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# CANADIAN CLOTHING AND TEXTILE MODEL

# AN ECONOMETRIC MODEL

# OF

# THE CANADIAN CLOTHING AND TEXTILE INDUSTRY

By

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## ABSTRACT

This thesis develops an econometric model of the Canadian clothing and textile industry for the purpose of investigating its structure, the market it faces, linkages between the market and the industry and the sensitivity of the industry to external factors. Using the model, several simulation experiments are conducted with the primary focus centered on the issues of protection accorded the industry. The future prospects of the industry under various alternative scenarios are evaluated.

Empirical support is indicated for most of the hypotheses underlying the specification of the model. Some of the hypotheses are: the firms in the industry engage in imperfect competition; the industry operates under constant return to scale; price competitiveness is a significant factor in explaining the level of imports; domestic production capacity has an influence on imports. It is found in the thesis that clothing imports respond with a relatively high elasticity to changes in price as well as income, revealing a source of instability inherent in the clothing industry. As a system, the model is found to trace the history of the industry with reasonable accuracy. The model is also found to display a considerable degree of consistency and stability in its responses throughout the simulation experiments. The thesis thus provides a dynamic, structural and simultaneous economic system that can be validly used either as a forecasting tool or frame of reference in analyses.

An <u>ex-ante</u> simulation intended as a reference forecast of the industry suggests that despite the present quota protection, the past downward trend observed in the clothing industry will likely continue in the future, while the textile industry will maintain a status quo. A simulation with a complete removal of tariff protection appears to support the argument that consumer gains will outweigh losses on the labour and production side. Another simulation suggests that there are policy options available that may be considered as effective means of stimulating the industry.

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# CHAPTER I. INTRODUCTION

During the last decade, the Canadian textile and clothing industry has undergone a number of significant changes in its domestic and international environments. The major developments underlying the changes include: transition from natural to man-made fibres; rapid progress in science and technology; massive expansion in textile production facilities in the early 1970s leading to excess capacity; emergence of low-cost developing countries as major world exporters of textile and clothing products; a continuing trade liberalization movement represented recently by the just-concluded Tokyo round of the GATT negotiations; and stepped-up efforts of the textile-importing countries to rationalize their protective measures, as witnessed by the 1974 signing of the Arrangement Regarding International Trade in Textiles.

Despite the rigorous experiences it has had in the process of adapting itself to these changes, the industry today still suffers from instability and extreme vulnerability to environmental changes. The root of the problems faced by the industry today lies in the simple law of international comparative advantage. The developing countries, given the present state of their industrial development and relative factor endowments, possess a comparative advantage in producing textile and clothing products, and naturally out-compete the producers of the developed countries as a supplier to the latter's domestic market - even with barriers. For obvious reasons, this poses a tough dilemma for the developed economies and hence their policy makers. The short-term, but more visible, concern over protection of the domestic industry and jobs in times of high unemployment rates and slow economic growth clashes with other targets: consumer welfare and the long-term rationalization of the industrial structure.

The dilemma is particularly acute at the present moment in the Canadian context. In response to the worsening plight of the industry, the government introduced in 1976, in addition to the existing tariffs, a protective measure of global quotas on fourteen categories of clothing products, invoking Article XIX of GATT. This measure was replaced in 1979 by bilateral trade agreements extending the coverage to most major textile and clothing products. Since these agreements are due to expire at the end of 1981, the Textile and Clothing Board, established as the major instrument for implementing the Canadian Textile Policy instituted in 1970, is presently conducting an inquiry into the industry to determine the question of whether to extend the special measures currently in force beyond 1981.

As has been witnessed by the dramatic turnaround in the fortunes of the industry in very recent years, the Canadian textile and clothing industry has naturally benefitted greatly from the above special measures. Encouraged by this, the industry now advocates extension of the special measures for a prolonged period of time, or until the industry reaches a viable, efficient and self-sufficient operation. The industry's advocacy for further protection, however, tends to bring the following contentions into a sharper focus. No fundamental change has occured during the recent past, particularly after 1976, to right what has plagued the industry for so long, i.e., the industry's vulnerability to foreign competition; the prolonged special protection measures have caused substantial damage to the welfare of the consumer as witnessed in the prices of traditionally low-priced garments; the adverse effect of quotas on imported textile materials, e.g., fabrics, has also pushed up the prices of textile end-products significantly; in an economy in which productivity and competitiveness are beginning to emerge as issues of great urgency for all industries, building a higher protective wall for an industry will rather hamper its long-run relative industrial position, only delaying the rationalization of the industry. In short, another round is currently being added to debates and controversies over the familiar issues surrounding the Canadian textile and clothing industry.

The purpose of this thesis is neither to participate in the round nor to offer a solution to the industry's problems. The thesis rather purports to understand better the industry through an econometric investigation of the industry structure, workings and interdependencies of the economic agents involved in the industry, and its relationship with outside economic forces. For this, the thesis attempts to build an econometric model of the Canadian textile and clothing industry, abstracting from reality the features of the industry essential to:

(1) understanding the nature and extent of the major causal linkages affecting the industry;

(2) highlighting the major issues of today as well as evaluating its future;

(3) providing a framework for the examination of alternative policies directed towards the industry.

These then basically constitute the contributions intended by the present thesis.

Properly constructed, an econometric model of the Canadian textile and clothing industry can offer what a descriptive or institutional approach cannot. It offers quantitative measures of causal relationships, established in a consistent framework, among the various economic forces in the industry. From the industry's point of view, it provides a unique opportunity to evaluate the future prospects of the industry contingent on various exogenous forces, thus enabling it to engage in medium- and long-term planning. More importantly, it is capable of handling "what if" questions arising from the need to consider the implications of alternative scenarios, assumptions and views regarding policies, economic forces beyond the industry's control and other elements of uncertainty: what will happen to the industry if all the protection measures are dismantled? Will the industry die the next day? What will be the effect of a sudden upward movement in the exchange rate on the industry's performance? What are the implications of various incentives that the government may introduce to stimulate the industry? What is the implication of a rapid increase in the crude oil price? Should the special measures currently in effect be removed, will the industry be forced back to the pre-1976 state? These are just a few of the host of questions vital to both the government and the industry, and an empirical model such as the one attempted here should be able to shed light on them.

As far as one can determine, no major attempt has been made so far to investigate quantitatively the Canadian textile and clothing industry as a system. The lack of such an effort seems particularly acute when one considers the frequency and intensity with which the debates over the issues of textiles and clothing have been conducted during the past, as well as the plethora of reviews, reports and studies on the subject. The present thesis is an attempt to fill this gap.

The main text of the thesis consists of six chapters. After reviewing the literature on the subject in Chapter II, the thesis looks into the industry in Chapter III to gain a perspective as to the state of the industry today and its past experiences and trends. A descriptive analysis of the major features and characteristics of the industry is presented. In Chapter IV, the formal model is presented. The structure and theoretical underpinnings of the theoretical model are explained, laying groundwork for econometric studies that follow in Chapter V. The results of estimation as well as their interpretations are presented in this chapter. Chapter VI applies the empirical model for various simulation experiments. Chapter VII summarizes and concludes the thesis.

# CHAPTER II. LITERATURE REVIEW

Aside from the highly controversial nature of the issues involved, the textile and clothing industry is one of the few industries that provide a rich ground for empirical analysis, be it a micro- or macro-analysis, on industrial structure, market, price determination, organization and production process, and interdependencies between these and other components. A good body of data relevant to the industry is available and the level of intelligence acquired about the industry is unusually high. As an economic system, the industry contains, within itself, many interesting causal relationships especially between sub-industries. It is therefore rather surprising to find that relatively little empirical investigation of the industry has been undertaken. Nevertheless, from the published literature, the following six studies are noted: Wallace, Nayler and Sasser, Bramson and Miles, Isard, Miller, McFetridge, and Lewis.

Among these, only McFetridge is a Canadian industry study, while Wallace, Isard, Miller and Lewis concern the U.S. textile industry, and Bramson and Miles, the U.K. textile industry. Looked at differently, Wallace and Bramson are industrial modelling attempts, whereas the rest are micro-econometric analysis, mainly concerned with specific aspects of the industry.

Wallace, Naylor and Sasser constructed a recursive, econometric model of the U.S. textile industry. The model was constructed as a short-run forecasting/simulation model. It deals with two commodity categories, apparel and total textiles. However, apparel is not treated as a separate industry in the model. It consists of nine linear equations that recursively determine apparel demand and output, demand for and output of total textiles, price of total textiles, employment, wages, profit and investment of the textile industry, excluding apparel.

