit forgone.

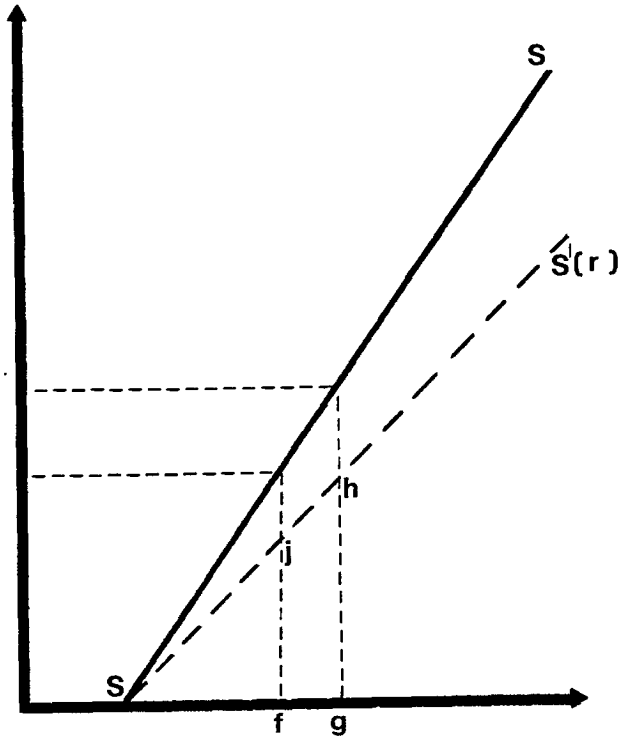
If the social rate of return on total saving is constructed so as to include the market distortions of both saving and consumer credit, the social opportunity cost of an increase in total saving measured by the area klmn will exactly

Figure 2a



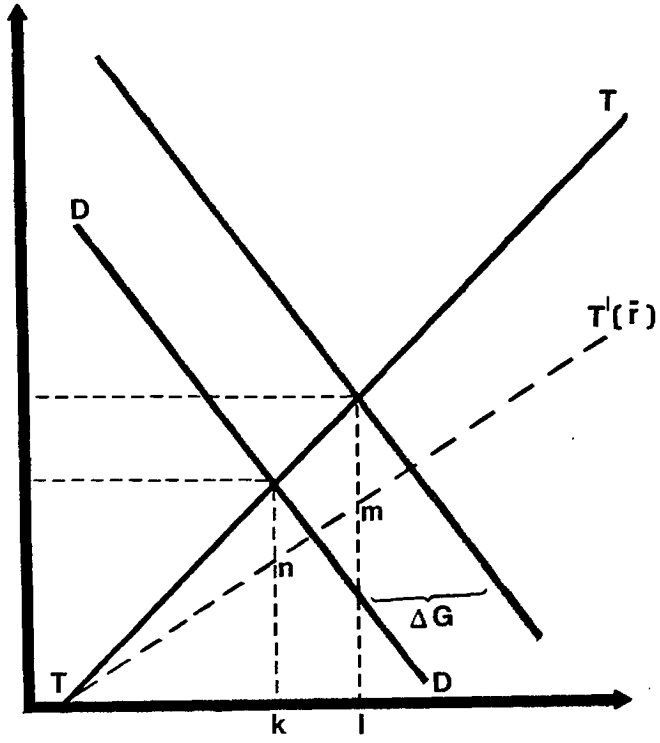
Consumer Credit

Figure 2b



Positive Saving

Figure 2c



Total Saving

equal the opportunity cost of an increase in positive saving, fghj , plus the opportunity cost of a decrease in consumer credit demand, abcd . The social rate of return which will properly weight the effect of all distortions in the measure of the opportunity cost of total saving is:

$$\bar{r} = \frac{r \frac{\partial SS'}{\partial r} - \rho \frac{\partial CC'}{\partial \rho}}{\frac{\partial SS'}{\partial r} - \frac{\partial CC'}{\partial \rho}}$$

If consumer credit is completely insensitive to the interest rate, this rate of return will equal the marginal rate of time preference. If positive saving is completely insensitive to the interest rate, then this rate of return will equal the social rate of return on consumer credit. If both saving and consumer credit demand are sensitive to interest rates, then it is a weighted average of their social rates of return where the weights are their respective shares in the funds released in consequence to government sourcing.

Using the established method of measuring the SOC of funds, most researchers have been using a measure of the marginal rate of time preference as the social rate of return on total saving, i.e. $\bar{r} = r$. We can now see that this method understates the true SOC of public funds under two conditions:

1. if consumer credit demand is interest elastic, and

2. if the social rate of return on consumer credit is greater than the marginal rate of time preference. This will usually be the case when there are personal income taxes and taxes on financial institution operations.

The rest of this paper is devoted to researching these two conditions.

1.4 STRUCTURE OF CONSUMER CREDIT MARKETS

1.4.1 Introduction

Consumer credit is short term credit extended by financial institutions to private consumers to finance final consumption of goods and services or to refinance such debts. Consumer credit is not a homogeneous product. The major categories of credit differ in their purpose and method of repayment. There are cash loans and vendor credit (or point-of-purchase loans) each of which differs according to the terms dictated by the lending institution. Where a cash loan is not tied to a particular purchase, vendor credit is. Another distinction is made between instalment and non-instalment credit: Credit repayed in equal instalments over a fixed period as opposed to a lump sum type of repayment. The distinction between these categories

is less clear-cut since, in many cases, one has the option to switch from one type of repayment to the other.

Through observation of credit uses and borrower characteristics, it has been concluded that consumer credit demand is insensitive to interest rates. However, the existing literature analyzing market equilibrium in credit markets determines credit markets to be in a state of permanent disequilibrium and that rationing prevails in both the commercial and consumer credit markets. Market distortions (such as government interest rate ceilings, and price stickiness caused by transaction costs or oligopolistic behavior among financial institutions) have allowed the non-interest rate terms of credit to create a market of heterogeneous goods. Rationing is a description of such a market. Interest rate elasticity of demand becomes irrelevant to the market clearing mechanism and there has been no successful attempt to measure it empirically as of yet.

1.4.2 Credit Uses and Borrower Characteristics

The two methods of credit distinction were thought to be important because their cyclical and secular behavior differed as well as their responsiveness to monetary and fiscal policy. Uses of consumer credit are varied and depend on the characteristics of the borrowers however much evidence points out that instalment credit is chiefly used

for financing consumer durable expenditures*--a trend influenced greatly by increased credit card use. In studies of the cyclical fluctuations of the volume of credit, demand for instalment credit has shown to be cyclical and demand for cash loans "showed traces of anticyclical behavior."** This confirmed that most instalment credit is used for purchases of consumer durables, which have a very high and positive income elasticity of demand because they can be easily postponed during recessions and bought during expansions. It also confirms that cash loans are used to cushion negative impacts of the business cycle. Used as emergency money, cash loans increase when incomes fall. However, since cash loans are becoming more prevalent and replacing vendor credit, they are being used for consumer durable expenditures as well and the distinction between instalment credit and cash loans is no longer relevant.

The characteristics of the borrowers and uses of credit determine the sensitivity of demand for credit to the price of credit i.e. the terms of credit. The terms of credit include the finance charge, the downpayment ratio, and the length of the contract***. In instalment credit, all three

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* U.S. Board of Governors of the Federal Reserve System, Consumer Instalment Credit. Part I: Growth and Import, Vol. 1 and 2 (Washington, D.C.: U.S. Government Printing Office, 1957).

** Gottfried Haberler, Consumer Instalment Credit and Economic Fluctuations, (New York: National Bureau of Economic Research, 1942), p. 6.