Aside from the fact that it represents the first attempt to construct a structural model of the industry, their model suffers from so many flaws, both theoretical and empirical, that one can hardly say the model achieved the intended purposes of explaining the behavior of the U.S. textile industry.

First of all, the model lacks a market clearing mechanism. There is no link between the real and price side. Price has no role to play in determining demand and the change in demand and supply conditions has no influence on the determination of price. Further, the price equation for apparel does not even exist in the model. Secondly, imports are exogenous. Hence, the model is incapable of answering the critical questions regarding foreigners' market penetration, protective reaction against it, and the effect of these on the performance of the domestic producers; these are the focal issues in today's textile and clothing industries in North America. Thirdly, equation specifications are too simplistic and in many instances lack theoretical justification. For instance, the wage rate is explained solely by the number of people employed; no price variable is present in the demand equations; and production is a function of sales and inventory variations alone. Empirically, all the equations are estimated in nominal terms, making it impossible to distinguish between changes attributable to price and real factors and thus offering no useful inference on elasticities. Finally, designed as a short-run forecasting model, it cannot address long-run structural questions, which are of more importance from the government as well as the industry's point of view. It ignores many strategically important variables.

Bramson and Miles constructed an input-output model of the U.K. textile and apparel industry disaggregated over as much as 50 sub-industry categories, as an institutional project of the National Economic Development Office (NEDO) in the U.K.. As the term input-output suggests, it is not an econometric model. It is designed primarily as a framework for measuring (in pound weights) intermediate input requirements in the textile industry based on the observed, fixed technical coefficients defining industrial input-output relationships between sub-sectors of the industry. Demand for all the end products including apparel is exogenous, prices are non-existent and no feedback occurs within the model. Once demands for end-products are exogenously given, the model calculates recursively the weights of textile materials purchased by each subsector, progressing backward to the fibre-producing industries.

Notwithstanding the obvious limitations of this input-output approach, it provides an insight into the complex, intricately woven inter-sectoral flows in the U.K. textile industry. The model can address such important issues as effective level of protection, implications of technological change on inter-industry flows and factor uses, optimum long-term policy planning towards efficiency of the industry - for instance, how much to invest in what sector to maintain the employment at a targeted level. Further, with a reasonable set of assumptions on demand and prices, and a consistent projection on the technical coefficients, both of which are no easy matter, the model may be employed as a very useful forecasting tool.

On the micro-econometric side, although the model by Isard is far from being a structural simulation/forecasting model, it offers an interesting approach to quantifying policy options that focus on how many textile imports should be allowed. Isard builds a simple five-equation production model where the concept of vintage-capital plays the key role in explaining inter-relationships between labour demand, investment, technological change and production. Through an empirical measurement of the two reduced-form equations, explaining production and labour demand as functions of successive vintage investments and technological changes associated with the vintage capitals, Isard attempts to find how much a capital-induced, labour -saving technological change will replace labour in the textile industry as compared to a reduction of employment as a result of textile imports retiring marginally profitable capital (or firms). One of his empirical findings is that in the U.S. textile industry, new investment in machinery and equipment, through capital-embodied technical change, will result in twice as large labour saving as that caused by import of foreign textile products. Simulating with the results, he suggests the likely maximum import growth rate that is feasible under alternative target employment paths, for a range of demand growth and technological change characteristics.

Isard's study is based on several strong assumptions including that of how much change in the output-labour ratio is due to a technological change (his assumption: 2/3). Nevertheless, it is felt that the study may provide a useful reference when discussing such questions as the benefit and cost of protection and effects of technological change in the textile industry.

Miller is similarly concerned with the relationships between employment, investment and output in the U.S. textile industry. Unlike Isard, however, Miller confines his attention to the short-run aspect of the industry's output-factor relationship. The study focuses its empirical investigation on the employment implications of cyclical swings, especially in respect of peak and off-peak periods. Based on the hypothesis that determination of labour demand at off-peak periods is completely different from that at peak periods, Miller constructs a supply model consisting of a dichotomized (peak, off-peak) system of equations covering labour demand, inventory changes, demand for labour hours and production. In particular, in the off-peak period system, in addition to effective labour demand, there is a separate equation for "reserve labour" demand which depends mainly on labour price and inventory investment. Costs involved in hiring and firing and uncertainties over cycles are the factors that force firms to keep a desired inventory of reserve workers. The reserve workers are further postulated as substitutable for inventory of finished products, which in turn is related to sales of both current and past period.

When applied to the U.S. wool and cotton weaving industries, the above hypotheses are empirically supported. It is also found that his dichotomous type of model produced a better prediction of actual labour demand than a model based on a standard (peak-period) specification. Miller's model thus offers a plausible explanation on relative stability in the textile industry observed during periods of low cycle.

McFetridge studies the pricing formation in the Canadian cotton textile industry. Through estimation of a meticulously developed price equation, the study attempts to determine if mark-up pricing is modified, to an extent, by excess demand or supply, and if it is, whether the relationship between the price change and the market disequilibrium is non-linear, that is, whether the magnitude of the price change is the same both in excess demand and supply situations.

The study finds that in the Canadian cotton textile industry, the output price is influenced by the market disequilibrium, in addition to unit labour cost, and further that the degree of influence is the same whether the disequilibrium is created by excess demand or supply. In addition, the study also finds that the domestic price of cotton-made textile products tends to move closely with the import price.

McFetridge's findings provide a useful reference for the present thesis especially in its treatment of industry prices.

Lewis estimates U.S. demands for seven categories of textile fibres: cotton, apparel wool, cotton wool, rayon-acetate staple, rayon-acetate filament yarn, synthetic staples and synthetic filament yarn, mainly for the purpose of measuring different elasticities of the variety of textile fibres. One of his major findings is that fibre demands are in general price-inelastic, which Lewis interprets as an explanation of observed instability in fibre prices in the U.S..

# CHAPTER III. THE CANADIAN TEXTILE AND CLOTHING INDUSTRY

## 1. Definition of the Industry

The Canadian textile and clothing industry comprises the manufacturers of goods categorized in the 1970 Standard Industrial Classification (SIC) as belonging to either textile (SIC05), knitting (SIC06) or clothing (SIC07) industries. It is possible and useful to subdivide knitting into non-clothing and clothing textiles, and to assign non-clothing knitted textiles to the textile industry and knitted clothing to the clothing industry. This is the classification used by the Department of Industry, Trade and Commerce and we find it convenient to make use of it here.

### Textile Industry

The textile industry engages in activities ranging from the production of man-made fibres and yarns to the transformation of natural or man-made fibres into apparel fabrics, and to the production of a wide variety of household and industrial products. The individual sub-industries in the textile industry are very closely interrelated in that output of one industry becomes the major material component for the production of another industry. Often these linkages represent merely several integrated stages of production for large firms producing a line of the linked textile goods. A high interdependence also exists between the textile industry and its customer industries--clothing, furniture and automotive--and its suppliers, notably petrochemical industries.

The natural fibres such as wool and cotton, and synthetic fibres (acetates, rayon, nylons, polyesters, acrylics) are the principal raw materials of the textile industry. The natural fibres are entirely imported, whereas major synthetic fibres are domestically produced, generally by foreign-controlled producers. The natural and synthetic fibres go through a number of processing steps before their conversion into yarns, which then are transformed to fabrics by weaving, knitting, tufting, braiding, felting, and bonding. Fabrics thus produced usually require bleaching, dyeing, printing, and other finishing operations before they are processed into final end-products including clothing, household products (thread, sheets, draperies, towels, blankets, carpets, mats, bedspreads, etc.) and industrial goods (cordage and twine, floor coverings and carpets, automotive fabrics and accessories and belts).

Clothing Industry

The Canadian clothing industry consists of firms producing apparel for consumers and industrial and institutional applications. The process involved includes cutting and sewing fabrics or knitting yarns into garments finishing the products for sale. The products of the industry include men's, women's and children's clothing, fur goods, foundation garments, gloves, hats/caps and knitted wears.

2. <u>Industrial Organization</u>

<u>Textile Industry</u>

The textile industry is composed of about 900 firms operating 987 establishments, most of which are located in relatively small towns in Ontario and Quebec. Despite the large number of firms and establishments, the industry may be characterized as a highly concentrated industry. Most man-made fibres are produced by two firms. There are only two Canadian producers of cotton apparel fabric, one of cotton denim fabric, two of nylon apparel fabric, three of polyester apparel fabric, two of sheets and pillowcases and acetate lining fabric, and three of towels. In addition, two firms account for 87% of worsted fabrics produced domestically. In 1975 the largest 26 establishments, or 3% of the total number of establishments, accounted for 31% of total employment of the industry. On the other hand, the smallest 529 establishments, or 52%, represented only 5% of employment.

The extent of the concentration in the textile industry is similarly reflected in the relative position of the few largest firms in the value of shipments. As shown in Table III-1, the four largest firms in the industry accounted for 93% of value of shipments of man-made fibres in 1974, 77% of cordage and twine, more than 60% of fibre and felt and about 40% of such products as carpets, yarns and cloth.

TABLE III-1

Percentage of Value of Shipments Accounted for by the Four and Eight Largest Firms, Subsectors of Textile Industry, 1974

| Subsector | % of Industry Value of Shipments | |
|---|---|---|
| | Four Largest Firms (%) | Eight Largest Firms (%) |
| Man-made yarns & fabrics | 39.3 | 56.5 |
| Cotton yarn & cloth | n.a.[1] | 100.0 |
| Wool yarn & cloth | 40.2 | 60.4 |
| Man-made fibres | 93.4 | 100.0 |
| Knitted fabrics | 27.9 | 43.2 |
| Narrow fabrics | 48.8 | 67.7 |
| Carpet, mat & rug | 39.3 | 61.4 |
| Fibre & felt: fibre mills | 59.7 | 83.5 |
| : felt mills | 71.6 | 90.3 |
| Cordage & twine | 76.9 | 93.3 |
| Embroidery, etc. | 30.0 | 46.3 |
| Misc. textiles including household goods | 33.2 | 45.2 |

[1]n.a.: Not available

Source: Statistics Canada, Manufacturing and Primary Industries Division. From The Canadian Textile and Clothing Industries: A Report by the Sector Task Force. Ottawa, 1978.

For some textile products, the eight largest firms are the sole domestic suppliers of these products. It is noted that the degree of concentration diminishes as the product line moves downstream towards the consumer level.

The relatively high concentration of production, especially in the upstream products, reflects the importance of scale economies, the limited size of the Canadian market, and insignificant export outlets. Relatively large investments are required to reach scale economies (an investment of $300,000 per employee is required to install new production facilities of synthetic fibres), and vertical integration of the industry is advanced. These provide the main barriers to market entry and are the main factors that maintain an oligopolistic structure in the industry.

In 1974, 42% of textile shipments were made by foreign-controlled companies, which operated 10% of the industry's establishments. Foreign ownership is more pronounced among manufacturers of synthetic fibres. Often, petrochemical products are the main products of these foreign-owned manufacturers of synthetic fibres.

The oligopolistic structure and widespread vertical integration in the industry imply, first, that prices will not be determined in a perfectly competitive way, and, secondly, that prices of materials will play a major role in the price movements of the textile products. The relationship between production cost and output price will be more direct as the large firms can reflect changes in cost in the output price with relative ease. A change in the price of raw materials will have a very widespread effect across the industry. Disruptions in the prices of natural fibres, which are entirely imported, and petrochemical products will have an important bearing not only on the industry but also on apparel producers.

Approximately half of what the industry produces is either fibres, yarns or fabrics, that is, intermediate products. In turn, 38% of these intermediate products are purchased by the clothing industry, 27% by automotive fabrics and household products, 5% by carpets and floor coverings and 2% by curtains and draperies. The sector producing the intermediate goods consumes 28% of its own products.

Clothing Industry

The clothing industry is characterized by a large number of producers, as reflected in the number of establishments in 1975 - 2,300. In contrast to the textile industry, about 70% of these establishments employ less than 50 people each, while 15% employ 100 or more. However the latter group, employing 100 or more each, provides 57% of total jobs available in the industry and 54% of the total value of clothing shipments.

Over the ten-year period 1965-75, the average size of a production unit showed a slight increase; in 1965, 11% of the total establishments employed 100 or more people each, while in 1975 the comparable figure is 15%. A change in the opposite direction is seen for the less-than-50 category in

Table III-2.

TABLE III-2

Size Distribution of Establishments in the Clothing Industry

| Number of Employees | 1965 No. of Firms | 1965 % | 1975 No. of Firms | 1975 % |
|---|---|---|---|---|
| Less than 50 | 1,943 | 74.5 | 1,627 | 71.1 |
| 50 to 99 | 378 | 14.5 | 349 | 15.1 |
| 100 and more | 268 | 11.0 | 342 | 14.8 |
| TOTALS | 2,607 | 100.0 | 2,318 | 100.0 |

Source: Statistics Canada, Manufacturing and Primary Industries Division. From *The Canadian Textile and Clothing Industries: A Report by the Sector Task Force*. Ottawa, 1978.

About 50% of the establishments producing apparel products are concentrated in men's, women's, and children's clothing, whereas knitted wear and foundation garments each account for one-third of the total establishments.

The multiplicity of small establishments in the clothing industry reflects a long tradition of individualism prevalent in the industry (many firms are run as family businesses), the relative ease of market entry, the extremely wide variety of product lines as demanded by consumers, and the ever-changing nature of the fashion-led market. Many of the small establishments today strive to stay efficient through specialization in one or two products and by quick adaptation to changing market conditions, an advantage of the small-scale operation. However, there is some indication of concentration also in this apparel industry. As shown in Table III-3, a relatively large share of shipments is accounted for by a small number of big establishments producing apparel products, notably in such sub-sectors as men's clothing, knitwears, fur goods, and foundation garments.

TABLE III-3

Canadian Clothing Industry Selected Sub-Sectors
Production Share of Establishments
with 100 or More Employees, 1975

| | Establishments | | Shipments | |
|---|---|---|---|---|
| | No. | % of Total Sub-Sector | ($Million) | % of Total Sub-Sector |
| Men's clothing | 140 | 22 | 611.4 | 65 |
| Women's clothing | 98 | 11 | 377.3 | 41 |
| Children's clothing | 22 | 16 | 77.0 | 45 |
| Fur Goods | 4 | 1 | 36.7 | 26 |
| Knitters | 54 | 34 | 209.2 | 73 |
| Foundation garments | 11 | 34 | 49.7 | 72 |

Source: Statistics Canada. From *The Canadian Textile and Clothing Industries: A Report by the Sector Task Force*. Ottawa, 1978.

The competition in the apparel market is acute with no major firms dominating the market. Price movements reflect more closely the relative strength of demand and supply with low profits accorded the industry. Between 1971 and 1977, the Consumer Price Index (CPI) on all items rose by 71%, whereas the CPI for clothing increased by only 43%. In 1975, the clothing industry earned a profit (after tax) of $2.50 per dollar of sales, which compares to $4.30 for manufacturing.

Relationship Between the Textile and Clothing Industries

The clothing industry is the major client of the textile industry, which supplies over one-third of its output to the former as raw materials. While the two industries affect each other through the client-supplier relationship, there is a marked asymmetry in the degree to which each is influenced by the other. The asymmetry comes mainly from the following facts. First, the textile industry has no alternative outlets for the products the clothing industry buys, whereas imported fabrics provide a choice for the latter between domestic and foreign raw materials. Secondly, the difference in ability or speed with which to adapt to changing market conditions is such that a slowly adapting textile industry is much more susceptible to adverse environmental changes. Compared to the small-scale, fixed-capital base operation of the clothing industry, the textile industry has to commit investment plans several years in advance of the period when a new facility comes on-stream.

The issue of import penetration provides a good illustrative example. Increased import penetration in textile and clothing products hurts domestic producers. An increased import of apparels cuts into the apparel producers' market, thereby forcing them to reduce output. However, the increased import of fabrics can be a boon to apparel producers since they will have a greater selection of style and colour combination from which to choose at a competitive price.

On the other hand, from the textile producer's point-of-view, the increased import penetration indiscriminately hurts the industry because it is not just fabric imports that will reduce demand for the products, but imported clothing will also affect the demand with the foreign-made clothing replacing domestic production.

By the same reasoning, if a special protection is accorded the textile industry, this will represent an addition to cost of production for apparel producers.

## 3. Industrial Activities and the Market

### The Textile and Clothing Industry Today

In 1978, the textile and clothing industry provided employment for a total of 187,000 people, accounting for 9.6% of total manufacturing employment (see Table III-5). Individually, the textile industry employed 66,000 or 3.4% of manufacturing, and clothing (including knitting) employed 121,000 or 6.2%. The industry in the same year generated through production activities a combined total of $1.8 billion, or 7.2% of total manufacturing, in value-added in 1971 constant dollars. About 55% of this real value-added was produced by the clothing industry and 45% by the textile industry (see Table III-5). Approximately the same composition applies to each industry's value of shipments in 1978. Of the total shipments by the textile industry, about 50% is accounted for by the intermediate products such as fibres, yarns and cloth mills. Total shipments by the textile industry are broken down in Table III-4 for the year 1976, the latest year such a breakdown is available.