***Compensating balance requirements and service charges are used to a lesser extent as non-interest rate terms of credit.

determine the size of the instalment payment. Consumer credit has been observed not to be sensitive to interest rates but rather to the size of the instalment payment.* On studying the effects of length of contract and size of downpayment on credit volume, Moore and Klein found high correlations between these terms and the volume of instalment credit extended in the U.S.**

Juster and Shay explain the low interest rate elasticity of credit demand by classifying most consumer credit borrowers as rationed borrowers. The rationed borrowers are less responsive to interest rates and more responsive to the other terms while the unrationed borrowers are more responsive to interest rates. The rationed borrowers are those people for whom the maturity limits and minimum size of downpayment represent binding constraints on their demand for credit. They would be willing to pay a higher interest rate to relax those constraints either through a decrease in downpayment or a lengthening of the maturity of the contract. They are people who have limited liquid assets and/or have a strong demand for consumer durables. Downpayment and contract length do not represent constraints for the unrationed borrowers. They are people who have larger holdings of liquid assets and/or a limited demand for

* Haberler, Consumer Instalment Credit, pp.100-105.
** Geoffrey H. Moore and Phillip Klein, Quality of Consumer Instalment Credit (New York: National Bureau of Economic Research, 1967).

consumer durables.*

1.4.3 Market distortions and Rationing

While the preceeding discussion tends to propose the hypothesis that consumer credit is insensitive to interest rates, the empirical work in this area has not been able to substantiate or disprove this theory due to difficulties inherent in the empirical analysis of credit markets with rationed disequilibrium. The credit rationing literature is much too wide in scope to adequately review here however, it is useful to discuss how rationing is thought to operate and why the consumer credit market is believed to be a rationed market.

Credit rationing is a situation where demand for credit is left unfulfilled at the prevailing market price. Many definitions exist for "demand" and "market price". However, to take the traditional view, "demand" represents the ability and willingness to borrow and repay the loan at the going market price. Juster and Shay's rationed borrowers represent rationed credit demand in this sense of the word. The "price" in this context means the interest rate of the loan. In a rationed market the non-interest rate terms of

* Thomas F. Juster and Robert P. Shay, Consumer Sensitivity to Finance Rates: An Empirical and Analytical Investigation, Occasional Paper No. 88 (New York: National Bureau of Economic Research, 1964).

the loan, the downpayment and length of contract, play an important role in the allocation of funds.

Jaffee and Modigliani* have done some important work on the presence of rationing in credit markets and have proven its accordance with rational behavior on the part of financial institutions. Two forms of credit rationing have been identified. Equilibrium rationing is rationing which results from long run decision making by financial institutions and dynamic rationing is a temporary phenomenon caused by adjustments in the market.

As long as there is uncertainty with respect to repayment, and interest rates are not free to reflect the financial institutions' perception of this risk, other methods of affecting the institutions' revenues and costs will be used to secure a profitable return. Equilibrium rationing occurs when the forces restraining interest rates from reflecting perceptions of risks persist in the long term. Such forces are institutional constraints, legal and social, such as government imposed interest rate ceilings.

Dynamic credit rationing occurs when interest rates cannot adjust quickly enough to changes in the market which affect either demand or supply. The "sluggish" adjustment of interest rates, a phenomenon called price rigidity or

*Dwight M. Jaffee and Franco Modigliani, "A Theory and Test of Credit Rationing", American Economic Review, (December 1969), pp. 850-879.

stickiness can be due to the nature of competition in the supply of credit, to the information and transaction costs involved in lending, and to government regulations. Jaffee and Modigliani show that banks would not ration credit if they were able to freely discriminate between borrowers: Each loan would have a different price and all borrowers would be accomodated. Since this type of price collusion in the credit markets is not legally feasible*, interest rates in credit markets are determined by a price setting mechanism which prevents interest rates from adjusting efficiently to changes in market forces:

> .. banks can best exploit their market power,while remaining within the bounds set be prevailing institutions, by classifying customers into a rather small number of classes within each of which a uniform rate is charged...In order to prevent, or at least minimize, competitive underbidding of rates they would need tacit agreement as to the appropriate rate structure for customers, and thus a classification scheme based on readily verifiable objective criteria would appear as an efficient and effective device....one can readily understand how such tacit agreement on the structure of class rates could be facilitated by tying these rates through fairly rigid differentials, to a prime rate set through price leadership.
>
> If we now superimpose the impact of usury ceilings along with the other legal and social constraints, it is clear that the entire structure of rates would tend to be compressed within narrower limits than would otherwise be optimal.**

The financial institutions use non-interest rate measures to

*Insurance pools which work in a very similar way are the only means by which the higher risk drivers can obtain car insurance policies.

**Jaffee and Modigliani, Theory and Test, p. 860.

adjust their portfolios when the complicated structure of interest rates is too sluggish to react to sudden changes; changes such as increases in the opportunity cost of money, or changes in incomes which affect the institutions' perception of risk and their willingness to hold debt, or shifts in demand for credit. Due to the risk-classification schemes, the incidence of dynamic rationing will fall more heavily on the higher risk-class borrowers, those who are already being rationed by forces creating equilibrium rationing.

If we think of the credit market in terms of rationing, our understanding of the underlying demand and supply behavior becomes clouded. The observed data can no longer be expected to represent the equilibrium quantity achieved through the normal market clearing mechanism. The observations, such as Point A in Figures 3 and 4, do not indicate whether they lie on the supply curve such as in Figure 3, periods of excess demand or rationing represented here by (Q1 - Q), and when they represent the equilibrium of

Figure 3

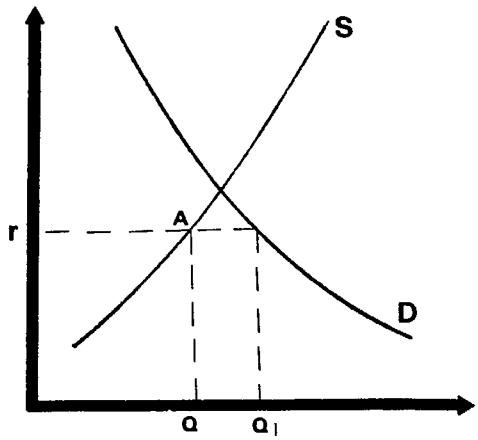
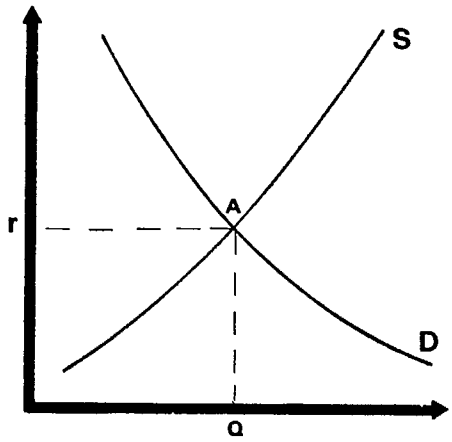


Figure 4



demand and supply such as in Figure 4. Several attempts at analyzing the credit markets, from the "rationing" point of view, have come up with different techniques to identify supply and demand forces but the results have been mixed.

The empirical works most pertinent to rationing in credit markets are by Greer and Shay* on the U.S. consumer credit market and by Jaffee** on the U.S. commercial credit market. Greer and Shay built disaggregated models of consumer credit in the U.S. for each major source of credit and for each of four end use categories: personal loans, automobile credit, other consumer goods credit, and mobile home credit. They identify a rejected demand function using market distortion parameters such as interest rate ceilings, concentration ratios, and entry barriers. This function provides the difference between demand and supply. They also try to incorporate these explanatory variables in the supply function. Due to rejection data difficulties, an overly complicated model involving cross demands between financial institutions, and difficulties estimating the interest rate ceiling effects in the interest rate equation, most results were spurious. Demand equations could not be estimated for most financial institutions and the only

*National Commission on Consumer Finance, Technical Studies, Vol. 4: "An Econometric Analysis of Consumer Credit Markets in the United States", ed. by Douglas F. Greer and Robert P. Shay (Washington, D.C.: Government Printing Office, 1974).

**Dwight M. Jaffee, Credit Rationing and the Commercial Loan Market (New York: John Wiley & Sons, 1971).

demand equation estimated, that of finance company credit had a positive interest rate coefficient.

Jaffee on the other hand, finds a proxy variable for the degree of credit rationing based on the proportion of loans granted to risk free customers. This proxy is used as a dependent variable regressed on the spread between a measure of the optimal interest rate for the financial institution and the quoted rate. Jaffee incorporates his estimated rationing proxy in the demand for credit equation using aggregated data. With an elaborate model of portfolio adjustment for commercial loan demand, he gets a very good fit and significant coefficients for interest rate variables and the proxy variable. His results imply that a 1% change in spread between the prime rate and the commercial loan rate would cause an impact on net change in credit outstandings of approximately 11%. A change in rationing, on the other hand, would have little impact.

Another way of approaching the consumer credit market which will prove to be more useful for determining the SOC of consumer credit is to view this market as a differentiated or heterogeneous market: A market of goods for which the market interest rate is not the single cost parameter. The non-interest rate terms of credit differentiate each loan.

Moore and Klein* call this the "quality" of the loan.

A price variable can be devised or a proxy can be found to take account of the quantity and quality characteristics of consumer credit along the same lines as Rosen's hedonic prices**. This price will then represent the equilibrium between supply and demand. Once demand and supply can be equated, their behavior can be analyzed with respect to this parameter and to other independent variables which identify their separate functions.

For the purpose of measuring the effects of government borrowing, an approach similar to the above is followed. This price conceptually takes into account all of the effects of government borrowing on the supply price of consumer credit. Assuming a heterogeneous market where non-interest rate terms of credit are used, government borrowing would cause a tightening of credit which may be reflected in increased downpayment ratios, decreased maturities as well as higher interest rates. Combined, these results would cause a greater reduction of consumer credit than would the increase in interest rates alone. Thus the appropriate elasticity of demand to be used in measuring the opportunity cost of forgone credit is the elasticity of demand with respect to this price.

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* Moore and Klein, Quality of Consumer Instalment Credit.
** Sherwin Rosen, "Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition", Journal of Political Economy, Vol. 82, No.1 (Jan/Feb 1974).

CHAPTER TWO: EMPIRICAL ANALYSIS OF THE RESPONSE OF CONSUMER CREDIT DEMAND TO INCREASED GOVERNMENT BORROWING

2.1 INTRODUCTION

To determine the part that consumer credit plays in the social discount rate for canada, it was necessary to understand the consumer credit market in Canada, and to determine how demand for consumer credit would respond to changes in capital market conditions. Using data compiled by Statistics Canada* and the Bank of Canada**, a demand model of consumer credit is built including the effects of government borrowing on the market price of credit and the effects of this price on the demand for credit.

Many efforts at building models of the consumer and commercial credit markets have led to the conclusion that these markets are in perpetual disequilibrium; that they are by nature rationed markets. Given the observed quantity of consumer credit outstanding, it is not obvious whether the consumer credit market in Canada is in effect an equilibrium market or a disequilibrium market. The use of a market proxy for the price of consumer credit circumvents this issue as well as data availability problems and makes it possible to successfully model the demand side of the consumer credit market.

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* Statistics Canada, Consumer Credit, Catalogue 61-004.
** Bank of Canada, Bank of Canada Review, Table 50.

2.2 THE CHARACTERISTICS OF THE CONSUMER CREDIT MARKET IN CANADA

2.2.1 The Measurement of Consumer Credit

The two most developed consumer credit markets in the world are found in the United States and Canada. In both countries statistics on consumer credit are compiled regularly however using different approaches. The U.S. Federal Reserve Board distinguishes between instalment and non-instalment credit, and in Canada, Statistics Canada categorized credit by means of borrowing practices; either vendor credit or cash loans.

Vendor credit includes conditional agreements held by financial corporations and credit extended by department stores, furniture and appliance stores, other retail dealers, credit card issuers marketing a specific product such as oil companies, airlines, etc..., and credit extended by public utilities. This sort of credit has been declining relative to cash loans. Whereas, in 1958 it comprised 51% of total consumer credit outstanding, by 1978, its share had fallen to 13%.* See Table 1.

Cash credit includes credit extended by the financial

* After December 1978, the consumer credit statistic became the responsibility of the Bank of Canada and was slightly modified. Consumer credit no longer included credit on the books of furniture and appliance stores, other retail outlets, public utlities and other credit card issuers. This reduced the 1977 statistic by about 8%. However, for future years, this is an overestimate due to the declining trend of this type of credit.

TABLE 1

THE DECLINE OF VENDOR CREDIT AS A PROPORTION OF TOTAL CONSUMER CREDIT IN CANADA 1948-1978

YEAR	VENDOR CREDIT %	CASH LOAN CREDIT %
1948	48.5	51.5
1958	51.2	48.2
1968	29.7	70.3
1978	13.0	87.0

Source: Statistics Canada. Consumer Credit. Catalogue No. 61-004 and the Bank of Canada. Bank of Canada Review. Table 50.

institutions: Chartered Banks (including all purpose credit card balances), Financial Corporations, Credit Unions and Caisses Populaires, Quebec Savings Banks , and Life Insurance Companies. Most of these loans are considered instalment credit, the largest component of consumer credit.

In Canada, the consumer credit statistic is reported as consumer credit outstanding. It does not include :

- interest and finance charges,
- loans fully secured by marketable bonds and stocks since these loans can be regarded as a reduction of personal holdings of liquid assets,
- student loans,
- long term loans such as residential mortgage and home improvement loans,
- loans between individuals,and
- outstanding debts to professional practitioners such as doctors, dentists, clubs ,hospitals and other personal service establishments.

2.2.2 The Nature of Competition in the Consumer Credit Market

Financial Corporations, previously known as Sales Finance and Consumer Loan Companies held the dominant share of the consumer credit market in Canada until 1965. The Sales

Finance Companies were engaged in discounting retail paper and thus were offering vendor credit. They were and still are relatively free from government regulation. The Consumer Loan Companies dealing mostly with small cash loans fall under the jurisdiction of the Small Loans Act of 1939 limiting interest rates to 12% on loans under $1500.* On the other hand, the wide use of service fees nullifies the constraints posed by this legislation on the receipts of these financial intermediaries.

This industry** grew very rapidly after the Second World War until the early sixties due to the tremendous growth in demand for consumer credit and due to their increased share of the total consumer credit business: In 1948, consumer credit totalled 7.5% of disposable income but by 1958 it had reached 13.8%. The Financial Corporations increased their market share from 16% in 1948 to 38% in 1958. Chart 1 depicts the market share trends of participants in this market.

Chartered Banks had not been interested in consumer credit until 1957 when they made a concerted effort to enter the market. Immediately, their share rose from 14% to 41% in

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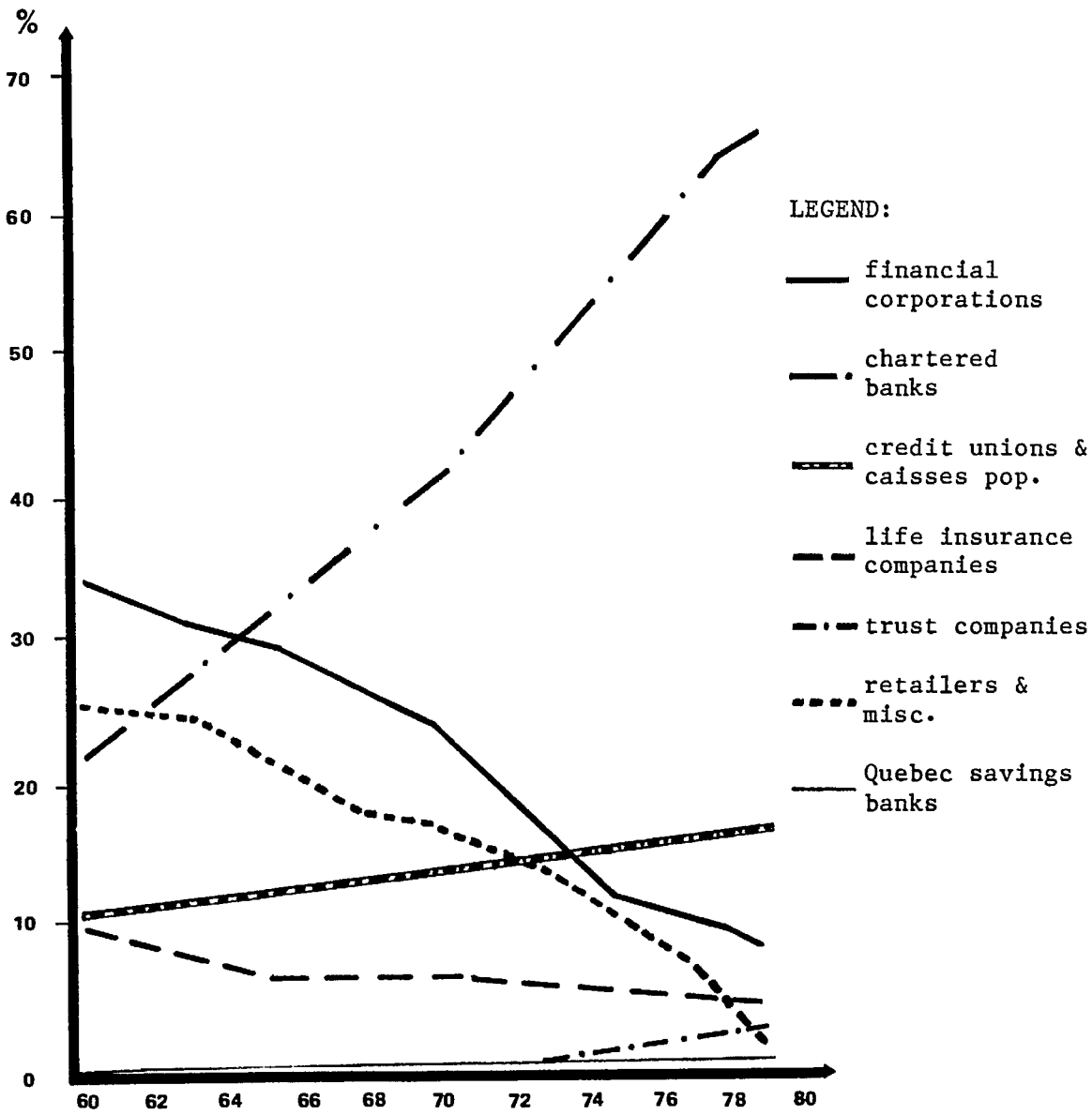
* The Small Loans Act is in the process of being replaced by Bill C-44 of July 21, 1980.