In 1978, the textile and clothing industry invested $80 million in real terms in plants, machinery and equipment, accounting for only 2% of total manufacturing investment. This contrasts with the industry's relative position in manufacturing in value-added terms, a factor that deepens further the already labour-intensive production process of the industry. The average employee in the textile and clothing industry was equipped with $13,629 worth of capital in 1978, whereas the comparable figure for total manufacturing was $38,992--about three times as much. The high labour-intensity of the clothing industry is responsible for this difference. When the clothing industry is taken alone, the capital per employee is $4,365, or close to one-tenth of the manufacturing figure. Reflecting its highly mechanized nature of upstream production stages, however, the average employee in the textile industry is equipped with the amount of capital comparable to that of manufacturing as a whole.

TABLE III-4

Shipments by Commodity Group:
Textile Industry, 1976

| Commodity | Percent |
|---|---|
| Intermediate Products | 48.8 |
| Man-made fibres | 8.8 |
| Yarns & Cloth Mills | 40.0 |
| Carpets & Floor Coverings | 12.5 |
| Curtains & Draperies | 2.6 |
| Automotive Fabrics & Accessories | 9.9 |
| Cordage & Twine | 0.6 |
| Others, including Household Products | 25.6 |
| | 100.0 |

Source: Statistics Canada, Manufacturing Industries of Canada: National and Provincial Areas, 1976 and CANSIM Databank.

TABLE III-5

The Clothing and Textile Industries Today: 1978

| | Textile | Clothing[1] | Total | Manufacturing |
|---|---|---|---|---|
| Shipments ($Million)[2] | 3,714 | 3,765 | 7,479 | 129,032 |
| Imports ($Million) | 1,278 | 734 | 2,012 | |
| Exports ($Million) | 224 | 145 | 369 | |
| Apparent Domestic Consumption ($Mill) | 4,768 | 4,354 | 9,122 | |
| Value-Added ($1971 Mill) | 815 | 1,010 | 1,825 | 25,219 |
| Employment (000s) | 66 | 121 | 187 | 1,956 |
| Investment ($1971 Mill) | 54 | 25 | 79 | 3,405 |
| Value-Added per Employee ($1971) | 12,350 | 8,347 | 9,759 | 12,893 |
| Capital per Employee ($1971) | 30,667 | 4,365 | 13,629 | 38,992 |
| Wage per Hour | 5.38 | 4.59 | | 6.84 |
| Industry Selling Price (1971=100) | 159.7 | 178.2 | | 190.4 |
| Import Price (1971=100) | 165.9[3] | 190.9 | | 183.3[4] |

[1] Knitting included in Value-Added, Employment and Investment.

[2] Includes exports.

[3] Estimate of aggregate import deflator for intermediate textile product.

[4] Estimate of aggregate price for Imports, Sections 4 and 5, of Trade of Canada.

Source: Statistics Canada. See DATA SOURCES AND ACCOUNTING IDENTITIES in APPENDIX B for source detail.

The high labour intensity of the clothing industry is directly translated into its productivity performance. Measured in terms of real value-added per hour, the productivity level in the apparel industry is equivalent to 61% of that in total manufacturing. While the textile industry shows a better labour productivity performance, it still lags behind total manufacturing. Hourly earnings similarly reflect productivity performance of each industry. The fact that a significant part of the workers in clothing are unskilled or semi-skilled also explains the lower level of labour earnings in this industry. Until very recently, industry selling prices of textile and clothing products have grown less rapidly than both overall manufacturing products and import prices. The keen competition between domestic producers, especially in apparel and between domestic and foreign producers has kept the prices of home-produced textile and apparel goods at a relatively low level. This then also suggests a low profit realized in the industry, relative to overall manufacturing.

Imports of textile and apparel products amounted in 1978 to $2 billion in current dollars, which is equivalent to 22% of the so-called apparent domestic consumption (ADC) of these products, defined as shipments net of exports plus imports. Clothing imports took a share of 17% of the ADC clothing market. The corresponding market share for the textile imports is 27%. In the textile case, however, the market share measured in value of shipments contains the element of multiple counting, because of vertical interrelationships between each stage of production. The market share based on shipment value therefore measures production activity, or opportunity to generate value-added, displaced by imports, rather than the amount of consumption actually met by imports. Measured by another method, which uses fibre weight equivalents as the measurement unit and eliminates multiple counting, imports of textile and apparel had a market share of 40% in 1976. This method shows the share of the ADC market held by domestic producers of cotton, wool and synthetic fibres if all imports of textiles and apparel are converted back to fibre-weight equivalent. It thus represents the share of the ADC held by domestic manufacturers at the first stage of manufacturing.

The Textile and Clothing Industry: 1961-1978

Until very recently, the Canadian textile and clothing industry was a dying industry. The ever-increasing market penetration by foreign-made textiles and apparel, especially the apparel produced in developing and Eastern-bloc countries, had been taking more and more business away from Canadian manufacturers, forcing them to reduce operations, lay off employees, cut investment and even leave the industry. The import penetration was particularly acute in the 1972-76 period, during which time imports of apparel increased at an annual rate of 16% in constant dollar measures, as compared to the annual average increase of 9% in the preceding decade (see Table III-6). With the domestic market growing only at 8% per annum (1972-76), foreign apparel thus came to take an ADC market share of 20%, measured in current dollar terms by 1976, an increase of five percentage points from the 1971 share.

Although the impacts of the increased market penetration by foreign apparel during 1972-76 can also be clearly seen in the declining investment and employment of the clothing sector, the major hardship was suffered by the textile industry. This was due to the fact that in addition to the still-growing import of foreign fabrics (although less rapidly than in the previous period), the displacement of domestic production activity of apparel manufacturers caused by the foreign apparel also hurt the industry through the consequent reduction in their overall market size. Thus, the apparent domestic consumption of textiles registered a meagre growth of 2.7% in the 1972-76 period, as compared to 7.3% in 1961-71. Increased unit labour costs and lower productivity, real value-added, employment and investment, all point to the aggravated environment for the textile industry.

A sharp increase in both domestic and import prices of textiles in very recent years is also partly responsible for the relatively small growth in the overall demand for textiles. The significant increase in the price of petrochemical products, the major raw materials for synthetic fibres, following the energy crisis of 1973-74, is considered as the main contributing factor.

TABLE III-6

The Clothing and Textile Industries: 1961-78[1]
(percent changes)

| | Textiles | | | Clothing | | |
|---|---|---|---|---|---|---|
| | 1961-1971 | 1972-1976 | 1978 | 1961-1971 | 1972-1976 | 1978 |
| Apparent Domestic Consumption | 7.3 | 2.7 | 8.8 | 4.4 | 7.8 | 6.2 |
| Imports | 6.6 | 4.7 | 4.5 | 8.7 | 15.8 | -1.7 |
| Import Shares[2] | .284 | .291 | .268 | .145 | .199 | .169 |
| Value-Added | 6.8 | 2.6 | 9.4 | 3.1 | 4.7 | 14.6 |
| Employment | 1.0 | -0.3 | 1.2 | 0.5 | 0.5[3] | 0.6 |
| Investment | 6.6 | -0.9 | 10.2 | 5.3 | -3.8 | 1.2 |
| Value-Added per Employee | 5.7 | 2.9 | 7.7 | 2.6 | 4.2 | 14.6 |
| Unit Labour Cost | 0.5 | 7.3 | -0.4 | 2.9 | 7.1 | -4.9 |
| Industry Selling Price[4] | 0.1 | 8.0 | 4.5 | 1.8 | 2.8 | 6.4 |
| Import Price[4] | 0.6 | 6.8 | 13.8 | 2.6 | 9.3 | 11.1 |

[1] All figures are percentage changes except import shares.

[2] Shares at the end of year of each period.

[3] Note that the 1973-76 average is -1.3.

[4] Prices of intermediate products for Textiles.

Source: Statistics Canada. See DATA SOURCES AND ACCOUNTING IDENTITIES in APPENDIX B for source detail.

With 1977 as a turning point, however, the trend has been completely reversed. Beginning in 1977, the market shares of imported textiles and clothing have actually decreased, the real output of the industry has shown a growth outpacing overall manufacturing, and for the first time in five years, both real investment and employment have risen, reversing the past trend. With decreasing unit labour cost and higher productivity, profits also soared to a level virtually unknown in the industry.

What has brought about this dramatic turnaround? In November, 1976, the federal government, upon the recommendation of the Textile and Clothing Board, introduced a special protective measure of global quotas on fourteen categories of clothing. Imports of such clothing were to be limited to 1975 levels through the end of 1977, which date was later extended to 1978. Coinciding with this, the value of the Canadian dollar began to decline in 1977, which resulted eventually in a 15% devaluation by 1978.