** Each market participant (e.g. Financial Corporations, Chartered Banks,etc...) has been designated as a separate industry where an industry is defined as a group of firms producing products that are close substitutes for each other. A market represents the exchange of a particular type of good or service, in this case it is the exchange of consumer credit.

CHART 1

MARKET SHARES OF PARTICIPANTS
IN THE CANADIAN CONSUMER CREDIT MARKET 1960-1979



1958.* Since then, they have raised their market share to 65% (1979) at the expense of the Financial Corporations which now hold only 8% of the market.

The Chartered Banks' successful entry was in part due to the favorable conditions they enjoyed in other markets. Imposed by the Bank Act, high minimum capital requirements for the establishment of new banks created strong entry barriers for the industry and after 1900 no legislation was enacted to prohibit bank mergers. Banking became a highly concentrated industry, with currently eleven Chartered Banks operating in the Canadian domestic capital market as the core of its "branch banking system".

Another factor influencing the banks' success was the shift of demand toward cash loans. Table 1 depicts the shift in composition of Canadian consumer credit demand since 1948. Cash loans have almost entirely replaced vendor credit. Financial corporations, very dependent upon vendor credit , had to shift the structure of their assets towards other types of investments such as retail and wholesale commercial sales paper. Not only did they have to shift their assets but also the structure of their liabilites. Their main source of money, bank loans, dried up as banks became direct competitors. Bank loans decreased from 14% of total

* A few conjectures as to the reasons why are proposed by Josef J. Vorstermans, Consumer Credit: VariousEconomic Aspects with Specific Reference to Canada (Tilburg, 1966), pp.115-118.

liabilities in 1965 to 4% by 1978. They had to increase their dependence on the money markets by issuing finance company paper, i.e. short term notes, and long term debt. Due to the setbacks they had suffered, several companies failed and the cost of capital for financial corporations increased.* The difficulty in obtaining funds constrained expansionary efforts to gain economies of scale badly needed to offset the lower margins. Banks were offering cash loans at much more favorable rates than were available in the past and forced a reduction in interest rates. However, Financial Corporations service the higher risk-class borrower and the industry has always been very concentrated**. These factors increased their bargaining power relative to their customers thereby allowing them to pass on some of the higher cost of capital.

The 1967 Bank Act further aggravated the situation by eliminating the 6% interest rate ceiling on bank loans (which previously had been circumvented to a certain extent by the use of service charges). Although Financial Corporations have been reduced to a minor force in the consumer credit market they remain extremely dependent on this market. As Table 2 indicates, 24% of their total

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* Notably the failure of Atlantic Acceptance Corporation in 1965 and the Prudential Finance Corporation in 1966.

** Although data cannot be gotten on concentration ratios, Neufeld has estimated that since the early 1960's the assets of the ten largest companies have represented, on the average, 90% of total industry assets in E. P. Neufeld, The Financial System in Canada: Its Growth and Development (New York: St. Martin's Press, 1972), pp 349-350.

TABLE 2

IMPORTANCE OF CONSUMER CREDIT

IN THE PORTFOLIOS OF FINANCIAL INSTITUTIONS: 1960-1979

	1965	1970	1975	1979
Assets dependent on the consumer credit market as a % of:				
Financial Corporations				
Total Assets	51	52	28	22
Total Accounts & Receivables	58	59	31	24
Credit Unions and Caisses Populaires				
Total Assets	32	33	25	23
Chartered Banks				
Total Assets	9	10	12	11
Total Loans*	16	23	25	24
Life Insurance Companies				
Total Assets***	NA	13	5	4
Quebec Savings Banks				
Total Assets	4	4	6	8
Trust and Mortgage Companies				
Total Assets	0	0.9	2.0	1.7

Source: Calculated from Bank of Canada. Bank of Canada Review.
Statistics Canada. Credit Unions, Catalogue No. 61-209.
*Total loans include Canadian day-to-day loans, call and short loans, loans in Canadian dollars and mortgages.
***Represents data for sixteen Life Insurance Companies whose incomes represented 80% of the total income for the industry in 1970.

Accounts and Notes Receivable and 22% of their total assets originated from the consumer credit market in 1979.

Another important group in this market is the group of Credit Unions and Caisses Populaires. Caisses Populaires are the Credit Unions' counterpart in the French Province of Quebec. While, together, they occupied a steady 11% of the consumer credit market in the early sixties, their share has increased to 16% in 1979.

The portfolios of the Credit Unions and Caisses Populaires have differed in the past. Credit Unions derived their funds primarily from the sale of shares to members and invested in consumer loans while the liabilities of the Caisses Populaires were mostly deposits made by members and their assets were heavily involved in mortgages. These trends have been reversed in the recent past and the group is becoming more homogeneous. In both cases, the risk factor in their lending tends to be low since the institutions have a certain degree of control over their members who are the debtors as well as the depositors. Therefore their lending interest rates tend to be lower than bank and financial corporation rates.

This industry is also changing very rapidly. After a long period of growth the industry is now maturing and consolidating. Credit Unions are increasing in size by means of mergers ,and forming large branching operations. They are now competing very favorably with the Chartered

Banks and Financial Corporations in both mortgage lending and consumer credit. While the Small Loans Act legislation pertains to their business it has not impeded their growth in the consumer credit business.

Through their policy loans, Life Insurance Companies are involved in the consumer credit market also, but not in a big way. This kind of credit has always been used as emergency credit and does not share in the growth of consumer durable financing. Policy loans now represent 4% of total consumer credit outstanding and only a small portion of Life Insurance Companies' assets.

Trust Companies are new competitors in the consumer credit market and are presenting a very real competition to the Chartered Banks and Financial Corporations because they are offering very competitive rates on secured loans. They are more flexible in their financial operations than other institutions due to their legal monopoly of corporate trustee powers, their main thrust. This business is very concentrated in spite of the large number of companies in the industry. Although the Small Loans Act limits interest rates in their consumer credit business, it does not pose a constraint on their growth in this market. In conjunction with Mortgage Loan companies, Trust companies had a 3% market share while consumer credit represented only 1.7% of their total assets in 1979.

Quebec Savings Banks, a group of savings and loan

institutions, are a source of consumer credit with very low growth. They represent a small fraction of the market.

2.2.3 Profile of Consumer Credit Borrowers in Canada

Consumer credit in Canada grew out of the need to finance the automobile in the early 1930's and since then has grown tremendously. Since 1962, in real terms, it has grown at a compound annual rate of 8.4%. In Section 1.3.2, the analytical considerations of consumer credit demand have led to the generalization that most of consumer credit was used by the consumers/borrowers with limited liquid asset holdings. Data on Canadian borrowers of consumer credit is scant but does substantiate this. The most recent information dates back to 1970 when the last results of a consumer finances survey were published.* Results from the last four surveys conducted in 1956, 1959, 1964, and 1970 indicate that consumer credit growth is coming from both a more extensive and intensive use of borrowed funds. The proportion of families using consumer credit has been rising from 49% in 1956 to 57% in 1970 and the size of the average loan has increased from $600 in 1956 to $1650 in 1970.

The distribution of debt outstanding seems to be highly correlated to the level of income across income groups. In 1970, the income group earning less than $10,000, then the

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* Statistics Canada, Incomes, Assets and Indebtedness of Families in Canada, Catalogue No. 13-547.

average income in Canada, held 73% of total consumer credit outstandings. Lower income groups held more of all types of debts, the higher income groups held more personal loans consisting of loans secured by marketable bonds and stocks (which are not included in the official consumer credit statistic). From this information it can be deduced that the higher income groups most probably borrow from Chartered Banks, Trust Companies and maybe Credit Unions, and lower income groups, by definition in a higher risk-class, borrow from Financial Corporations, Life Insurance Companies, Credit Unions and Chartered Banks.

2.3 ECONOMETRIC ANALYSIS OF CONSUMER CREDIT DEMAND

2.3.1 Introduction

The model incorporates the theoretical considerations of consumer credit markets expressed in Chapter I and the observations of the Canadian market as discussed in the last Section. It consists of three equations: The interest rate equation (or price equation), the consumer durable demand equation and the consumer credit demand equation. It aggregates consumer credit over all sources and uses, and treats the market as being differentiated solely by the terms of credit.

The time unit chosen for the analysis is the calendar quarter since it provides a short enough time span to allow

short term changes to be apparent yet long enough to make the eighteen year observation period ,1962:1 to 1980:1, a manageable (and affordable) task in terms of data collection and manipulation. All data expressed in the numeraire are seasonally adjusted at annual rates and expressed in real terms, 1970 Canadian dollars, unless stated otherwise. All rates are expressed in annual rates.

Results are described below: T values in parentheses under the coefficients, the coefficient of determination corrected for degrees of freedom, $\bar{R}^2$, the standard error of estimate, SEE, and the Durbin Watson statistic, D.W. are provided for each equation.

2.3.2 Identifying the Impact of Capital Market Conditions on the Demand for Consumer Credit

There are two methods of identifying the impact of capital market conditions on the demand for consumer credit. The first method is achieved by estimating the cost of consumer credit to borrowers directly and determining how changes in this variable alter the quantity of consumer credit demand . But, given that the price of credit would have to include the interest and non-interest terms of credit, and that detailed data on credit terms of consumer credit in Canada are not available, the use of this method is ruled out.

The second method uses the assumption that the Financial Corporations operate with approximately constant expenditures, as a proportion of loaned funds, save borrowing

costs. An examination of the Financial Corporations' Profit & Loss Statements over a period of ten years indicates that this condition holds. See Table 3. Borrowing costs vary with the conditions in the Canadian capital market. Therefore, changes in the 90-day finance company paper rate will be reflected in the fluctuations of the credit terms charged by Financial Corporations to the ultimate borrower. Thus the second method of identifying the impact of the capital market on consumer credit demand is by means of the derived demand for funds by the Financial Corporations. The 90-day finance company paper rate is the rate of interest Financial Corporations pay for short term paper which is now their largest source of short term funds.

2.3.3 Formulating and Estimating the Interest Rate Equation

The demand for consumer credit is part of a general equilibrium framework of economic activity, being affected by many forces in the economy and in turn affecting many variables in the economy. The use of instrumental variables, a technique that is designed to include a limited linkage to the rest of a larger system within the estimation of a single structural equation, was used for the interest rate equation: Rather than using the variable itself, we estimated the interest rate equation using the macrovariables in Jenkins' formulation of the Canadian industrial bond rate equation*.

TABLE 3

PROFIT AND LOSS STATEMENT OF FINANCIAL CORPORATIONS IN CANADA 1969 - 1978

in 10^6 $ and (% of amount of credit extended *)

	1969	1972	1975	1978
Total Revenues	663 (15.9)	752 (15.7)	1432 (18.2)	1695 (17.4)
Costs of Borrowing	295 (7.1)	271 (5.7)	641 (8.2)	833 (8.6)
Operating Expenses**	188 (4.5)	223 (4.7)	369 (4.7)	467 (4.8)
Provision for Doubtful Receivables	41 (1.0)	48 (1.0)	106 (1.3)	129 (1.3)
Depreciation & Amortization	17 (0.4)	20 (0.4)	8 (0.1)	10 (0.1)
Total Expenses	541 (13)	562 (11.8)	1124 (14.3)	1439 (14.8)
Net Income Before Taxes	122 (2.9)	190 (4.0)	308 (3.9)	256 (2.6)
Income Tax ***	62 (1.5)	91 (1.9)	146 (1.9)	98 (1.0)
Net Income after tax ****	60 (1.5)	99 (2.0)	162 (2.0)	158 (1.6)
Accounts and Notes Receivable (yearly avg)	4,831	5,533	9,281	11,416
Amount of Credit Extended	4,168	4,781	7,849	9,721

Source: Calculated from data found in Statistics Canada; Financial Institutions, Catalogue #61-006.

* The amount of credit extended can be taken as the good that financial corporations sell. If they are designated by X then Accounts and Notes Receivable are designated by (1+P)X where P is the price of this good. Total Revenues are PX and Total Expenses are CX. The amount of credit extended is then calculated as Accounts and Notes Receivable minus Total Revenues.

** Salaries and other expenses

*** Provision for current and deferred

**** Before extraordinary gains and losses (due to sale of assets)

In the structure of the Canadian capital market, it seems reasonable to assume that the demand and supply of consumer credit do not independently determine the finance company paper rate, rather, that this rate is tied to the bank rate (similar to the prime rate in the U.S.) and is thereby dependent on the forces of the capital market as a whole.

Once the interest rate is exogenous, the problems of simultaneous equation estimation are avoided and the model can be estimated by ordinary least squares without bias. The structural equation of the interest rate is:

$$R_t = C + \sum_{i=2}^{4} a_i CHY_{t-i} + \sum_{i=0}^{9} b_i ACCM_{t-i} + \sum_{i=0}^{8} c_i CHG_{t-i} + d\ EX_t + e\ DEX_t + \sum_{i=0}^{6} f_i\ CHP_{t-i}$$

This is the short run specification of the nominal rate of interest. It includes two parts which explain both components of the nominal interest rate, the real rate and the expected inflation portion. Once the nominal rate is estimated, the real component can be derived and used in the other equations.

CHY is the rate of growth in real income or real output which should be positively correlated to the real interest rate due to its positive effect on the demand for real cash balances. The impact of this variable does not appear to

*Economic Council of Canada, Inflation, Its Financial Impact on Business in Canada, by Glenn P. Jenkins, Discussion Paper No. 72 (Ottawa: January 1977), Appendix C.

occur coincidental but operates with a lag. The best fit was obtained as a three period polynomial distributed lag of the second order beginning with a lag of two periods.

ACCM is the change in the growth rate of the money supply, M2 in nominal dollars. We would expect it to have a negative impact on the real interest rate due to the liquidity effect of a change in monetary policy. Since this effect is expected to change over time; weak at the beginning, increasing then decreasing again. A third order, ten time period polynomial distributed lag structure was used to identify this variable.

CHG is the change in the government of Canada's real direct debt held by the private sector. The government presence in the capital market in Canada is extremely important. Direct government debt held by the private sector represented 35% of all Canadian Dollar assets of the financial institutions. In 1979, it has decreased to 26%. One would expect an increase in government borrowing from the capital market in Canada to crowd out private demand for funds by bidding up the real rate of interest. The government borrowing effect diminishes over a period of time. The shifting of assets in the portfolios of financial institutions does not take place instantaneously, therefore this effect should also work with a lag. The variable has been specified as a second degree, nine quarter polynomial distributed lag.

EX is the expected change in the exchange rate for the whole

period ,1962:1 to 1980:1, and DEX is the same variable appearing only during periods of the flexible exchange rate regime in Canada, 1971:1 to 1980:1. The expected change in the exchange rate is measured by the difference between the 90-day forward exchange rate and the current spot exchange rate expressed as a percentage of the spot rate. Both of these variables are expected to explain variations in the short run real interest rate. Expectations of changes in the exchange rate would cause capital flows, especially strong given the economic interdependence with the United States, to affect Canadian rates. Expected increases in exchange rates during the flexible exchange rate regime are expected to explain increases in the interest rate almost instantaneously due to arbitrage.