As a result of these two events, imports of clothing in constant dollars have decreased 20% in 1977 and a further 2% in 1978. With consumption growing at a relatively healthy rate of 6% in real terms (1978), the import share in the apparel market fell to 17% from 20% in 1976. Domestic producers of apparel, given the increased share of the market, produced 14.6% more output in 1978 than in the previous year, a far better performance than that of total manufacturing which increased its output by 7.8% in the same year. The textile industry also benefited from the boom in the apparel sector. Output rose by 9.4% in 1978, one thousand new jobs were made available, and with higher profits and improved future prospects, real investment went up by 10% after the continued negative growth in the preceding years.

## CHAPTER IV. THE MODEL

### 1. The Structure of the Model

The model comprises altogether 85 economic relationships, of which 35 are stochastic relationships and 50 are identities. For this, the model requires a total of 52 exogenous variables. Most of the exogenous variables are macroeconomic variables that define general economic conditions under which the industry operates. In all, the model works with 137 economic variables. It is constructed as an annual model.

Before looking at the detailed model, which appears in the next section, it is useful to consider the following summary sketch by way of viewing the overall model structure.

Block 1

| | | |
|---|---|---|
| $C = f(\underset{(-)}{CP/\overline{D}}, \underset{(+)}{\overline{A}})$ | (real) | (Consumption) |

Block 2

| | | |
|---|---|---|
| $M = f(\underset{(-)}{MP \cdot (1+\overline{TRF})/IP}, \underset{(+)}{C}, \underset{(-)}{K})$ | (real) | (Imports) |

Block 3

| | | |
|---|---|---|
| $S = C-M$ | (real) | (Domestic shipments) |
| $G = S+\overline{X}+\overline{V}$ | (real) | (Gross output) |
| $R = f(\underset{(+)}{G})$ | (real) | (Intermediate input) |
| $Y = G-R$ | (real) | (Value-added) |

Block 4

$YP = f((W \cdot L)/Y, \underset{(+)}{MP_{-1}}, \underset{(+)}{U})$, with $(W \cdot L)/Y$ (+) (Value-added deflator)

$RP = f(\underset{(+)}{MP}, \underset{(+)}{\overline{B}})$ (Price of Intermediate Input)

$MP = \overline{FP} \cdot \overline{Z}$ (Import price)

$IP = f(\underset{(+)}{YP}, \underset{(+)}{RP})$ (Industry selling price)

$CP = f(((S/C) \cdot IP + (M/C) \cdot MP \cdot (1+\overline{TRF})) \cdot (1+\overline{TAX}))$ (Consumption deflator)

Block 5

$L = f(\underset{(+)}{Y}, \underset{(-)}{K}, \underset{(-)}{U}, \underset{(-)}{\overline{TIME}})$ (Employment)

$I = f(\sum_{0}^{n} \Delta(\underset{(+)}{(Y \cdot YP)/\overline{UCC}})_{-i}, \underset{(\mp)}{K_{-1}})$ (real) (Gross fixed investment)

$W = f(\underset{(+)}{\overline{WM}}, \underset{(+)}{(Y/L)/\overline{H}})$ (nominal) (Wage rate)

$K = I + K_{-1} - I_{-\ell}$ (real) (Gross capital stock)
($\ell$: service life)

$U = f(\underset{(+)}{Y/K})$ (Capacity utilization rate)

Where the exogenous variables with the bar notation on top are:

| | |
|---|---|
| A | Activity variable |
| B | Prices affecting RP other than MP, such as price of petrochemicals |
| D | General price deflator |
| H | Output per worker in manufacturing |
| FP | Landed import price denominated in foreign currency |
| TAX | Sales tax rate |

| | |
|---|---|
| TIME | Time trend |
| TRF | Tariff rate |
| UCC | User cost of capital including interest rate, tax rate, investment price, etc. |
| V | Change in inventories |
| WM | Wage rate in manufacturing |
| X | Exports |
| Z | Exchange rate |

The expected directions of effect (signs of partial derivatives) are indicated in parentheses beneath the variables.

As seen in the above, the model is divided into five segments with each called a block [1]. The blocks cover (1) consumption, (2) imports, (3) shipments/intermediate inputs demand/value-added, (4) prices, and (5) wage/employment/ investment. There are six commodity categories covered in the model. They are: clothing, including knitted wears; carpets and floor coverings; curtains and draperies; cordage and twine; all other textile end-products including automobile fabric accessories; and intermediate products including fibres, yarns and fabrics. This commodity distinction, however, does not apply in block 5, where employment, wages and investment are determined for the two major industry groups, clothing including all knitting, and total non-clothing textiles that comprise all other five commodity categories.

The model is built on a scheme closely resembling the CANDIDE class of models[2] where the input-output (I/O) structure plays a key role in linking final demand and industrial output. Final demands - consumption (block 1), imports (block 2), exports and inventory investments (exogenous) - are determined first. These are then converted into outputs or values-added of the clothing and textile industry through the use of I/O relationships between intermediate and end-product subsectors and the relationships specifying input requirements by these sectors (block 3). The determination of final demand prices in the model also resembles the I/O concept in that the prices use as weights the shares of domestic and foreign supplies in total consumption (block 4, consumption deflators). Industrial output or value-added in turn plays an important role in determining investment and employment (block 5).

In its actual solution, however, the model determines simultaneously domestic demand, output and price. This is seen from the market clearing mechanism incorporated essentially in the equations for shipments (S) and output (Y) in block 3, output price (YP) in block 4, and capacity (K) and capacity utilization (U) in block 5. It can be shown through a series of substitutions that the model described above is reduced to a system consisting of the following three equations:

$$Y = f(YP, K, \text{Exogenous variables})$$

$$YP = f(Y, K, \text{Exogenous variables})$$

$K = f(Y, YP, K_{-1}, \text{Exogenous variables})$

The quantity of output (Y) depends on price (YP), capacity (K) and a set of exogenous variables. It is noted that the capacity variable in the equation for Y originates from the specification of imports in block 2, which asserts that the level of imports is determined partly by the size of domestic manufacturing capacity. Price in turn is determined by the level of output, capacity and exogenous variables. The equation for K closes the system.

In the short-run in which capacity is held constant, i.e., $K = \overline{K}$, output and price can be viewed as simultaneously determined by solving the first two equations of the above reduced model, given the values of exogenous variables and $\overline{K}$. In a dynamic setting, however, capacity grows in response to changes in output and price, hence, K is solved together with Y and YP. Output, price and capacity are simultaneously determined.

In the actual model specification, the implicit output relationship described in the above three-equation system is disaggregated into a set of demand equations for the six commodity categories in block 1. Together with the price equation (YP) specified in block 5, this implies that the model basically assumes imperfect competition as the underlying market structure, where the firms, hence the industry, will not have a supply curve. The firms in the industry are assumed to have a certain degree of monopoly power so that they exert an influence on price determination in the market place. Specifically, they set price as a markup of unit variable cost with the markup factor also varying with changes in demand conditions.

It may be argued that the clothing market is better described as perfectly competitive, although oligopoly approximates more closely the market structure of non-clothing textiles. While there is no clear-cut evidence as to which represents the true competitive nature of the market faced by the clothing firms, the following considerations provide a rationale for treating the clothing industry as imperfectly competitive, as the model does. First, as mentioned earlier, there is a considerable degree of concentration observed in the clothing industry, especially in knitwears, foundation garments and men's clothing (see Table III-3 on page 22) and concentration has deepened in recent years (Table III-2 on page 21). Secondly, clothing products are generally characterized as highly differentiated between them in color, design and materials. This, together with the above fact regarding concentration, indicates that the apparel-producing firms may compete for the apparel market share with their differentiated products. In this case, the apparel firms will not act simply as price-takers. Thirdly, until recently, the clothing industry has been carrying a considerable amount of excess capacity, a characteristic that would not occur in a perfectly competitive situation.

In block 1, consumption of clothing and textile products is determined by consumption price deflated by general price deflator and an activity variable, e.g., disposable income, GNP, residential and non-residential construction expenditures, etc. It is mostly through this consumption block that the general macroeconomic condition is introduced into the model. Consumption as used in the model closely resembles apparent domestic consumption (ADC), i.e., domestic shipments net of exports plus imports. However, this concept is slightly modified in the model to include sales tax as well as tariffs.

Block 2 determines imports. In addition to the overall domestic demand condition and domestic production capacity, the price of imports relative to domestic price is another important determinant. Such factors as productivity, unit labour cost, exchange rate and tariffs affect the competitiveness of domestic and foreign products as represented by the relative price term.