CHP, the expected inflation variable, is the inflation rate as measured by the percent change in the gross national expenditure price deflator. Identifying it by a second degree, seven period polynomial distributed lag in the model assumes that expectations are formed through experience with past inflation. The effect of inflation expectations should be the sum of the effects of each of the lagged values (i.e. the sum of the lag coefficients). The inflation would be fully expected and reflected in the interest rate where the sum of the coefficients of all the lagged values equals one.

Table 4 presents the results of the price equation. The equation performed very well explaining approximately 92% of the variation in the finance company paper rate. The

TABLE 4

THE ESTIMATED INTEREST RATE EQUATION

$$R_t = \underset{(1.54)}{2.187} + \sum_{i=2}^{4} a_i CHY_{t-i} - \sum_{i=0}^{9} b_i ACCM_{t-i} + \sum_{i=0}^{8} c_i CHG_{t-i} - \underset{(-1.87)}{0.648}\, EX_t + \underset{(1.90)}{0.721}\, DEX_t + \sum_{i=0}^{6} f_i CHP_{t-i}$$

a_2 = 0.045 (1.76)	b_0 = -.014 (-0.76)	c_0 = -.005 (-.48)	f_0 = 0.093 (2.42)
a_3 = 0.063 (2.57)	b_1 = -.036 (-1.32)	c_1 = 0.009 (0.86)	f_1 = 0.118 (4.29)
a_4 = 0.048 (2.44)	b_2 = -.055 (-1.32)	c_2 = 0.020 (1.72)	f_2 = 0.131 (4.60)
	b_3 = -.069 (-1.72)	c_3 = 0.027 (2.12)	f_3 = 0.130 (4.08)
	b_4 = -.077 (-1.90)	c_4 = 0.031 (2.30)	f_4 = 0.117 (3.63)
	b_5 = -.081 (-2.02)	c_5 = 0.032 (2.40)	f_5 = 0.091 (3.32)
	b_6 = -.078 (-2.06)	c_6 = 0.029 (2.46)	f_6 = 0.052 (3.10)
	b_7 = -.069 (-2.01)	c_7 = 0.023 (2.49)	
	b_8 = -.054 (-1.90)	c_8 = 0.013 (2.51)	
	b_9 = -.031 (-1.77)		
$\sum a$ = 0.157 dop = 2	$\sum b$ = -0.564 dop = 3	$\sum c$ = 0.180 dop = 2	$\sum f$ = 0.731 dop = 2

Where: CHY is the growth of real income
ACCM is the accelaration in the money supply
CHG is the change in government debt held by the private sector
EX and DEX are the expected change in the exchange rate
CHP is the expected inflation rate
dop is the degree of the polynomial
R is the 90-day finance company paper rate

Sample period -- 1973:1 to 1980:2

$\bar{R}^2$ = 0.9088 SEE=0.7666 D.W.= 1.86

The Cochrane-Orcutt technique was used to correct for serial correlation.

standard error of estimate of 0.76 is approximately 1% of the mean value of the dependent variable. Using the Cochrane-Orcutt technique to correct for serial correlation in the error terms, the model performed better on the Durbin-Watson test with a measure of 1.86. The coefficients have the right signs and can be accepted at a 95% level of significance according to their T statistics.

The growth in real income, CHY, proved to be one of the most important explanatory variables. However it is not until it is lagged three quarters that it significantly affects the interest rate and it remains significant for three quarters. At the peak, a 1% increase in real income would result in a 0.06 of a point increase in the finance company paper rate. The second order effects on the other variables are significant: The inclusion of real income growth in the function increases the importance of money, government debt and inflation.

The acceleration of money effect, ACCM, is not significantly different than zero during the same period. When lagged, it is at first low and can be accepted on the 90% level of significance. The impact becomes stronger and more significant, reaching a peak after a year lag when a 1% increase in the growth of the money stock would cause a 0.08 of a point decrease in the finance company rate. This effect then decreases and becomes insignificant by the ninth period. Experimenting with different lag structures showed that this variable continues to affect interest rates up to

two years of lag. An increase in lags tends to slightly increase the effect of inflation and a decrease tends to diminish government debt's effect on the interest rate but these second order effects are slight.

The government debt variable also proves to be an important source of explanation. Its coefficients are all positive except the first one which is negative and insignificant. The use of the Cochrane-Orcutt technique reduces the size and importance of this coefficient which may suggest that it is picking up the effect of a missing variable. The eight period lag is the optimal formulation of this variable ; that is, overall it is the most significant set of coefficients. The maximum impact is in the third and fourth quarter lags when a 1% increase in real government debt held by the private sector will effect a 0.03 of a point increase in the finance company paper rate, a similar order of magnitude as Jenkins' results on the industrial bond rate. Earlier debt has a smaller impact but remains significant at the 99% level.

Expected changes in the exchange rate are significant. The expectations during periods of flexibe exchange rates ,DEX, have a positive coefficient implying that a 1% increase in expected changes in the exchange rate would have a 0.72 of a point impact on the interest rate. The expected changes in the exchange rate for the whole period, EX, has a negative coefficient and is extremely important to the impact of DEX. This can be explained by the lack of correlation between

exchange rates and interest rates during fixed exchange rate regimes and by the second order effects between the two exchange rate variables. This effect, approximately -0.65, is not as great in magnitude as that of the flexible rate period and does not cancel it out.

The historical experience of inflation, CHP, is also very significant in explaining variations in the nominal interest rate over time. The sum of its lagged coefficients over eight periods implies that 73% of the historical rates of inflation is built into expectations of future inflation and reflected in the nominal interest rate.

Testing the stability of the coefficients by estimating the equation over different time periods brought good results. The coefficients did not significantly differ and performed better as the time period shifted closer to the present: The standard error was reduced and the significance of the coefficients increased. This indicates better explanatory powers for recent history and good forecasting capabilities.

2.3.4 The Consumer Durable Demand Equation

Consumer durable expenditures compose the major use of consumer credit and this variable is included in the

formulation of the credit demand function. However, the relation between these two variables is two sided: As much as consumer durable demand affects the demand for consumer credit, consumer credit affects consumer durable expenditures. In order to avoid the simultaneous equation bias which this would cause (i.e. the correlation of the consumer durable variable with the error term in the credit demand equation), real expenditures on consumer durables are exogenously determined. The estimated values are then used in the consumer credit demand function. Just as in the price equation, the independent variables of this equation allow for linkages to the rest of the economy. The independent variables chosen are real disposable income, LDY, the unemployment rate, LU, and the relative price of consumer durables, LRELP.

The demand for consumer durables should be positively related to real disposable income and should have a coefficient greater than one since it is very cyclical and volatile as described in Section 1.3.2. Unemployment should have a negative coefficient as well as the relative price term which is measured by the price index for consumer durable expenditures divided by the gross national expenditures price index. A log linear formulation is used for this function which is regressed by the ordinary least squares method:

$$LCD_t = -3.96 + 1.20\ LDY_t - 0.14\ LU_t - 0.867\ LRELP_t$$

$$(-3.06)\quad (10.07)\quad (-5.27)\quad (-4.40)$$

$\bar{R}^2 = 0.99$ SEE = 0.037 D.W. = 1.15

This equation performs very well by all tests. The coefficients have the right signs and the income elasticity of consumer durable demand is 1.2 as expected.

2.3.5 The Consumer Credit Demand Funtion: Synthesis of the Model

In this model, consumer credit demand is measured by the net change in consumer credit outstanding. For the purpose of finding the social opportunity cost of government borrowing, we need to know the value of the consumption forgone due to a decrease in consumer credit demand. Debt repayments have the same opportunity cost in this framework as credit extensions since an increase in debt repayments is equivalent from the point of view of forgone consumption as a decrease in credit extensions. The change in consumer credit nets out the debt repayments and allows us to measure the funds that would be used for financing consumption. This parallels the notion that credit is a net liability while saving is a net asset in the portfolio of the household. Either an increase in the net asset or a decrease in the net liability will lead to a decreased use of funds for the purpose of consumption.