Block 3 determines output as measured by real value-added (Y). The equation for shipments (S) ensures the equality between realized demand and supply, thus providing the key link between demand and supply. Shipments as used in the model are domestic shipments excluding exports. Exports are determined exogenously in the model. Aside from the difficulty of obtaining the export price data, the industry's export is relatively insignificant in value (less than

5% of total shipments). Inventory changes are also exogenized in the model for similar reasons. The amount of inventory changes at the manufacturing level is negligible for both clothing and textile industries. This may reflect the fact that inventory-holding in the industry primarily occurs after shipments. Implication of this is discussed in the following section.

In block 4, output price or value-added deflator is first determined as a function of unit labour cost and capacity utilization. It is also influenced by the level of import price. The price of intermediate input depends on prices of imported raw materials and other raw materials, primarily chemicals.

The industry selling price is determined as a composite index of value-added deflator and intermediate input price with weights approximated by stochastically estimated coefficients. This implies that the industry selling price is derived in the model as a fixed-weight price index. It is thus consistent with the actual industry selling price data which are constructed with constant weights. Import price is derived simply by converting landed import price denominated in foreign currency into a Canadian dollar denominated price. It is here that exchange rate changes enter the model. Finally, consumption deflator is determined in the model as an index comprising industry selling price and import price. The weights used are the market shares of domestic shipments and imports in total consumption. The shares are endogenously determined, implying that the weights change in the model. The consumption deflator also includes retail and manufacturers' sales taxes as well as customs duties paid. The significance of taxes and tariffs included in the price determination will be borne out by the fact that the model thus allows an examination of policy implications as regards different tax schemes (as an incentive to the industry) and alternative protective regimes.

Block 5 determines employment, investment, capital, wage rate and capacity utilization. Employment as measured by the number of workers employed is derived as demand for labour through an inverted production function. Labour demand thus depends on the level of output, capital stock and the current state of production technology. In addition, to account for a cyclical element present in employment, the capacity utilization rate is also included as a determinant. It is generally believed that, in the early part of a cylical downturn, the number of workers employed tends to be higher than can be justified by the current level of production, or vice versa. It is thus postulated that the level of employment is negatively related to the cyclical pattern represented by the capacity utilization rate.

Although the wage rate does not enter explicitly in the employment relationship as defined in the model, the link between wages and employment is implicit in the overall model structure. As an illustration, when there is an increase in the wage rate (W), *ceteris paribus*, it will result in a higher output price (YP,IP and CP) through the increased unit labour cost $((W \cdot L)/Y)$. The higher output price will then reduce product demand, leading to a production cutback and eventually to a lower demand for labour.

The wage rate (nominal) in the industry is basically assumed to depend on the general wage trend represented by the wage rate in manufacturing. Hence, to the extent that manufacturing wages are influenced by the general price level and the economy-wide labour supply condition (e.g. unemployment rate), wages in clothing and textiles will also be affected by these factors. However, a comparison of observed wage movements in clothing and textiles with those in manufacturing indicates that they do not move exactly in parallel over time. To account for the possible deviation of the wage behavior in clothing and textiles from that of manufacturing, a term representing the relative productivity performance $((Y/L)/\bar{H})$ is additionally introduced in the wage determination.

## 2. Model Specification

This section presents the fuller-detail description of the model. A complete glossary of the symbols used is provided in Appendix A.

### Block 1 - Apparent Domestic Consumption

Clothing

(CCLOTH/CCLOTP)/POP = f(YD/POP, CCLOTP/CPI, WPARTR)

Carpet and Floor Covering

(CCARPT/CCARPP) = f(CCARPP/PGNE, IR, BLDGCK, STH<-1>)

Curtains and Draperies

(CCURTN/CCURTP) = f(CCURTP/PGNE, IR, BLDGCK, STH<-1>)

Cordage and Twine

(CCORDG/CCORDP) = f(GNEXPK, CCORDP/PGNE)

Other including Automotive Accessories

(COTHER/COTHEP) = f(YD, COTHER/PGNE)

Intermediate Products: Fibres, Yarns and Fabrics

(CFYACM/CFYCMP) = f(CFYCMP/PGNE,AINDXK)

Total Non-clothing Textile Products

CTEXTL = CCARPT+CCURTN+CCORDG+COTHER+CFYACM

Apparent domestic consumption (ADC) in real terms is determined in general by an activity variable relevant to each commodity category and a relative price. As noted earlier, ADC is defined in the model as shipments net of exports, i.e., domestic shipments, plus imports, including taxes and customs duties. The deflator for ADC similarly includes taxes and tariffs.

The ADC in real terms essentially measures the volume of sales made at the wholesale level. It differs from what is actually consumed at the level of the final user, be it consumer or producer; the difference is the change in inventories. Hence,

$$ADCK = FC+INV$$

where:

ADCK ADC in real terms
FC real consumption at the final user level, or final sales at the retail level
INV an inventory change.

To the extent that the inventory demand is a function of sales or expected sales, ADCK can be described as,

$$ADCK = FC+INV(FC)$$

$$= f(FC)$$

More specifically, if one assumes that the inventory demand from retailers and wholesalers is a constant fraction of ADCK, the above can be re-expressed as

$$ADCK = FC+d\cdot ADCK$$

or

$$ADCK = [1/(1-d)]\cdot FC.$$

ADCK is proportionate to FC by virtue of the scale factor 1/(1-d), which allows a direct explanation of ADCK with the use of the variables that determine FC. If

$$FC = f(A \cdot P)$$

then

$$ADCK = a \cdot f(A,P)$$

where $a = 1/(1-d)$.

Assuming FC is a linear function such that

$$FC = \alpha + \beta \cdot A + \gamma \cdot P \qquad (\beta > 0,\ \gamma < 0)$$

then

$$\text{(A)} \quad ADCK = a \cdot \alpha + a \cdot \beta \cdot A + a \cdot \gamma \cdot P$$

$$= \alpha' + \beta' \cdot A + \gamma' \cdot P$$

or, in a log-linear form,

$$\text{(A)'} \quad Log(ADCK) = \alpha' + B' \cdot Log(A) + \gamma' \cdot Log(P)$$

It is noted that the elasticities implied by the coefficients $\beta'$ and $\gamma'$ will be higher than the final consumption elasticities $\beta$ and $\gamma$ by the scale factor a.

Real per capita ADC of clothing is explained by real per capita disposable income, the clothing ADC deflator relative to the Consumer Price Index (CPI), and women's labour participation rate (WPARTR).

The variable WPARTR was included primarily to capture the effect of the demographic shift in per capita clothing consumption arising from the relative increase in women's clothing consumption as compared to that of men's and children's wears. The last decade has seen a marked change in the spending pattern in general, and that of women in particular as women's role as wage earners has been increasing, with the coinciding phenomenon of the increased number of no-children, two-income families pointing to the relative increase in women's clothing consumption.

To the extent that women consume more clothing on a per capita basis, as compared to men and children, the above-noted trend suggests that overall per capita clothing consumption will have risen. Statistics show that women indeed spend almost twice as much on clothing as do men[3].

The ADC of carpets and floor coverings is explained by a relative price and the carpet demand arising from both housing (IR) and non-housing (BLDGCK) construction. The variable BLDGCK refers to building components of non-residential construction expenditures including replacement investments. The variable IR is expenditures on housing construction including additions and alterations. To capture the effect of the existing stock of housing on the housing consumption of carpets, the variable STH (stock of housing) is also included.

The ADC for curtains and draperies follows the same specification as for carpets and floor coverings. The office and industrial demand for curtains and draperies is explained by BLDGCK.

The level of consumption in cordage and twine is explained by a general economic activity level represented by gross national expenditure (GNEXPK) and a relative price. In the model, cordage and twine are regarded as demanded mainly for industrial use.

The commodity category "other" in the model includes automobile interior fabrics and accessories, home furnishings such as bedsheets and pillowcases, and canvas products, etc. Although the demand for automotive products, which accounts for about one-quarter of the "other" category, could be separately explained by a variable such as output of automobiles, YD is used here to represent the overall demand for "other" to avoid the potential problem caused by the multi-collinearity between YD and output of automobiles.

The ADC of intermediate products such as fibres, yarns and cloth mills depends on the production activity of the manufacturers producing end-textile products including apparels, represented by AINDXK. AINDXK is a weighted average index of real value-added of the end-product textile producers with 1971 I/O coefficients used as the relevant weights (see equations for AINDEX and AINDXK in block 3).

Block 2 - Imports

Clothing

MCLOTH/MCLOTP = f((MCLOTP·(1+TARIF1))/ISPCLT,CCLOTH/CCLOTP,KCLOTK)

Carpet and Floor Covering

MCARPT/MCARPP = f((MCARPP·(1+TARIF2))/ISPCRP,CCARPT/CCARP,KTEXTK·(VCARPT/VTEXTL))

Curtains and Draperies

MCURTN/MCURTP = f((MCURTP·(1+TARIF3))/ISPCRT,CCURTN/CCURTP,KTEXTK·(VCURTN/VTEXTL))

Cordage and Twine

MCORDG/MCORDP = f((MCORDP·(1+TARIF4))/ISPCOR, CCORDG/CCORDP,KTEXTK·(VCORDG/VTEXTL))

Other Textile End-products including Automotive Accessories and Fabrics

MOTHER/MOTHEP = f((MOTHEP·(1+TARIF6))/ISPOTH, COTHER/COTHEP,KTEXTK·(VOTHER/VTEXTL))

Intermediate Products: Fibres, Yarns and Fabrics

MFYACM/MFYCMP = f((MFYCMP·(1+TARIF7))/ISPFYC, CFYACM/CFYACP,KTEXTK·(VFYACM/VTEXTL))

Total Non-Clothing Textile Products

MTEXTL = MCARPT+MCURTN+MCORDG+MOTHER+MFYACM

Imports are determined as functions of the import price (including tariffs) relative to the domestic price (represented by industry selling price), domestic market size (ADC), and domestic capacity to supply the market. Tariff rates, e.g. TARIF1, TARIF2, etc. are nominal _ad valorem_ duties paid at customs. Except in clothing, capital stock used for each individual commodity category is that of the total non-clothing textiles (KTEXTK). This choice was dictated by the fact that the capital stock data for the textile sub-industries were not available. To make the stock series more specific to the sub-industries, the capacity term in each import equation was multiplied by each industry's value share of output in the total non-clothing textiles, e.g. (VCARPT/VTEXTL), (VCURTN/VEXTL). Capital stock representing the capacity constraint basically sets lower as well as upper boundaries for the volume of imports.

Import prices here include the exchange rate (Canadian dollar per U.S. dollar) as defined in the import price equations shown in block 4.

## Block 3 - Shipments, Intermediate Inputs and Value-Added

### Domestic Shipments

SCLOTH = CCLOTH/((1+TAXRS1)·(1+TAXMFC))-
MCLOTH·(1+TARIF1) (clothing)

SCARPT = CCARPT/((1+TAXRS2)·(1+TAXMFG))-
MCARPT·(1+TARIF2) (carpet)

SCURTN = CCURTN/((1+TAXRS3)·(1+TAXMFG))-
MCURTN·(1+TARIF3) (curtains)

SCORDG = CCORDG/(1+TAXMFG)-MCORDG·(1+TARIF4)
(cordage)

SOTHER = (OTHER/((1+TAXRS4)·(1+TAXMFG))-
MOTHER·(1+TARIF6) (other)

SFYACM = CFYACM/(1+TAXMFG)-MFYACM·(1+TARIF7)
(intermediate products)

STEXTL = SCARPT+SCURTN+SCORDG+SOTHER+SFYACM
(non-clothing textiles)

### Value Shares of Domestic Shipments

SHRCLT = SCLOTH/(SCLOTH+MCLOTH) (clothing)

SHRCRP = SCARPT/(SCARPT+MCARPT) (carpet)

SHRCRT = SCURTN/(SCURTN+MCURTN) (curtains)

SHRCOR = SCORDG/(SCORDG+MCORDG) (cordage)

SHROTH = SOTHER/(SOTHER+MOTHER) (other)

SHYFYC = SFYACM/(SFYACM+MFYACM)
(intermediate products)

SHRTXT = STEXTL/(STEXTL+MTEXTL)
(non-clothing textiles)

Intermediate Inputs

RAWCLT = f(SCLOTH+XCLOTH+INVCLT) (clothing)

RAWCRP = f(SCARPT+XCARPT+INVCRP) (carpets and floor covering)

RAWCRT = f(SCURTN+XCURTN+INVCRT) (curtains and draperies)

RAWCOR = f(SCORDG+XCORDG+INVCOR) (cordage and twine)

RAWOTH = f(SOTHER+XOTHER+INVOTH) (other)

RAWFYC = f(SFYACM+XFYACM+INVFYC) (intermediate products)

Values-Added

VCLOTH = SCLOTH+INVCLT-RAWCLT+XCLOTH (clothing)

VCARPT = SCARPT+INVERP-RAWCRP+XCARPT (carpets and floor covering)

VCURTN = SCURTN+INVCRT-RAWCRT+XCURTN (curtains and draperies)

VCORDG = SCORDG+INVCOR-RAWCOR+XCORDG (cordage and twine)

VOTHER = SOTHER+ZNVOTH-RAWOTH-XOTHER (other)

VFYACM = SFYACM+INVFYC-RAWFYC+XFYACM (intermediate products)

VTEXTL = VCARPT+VCURTN+VCORDG+VOTHER+VFYACM (total non-clothing textiles)

VKNTFB = f(VFYACM) (knitted fabric)

Activity Index for Total Textile End-Products Including Clothing

$$AINDEX = 0.318 \cdot (VCLOTH/841.2) + 0.05 \cdot (VCARPT/68.66) + 0.019 \cdot (VCURTN/18.926) + 0.005 \cdot (VCORDG/8 \cdot 621) + 0.28 \cdot (VFYACM/471.2) + 0.265 \cdot (VOTHER/262.56)$$

Activity Index in Real Terms

$$AINDXK = AINDEX / ((VCLOTP \cdot VCLOTH + VTEXTP \cdot VTEXTL) / (VCLOTH + VTEXTL))$$

Block 3 determines domestic shipments, demands for intermediate inputs, values-added, and market shares in value terms of domestic shipments.

Domestic shipments are derived as a difference between ADC and imports. Domestic shipments exclude exports. Since ADCs in the model include taxes--retail sales tax (TAXRSI, TAXRS2, etc.) and manufacturers sales tax (TAXMFC and TAXMFG) --the ADCs are deflated by taxes before subtracting from them tariff-included imports, to derive value of domestic shipments consistent with the published data in the Census of Manufacturers.

Intermediate inputs are determined as functions of gross output, defined as domestic shipments plus exports plus inventory changes. In the model, the variables, both on the left- and right-hand sides, enter in the equations in nominal terms. Although this was necessitated by a data availability problem, the nominal relationship may be justified as follows.

Define the relationship between intermediate input and gross output as

$$R \cdot RP = \sigma \cdot G \cdot GP$$

where:

| | |
|---|---|
| $R$ | intermediate input demanded in real terms |
| $RP$ | deflator for R |
| $G$ | real gross output |
| $GP$ | deflator for G |
| $\sigma$ | a constant term. |

Taking time derivatives, this can be re-expressed as

$$\dot{R} = \dot{G} + \dot{GP} - \dot{RP}$$

$$= \dot{G} + (a \cdot \dot{VP} + b \cdot \dot{RP}) - \dot{RP}$$

$$= \dot{G} + a \cdot \dot{VP} - (1-b) \cdot \dot{RP}$$

where:

| | |
|---|---|
| $VP$ | deflator for value-added |
| $\dot{R}$ | = (dR/dt)/R |
| $\dot{G}$ | = (dG/dt)/G |
| $\dot{VP}$ | = (dvp/dt)/vp |
| $\dot{RP}$ | = (dRP/dt)/RP |
| a and b | value shares of value-added and intermediate input components in gross output such that a+b=1 and hence (1-b)>0. |

While the volume of intermediate input demanded will grow with real gross output, it is also affected by price changes: the rate of change in R is negatively related to the rate of change in its own price RP and positively to that of VP. This latter proposition regarding VP will be true as long as there are substitutions between factors of production, i.e., capital and labour, and intermediate inputs.

Values-added are derived simply as differences between gross output and intermediate inputs. The relationship between the value-added of knitted fabrics

(VKNTFB) and intermediate products (VFYACM) is necessary to reconcile the different treatments of the knitted fabric sector; in employment, investment and wage rates, it is defined as a part of knitting, whereas in the definition of commodity sub-categories, it belongs to intermediate products.