Credit demand is negatively related to the real price of credit, REALR, which was derived from the interest rate equation by subtracting the estimated expected inflation term from the estimated nominal interest rate. The desire to buy consumer durables is another major factor in the demand for credit. This variable, CD, is derived by finding the antilogarithm of the estimated value of the consumer durable expenditures function. The third variable is real wealth, WR, which acts as a proxy for personal savings or liquid assets in the portfolio of the household. Much like the wealth effect in the consumption function, one would expect that it enters positively in the credit demand function. However, one may argue that the higher the wealth position of the household the more likely it is to internally finance its consumption and the less need it has for consumer credit. This negative relation was evident in the results of the 1970 survey of consumer indebtedness in Canada described in Section 2.2.3. This variable is specified as a second degree, eight period polynomial distributed lag. The eight quarter lag was necessary to cover two annual observations because the quarterly wealth series was linearly extrapolated from annual data.

The function is linear and is estimated using the ordinary least squares method. A log specification could not be used because the dependent variable contains negative observations. The equation takes the form shown below and the results are summarized in Table 5 :

TABLE 5

THE ESTIMATED CONSUMER CREDIT DEMAND EQUATION

$$CCR_t = \underset{(-1.15)}{-303.098} - \underset{(3.86)}{27.609}\ \hat{REALR}_{t-2} + \underset{(2.49)}{0.029}\ \hat{CD}_t + \sum_{i=0}^{7} \delta_i WR_{t-i}$$

δ_0=.00379(4.41)

δ_1=.00204(4.38)

δ_2=.000646(3.33)

δ_3=-.00038(-1.98)

δ_4=-.00104(-3.44)

δ_5=-.00133(-3.78)

δ_6=-.00125(-3.92)

δ_7=-.00081(-3.99)

sum of lag coef=.0017
degree of polynomial= 2

Sample period -- 1974:1 to 1980:1

$\bar{R}^2$ =.2777 SEE=126.721 D.W.=1.79

$$CCR_t = C + \alpha \hat{REALR}_{t-2} + \beta \hat{CD}_t + \sum_{i=0}^{7} \delta_i WR_{t-i}$$

Out of several different formulations of this function, this is the one that best describes the relationship between consumer credit demand and the expected real interest rate variable. All of the coefficients have the right signs and are very significant at the 99% level. The expected real interest rate variable does not become a significant explanatory factor until it is lagged two periods implying that there is approximately a six month lag from the time when the cost of funds increases for the Financial Corporations to the point where these costs affect the quantity of consumer credit demanded. The resulting interest elasticity of credit demand with respect to the expected real interest rate is -0.34.

Expenditures on consumer durables have a very significant positive coefficient as expected. It implies that a 1% increase in consumer durable expenditures will lead to a 1.2% increase in demand for consumer credit. This is consistent with the hypothesis that the marginal purchases of consumer durables are financed more by credit than are such expenditures on the average.

The wealth effect is positive and very significant for the first three lags. It becomes small and negative after that, remaining very significant. The total effect of a 1% increase in wealth on the demand for credit is a 1.5% increase over a two-year period.This implies that in

aggregate the increase in wealth increases the collateral available for an expansion of consumer credit.

The coefficients proved to be very stable when the equation was estimated for different intervals within the sample period. Experimentation with other explanatory variables resulted in very little improvement in the overall accuracy of the equation.

Using the three equations estimated above, we can now trace the effect of a one-time change in the growth of real government debt in period t on the demand for consumer credit:

Given that $\Delta REALR_i = \Delta R_i$

Then $\Delta R_i = c_i \Delta CHG_t$

$\Delta CCR_{i+2} = \alpha \Delta R_i$

$\Delta CCR_{i+2} = \alpha c_i \Delta CHG_t$

Where: $i = t, t+1, t+2, t+3, \ldots, t+8$
R is the nominal rate of interest
REALR is the real rate of interest
CHG is the growth in government debt
CCR is consumer credit demand

In this case:

$\alpha = -27.609$

$c_t = -00.005$

$c_{t+1} = 0.009$

$c_{t+2} = 0.020$

$c_{t+3} = 0.027$

$c_{t+4} = 0.031$

$c_{t+5} = 0.032$

$c_{t+6} = 0.029$

$c_{t+7} = 0.023$

$c_{t+8} = 0.013$

Simulating the results, in real terms, using a $1 billion increase in government debt held by the private sector in

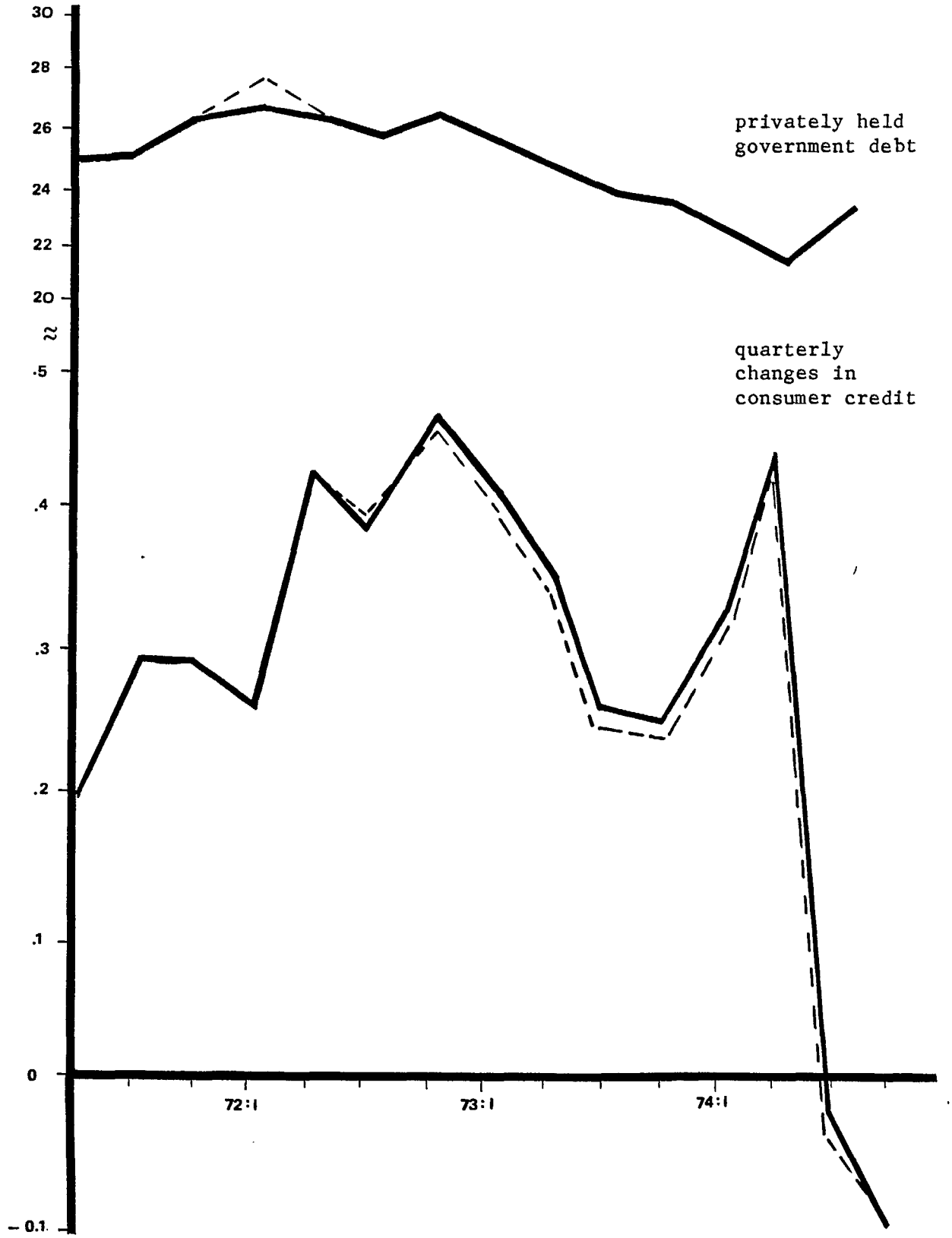
the first quarter of 1972 (a quarter of average government expenditures), we get effects on consumer credit demand from 1972:3 to 1974:3. The sum of the effects is a decline of approximately $75 million or 7.5% of the increase in government debt. This effect is graphed on Chart 2. The simulation was tested over the range of the sample and the results proved stable. The effect ranged from $81 to $75 million depending on the level of and changes in government debt.

Using the results derived at the mean, they imply that 7.5% of government sourcing will come out of consumption forgone due to a decrease in consumer credit demand. This can occur by either increased repayments or decreased new borrowings. If we take Juster and Shay's line of argument then we can say that decreased consumer credit will come first from the borrowers with higher levels of liquid assets since they are attributed with the higher interest elasticity of demand and this will tend to affect Trust Companies and Chartered Banks relatively more than Financial Corporations and Credit Unions. However, this implication is just conjecture. It would require a more disaggregate model of the consumer credit market in Canada to test this hypothesis.

CHART 2

THE SIMULATED IMPACT OF AN INCREASE IN GOVERNMENT DEBT
OF $1 BILLION IN 1972:1
ON THE DEMAND FOR CONSUMER CREDIT IN CANADA

in billions of 1970 dollars



CHAPTER THREE: RESULTS AND IMPLICATIONS FOR THE DISCOUNT RATE IN CANADA

3.1 INTRODUCTION

The social discount rate for Canada has been estimated recently by Jenkins* and revised by Burgess**. In the first study it was estimated at 10.78% and in the second study it was revised to 7.97%. Jenkins attributes 5% of the additional funds borrowed by the government to be sourced from increased saving and Burgess estimates this proportion to be 15%. Both analyses use 4.14% as the marginal rate of time preference and in both cases this rate of return relates to positive saving while their measure of saving is actually total saving. To suggest changes in these estimates of the social discount rate for Canada, it would be necessary to derive the social rate of return on consumer credit based on the results of our model and the social rate of return on positive saving derived in a similar fashion.

3.2 SOCIAL OPPORTUNITY COST AND CONSUMER VALUATION OF CONSUMER CREDIT

While the 90-day finance company paper rate, expressed in

*Economic Council of Canada, Capital in Canada:Its Social and Private Performance, by Glenn P. Jenkins, Discussion Paper No. 98 (Ottawa, 1977).
**Energy, Mines and Resources Canada, The Social Discount Rate for Canada: Theory and Measurement, by David Burgess (Ottawa, 1979).

real terms, is the market price of a dollar which goes towards the extension of consumer credit, it is not the social cost of providing an extra dollar of consumer credit to the market. Distortions caused by taxes on the operations of financial institutions cause additional real social costs. It is therefore the consumer credit demand schedule as a function of the augmented interest rate (i.e. the 90-day finance company paper rate plus taxes on the operations of the Financial Corporations) which will indicate the social opportunity cost of consumer credit. This rate is represented by ρ in Figure 2a of Section 1.3.

The rate of interest which represents the consumer's willingness to pay for credit is greater than ρ because it includes all costs which are borne by the borrower for an extra dollar of consumer credit he/she borrows. This will typically include some costs which are not social costs such as the operating expenses and profits of the financial intermediaries.

We have chosen the Financial Corporations as the marginal source of credit on the market and the market participant whose financial statements most represent the effect of consumer credit market conditions. Therefore, we will assume that the value of consumer credit to the marginal borrower is that of the borrower using Financial Corporation credit.

To calculate the social opportunity cost of consumer credit,

total Federal, Provincial and other indirect taxes; taken as a proportion of credit extensions; are added to the estimated expected real interest rate.See Table 6. For the period between 1969 and 1978, Financial corporations paid between 54% and 49% of their taxable income in taxes. As a proportion of their credit extensions, these taxes averaged 1.34%. The mean social rate of return on consumer credit was found to be approximately 4.2%.*

Using Table 3 as the source of the financial P&L data for the period 1969 to 1978, a price is constructed which reflects the consumer's willingness to pay for this credit. To make all costs comparable to the interest rate, they are taken as a percentage of the amount of consumer credit extended. If the amount of credit extended is designated by X then Accounts & Notes Receivable will be designated by $(1 + P) \times X$ where P is the interest rate charged the borrower. Total Revenues are $P \times X$ and Total Expenses are $C \times X$. The amount of credit offered is then calculated as Accounts & Notes Receivable minus Total Revenues or:

$$X = [(1 + P) \times X] - (P \times X)$$

The real price to the borrower will then be P, adjusted for the expected inflation rate. For the purpose of exposition, the mean price is derived, however this method can be used

* Taxation Statistics were found in Statistics Canada, Corporation Taxation Statistics, Catalogue No. 61-208 and Corporation Financial Statistics, Catalogue No. 61-207.

TABLE 6

DERIVATION OF THE SOCIAL OPPORTUNITY COST AND CONSUMER VALUATION OF CONSUMER CREDIT IN CANADA: 1968-1979

(Calculated at the mean)

	% **
Total Federal, Provincial & other indirect taxes paid as a % of total credit extended by Financial Corporations*	1.34
Estimated expected real interest rate paid by Financial Corporations	+ 2.85
Social Opportunity Cost per $ of consumer credit	4.19

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Total Federal, Provincial & other indirect taxes	1.34
Profits	+ 1.78
Operating Expenses	+ 4.68
Losses	+ 1.15
Depreciation & Amortization	+ 0.25
Estimated expected real interest rate paid by Financial Corporations	+ 2.85
Consumer valuation of consumer credit	12.05

* Total taxes paid differ from the income tax figures in Table 3 because taxes paid are the actual tax payments recorded in the taxation statistics of Statistics Canada while the income tax figures in the P&L Statements of Financial Corporations are the accounting of provisions for current and deferred taxes.

** As a % of total credit extended by Financial Corporations

to derive the price for each quarter in the sample period. To be consistent with the model, we will construct the price using the derived mean of the expected real interest rate, 2.85,* and augment it by Operating Expenses, Losses, Depreciation & Amortization, Income Taxes and Normal Profits. While Operating Expenses, Losses and Depreciation & Amortization can be considered relatively constant and averaging approximately 6.1% over this period, Income Taxes and Normal Profits vary depending, among other things, the real interest rate. We have calculated them to be on the average 109% of the expected real interest rate.

The consumer's willingness to pay for an extra dollar of consumer credit can be calculated as:

$$R = REALR\ [1 + (T + \pi)] + OC$$

Where: REALR is the expected real interest rate
T is the income tax rate
π is the normal profit rate
OC is the other costs which are considered constant

The average consumers' valuation of consumer credit must be at least equal to the calculated supply price of consumer loans, 12.05%.

*The estimated nominal 90-day finance company paper rate, the rate used to calculate the expected real interest rate, is 7.4% in 1969, 5.6% in 1972, 8.0% in 1975, and 8.5% in 1978 compared to the Cost of Borrowing of Financial Corporations of 7.1%, 5.7%, 8.2%, 8.6% respectively.

3.3 IMPACT OF CONSUMER CREDIT ON THE SOCIAL DISCOUNT RATE IN CANADA

The results of our model suggest that when dividing total saving into positive saving and consumer credit, we can determine that government sourcing will decrease the demand for consumer credit. This will add to the social opportunity cost of public funds. In Canada, we found that 7.5% of government sourcing comes from consumer credit at a social rate of return of 4.2%. Therefore decreased consumer credit demand will contribute 0.32 percentage points to the social opportunity cost of public funds.

With respect to the other studies on the social discount rate, nothing can be said without using their own assumptions about the interest elasticities of saving, saving's share of the funds forthcoming due to government sourcing, and their marginal rate of time preference. The effects of an incremental increase in government borrowing on total saving is the sum of the effects on each of its parts, as described in Section 1.3. Our results show that 7.5% of the sourcing will come from decreased consumer credit. If the elasticity of positive saving is either 0.2 (Jenkins) or 0.4 (Burgess) then positive saving will also be affected by government borrowing and its share added to that of consumer credit must be at least as great as 7.5%. This conflicts with Jenkins' estimate of a total saving share of 5%. This amendment of Jenkins' analysis will slightly lower his estimate of the social discount rate for Canada.

On the other hand, given that 7.5% of the funds are derived from decreased consumer credit demand, it must be weighted by the social rate of return on consumer credit which we have estimated to be 4.2%. Therefore, if the share of funds forthcoming from total savings is 15%, as Burgess suggests, the other 7.5% must be due to positive saving. However, no comparison or conclusion can be made since the derivation of a social rate of return on positive saving has not yet been attempted.

The revision of another study's figures using a different analysis and set of assumptions is not fruitful and the results of this study are not enough to estimate the full social discount rate for Canada. A similar study of the effect of government borrowing on positive saving is needed to arrive at a more complete analysis of the weights to be applied to all sources of public funds.

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