## Block 4 - Price Determination

### Value-Added Deflators

VCLOTP = f(ULCCLT,(MCLOTP-ISPCLT)<-1>,UTLZCE)
(clothing)

VTEXTP = f(ULCTXT,(MTEXTP-ISPTXT)<-1>,UTILZE)
(non-clothing textiles)

### Industry Selling Prices

ISPCLT = f(VCLOTP,CFYCMP) (clothing)

ISPCRP = f(VTEXTP·(VCARPT/VTEXTL),CFYCMP) (carpets)

ISPCRT = f(VTEXTP·(VCURTN/VTEXTL),CFYCMP) (curtains)

ISPCOR = f(VTEXTP·(VCORDG/VTEXTL),CFYCMP) (cordage)

ISPOTH = f(VTEXTP·(VOTHER/VTEXTL),CFYCMP) (other)

ISPFYC = f(VTEXTP·(VFYACM/VTEXTL),ISPCHM,
MFYCMP·(1+TARIF7)) (intermediate products)

ISPTXT = (ISPCRP·SCARPT+ISPCRT·SCURTN+ISPCOR·SCORDG+
ISPOTH·SOTHER+ISPFYC·SFYACM)/STEXTL
(total non-clothing textiles)

### Import Prices

MCLOTP = MCLTFP·REXN (clothing)

MCARPP = MCRPFP·REXN (carpets)

MCURTP = MCRTFP·REXN (curtains)

MCORDP = MCORFP·REXN (cordage)

MOTHEP = MOTHFP·REXN (other)

MFYCMP = MFYCFP REXN (intermediate products)

MTEXTP = (MCARPP·MCARPT+MCURTP·MCURTN+MCORDP·
MCORDG+MOTHEP·MOTHER+MFYCMP·MFYACM)/MTEXTL
(non-clothing textiles)

$$TARIFT = (TARIF2 \cdot MCARPT + TARIF3 \cdot MCARPT + TARIF4 \cdot MCORDG + TARIF6 \cdot MOTHER + TARIF7 \cdot MFYACM)/MTEXTL$$
(tariff rate for non-clothing textiles)

Deflators for Apparent Domestic Consumption

$$CCLOTP = (SHRCLT \cdot ISPCLT + (1-SHRCLT) \cdot MCLOTP \cdot (1+TARIF1)) \cdot (1+TAXMFC) \cdot (1+TAXRS1)$$
(clothing)

$$CCARPP = (SHRCRP \cdot ISPCRP + (1-SHRCRP) \cdot MCARPP \cdot (1+TARIF2)) \cdot (1+TAXMFG) \cdot (1+TAXRS2)$$
(carpet)

$$CCURTP = (SHRCRT \cdot ISPCRT + (1-SHRCRT) \cdot MCURTP \cdot (1+TARIF3)) \cdot (1+TAXMFG) \cdot (1+TAXRS3)$$
(curtains)

$$CCORDP = (SHRCOR \cdot ISPCOR + (1-SHRCOR) \cdot MCORDP \cdot (1+TARIF4)) \cdot (1+TAXMFG)$$
(cordage)

$$COTHEP = (SHROTH \cdot ISPOTH + (1-SHROTH) \cdot MOTHEP \cdot (1+TARIF6)) \cdot (1+TAXMFG) \cdot (1+TAXRS4)$$
(other)

$$CFYCMP = (SHRFYC \cdot ISPFYC + (1-SHRFYC) \cdot MFYCMP \cdot (1+TARIF7)) \cdot (1+TAXMFG)$$
(intermediate products)

Unit Labour Cost

$$ULCCLT = WCLOTH/((VCLOTH+VKNTFB)/VCLOTP)$$
(clothing)

$$ULCTXT = WTEXTL/((VTEXTL-VKNTFB)/VTEXTP)$$
(non-clothing textiles)

Block 4 describes the overall pricing mechanism of the model. The value-added deflator, or unit output price, is explained by unit labour cost, the price differential between import and domestic prices lagged one period, and capacity utilization rate. It is assumed here that the price in the industry is set primarily as a constant mark-up of unit labour cost (ULCCLT, ULCTXT). However, it is hypothesized that the pricing also takes into account the price differential between domestic and import prices. When the import price rises, for instance due to devaluation, there will be a strong tendency for the domestic producers to catch up with the import price trend, thus raising the price of their products accordingly. It is generally recognized that this is one source of inflation originating from devaluation.

There is another factor affecting the pricing in the industry. In the industry, especially in the clothing sector, there are enough elements of competition that the relative strengths of supply and demand will have an influence on the price. In addition, the ability of the industry to supply the market in the relatively short period of time will also be an important factor. These considerations are embodied in the capacity utilization rates (UTILZE, UTLZCE).

Industry selling prices are determined as functions of factor price, i.e., value-added deflators, and intermediate input prices. The intermediate input price for all the commodity categories except for the intermediate products is represented by the consumption price of fibres, yarns and fabrics (CFYCMP).

As the input materials prices for the intermediate sector, the industry selling price of industrial chemicals (ISPCHM) and the price of imported fibres, yarns and fabrics (MFYCMP) are used. Since no individual value-added deflators for textile sub-categories are available, the aggregate deflator (VTEXTP) is substituted with an adjustment with the value share of each category in total value-added acting as a differentiating factor.

Import price identities convert foreign landed price denominated in U.S. dollars into Canadian dollar prices.

As noted earlier, ADC deflators are endogenously determined in the model as weighted averages of domestic prices (industry selling prices) including taxes and import prices including both customs duties and taxes. The relevant weights come from block 3, where value market shares of domestic suppliers and foreign producers are determined.

## Block 5 - Employment, Wages and Investment

### Employment

$$ECLOTH = f((VCLOTH+VKNTFB)/VCLOTP, KCLOTK, TIME) \quad \text{(clothing)}$$

$$ETEXTL = f((VTEXTL-VKNTFB)/VTEXTP, KTEXTK, TIME) \quad \text{(non-clothing textiles)}$$

### Wage Rate

$$(\dot{WCLOTH/ECLOTH}) = f((\dot{MAWA/MAET}), \dot{PDC}/(MAY/MAET)) \quad \text{(clothing)}$$

$$(\dot{WTEXTL/ETEXTL}) = f((\dot{MAWA/MAET}), \dot{PDT}/(MAY/MAET)) \quad \text{(non-clothing textiles)}$$

### Investment

$$ICLOTH/ICLOTP = f(\sum_{0}^{i}\Delta((VCLOTH+VKNTFB)/UCCCLT)\langle -i\rangle, KCLOTK\langle -1\rangle) \quad \text{(clothing)}$$

$$ITEXTL/ITEXTP = f(\sum_{0}^{i}\Delta((VTEXTL-VKNTFB)/UCCTXT)\langle -i\rangle, KTEXTK\langle -1\rangle) \quad \text{(non-clothing textiles)}$$

### Capital Stock

$$KCLOTK = (ICLOTH/ICLOTP)+KCLOTK\langle -1\rangle - (ICLOTH/ICLOTP)\langle -23\rangle \quad \text{(clothing)}$$

$$KTEXTK = (ITEXTL/ITEXTP)+KTEXTK\langle -1\rangle - (ITEXTL/ITEXTP)\langle -30\rangle \quad \text{(non-clothing textiles)}$$

### User Cost of Capital

$$UCCCLT = ICLOTP\cdot((1-TXPRFC\cdot LCCAC)\cdot 0.0338+RINDB/100)/(1-TXPRFC) \quad \text{(clothing)}$$

$$UCCTXT = ITEXTP\cdot((1-TAXPRF\cdot LCCA)\cdot 0.0439+RINDB/100)/(1-TAXPRF) \quad \text{(non-clothing textiles)}$$

Capacity Utilization Rate

UTLZCE = f(((VCLOTH+VKNTFB)/VCLOTP)/KCLOTK) (clothing)

UTILZE = f(((VTEXTL-VKNTFB)/VTEXTP)/KTEXTK) (non-clothing textiles)

Return to Capital

PROFTC = (VCLOTH+VKNTFB-WCLOTH)·(1-TXPRFC) (clothing)

PROFIT = (VTEXTL+VKNTFB)-WTEXTL)·(1-TAXPRF) (non-clothing textiles)

Labour Productivity

PDC = ((VCLOTH+VKNTFB)/VCLOTP)/ECLOTH) (clothing)

PDT = ((VTEXTL-VKNTFB)/VTEXTP)/ETEXTL) (non-clothing textiles)

The employment functions in block 5 are essentially production functions normalized for labour demand. Their specific functional forms may be developed as follows.

A Cobb-Douglas production function of the following form,

$$Y = A \cdot e^{\lambda t} \cdot K^{\alpha} \cdot U^{\gamma} \cdot L^{\beta}$$

where:

- Y output
- t time
- K capital stock
- L number of people employed
- t time trend
- U capacity utilization rate

can be transformed into the labour demand equation,

$$\text{Log}(L) = -(1/\beta)\cdot\text{Log}(A)-(\lambda/\beta)\cdot t-(\alpha/\beta)\text{Log}(K)-$$
$$(\gamma/\beta)\cdot U+(1/\beta)\cdot\text{Log}(Y)$$

A direct estimation of this equation will encounter the problem of multicollinearity between output, capital stock, and the time trend variable. One solution to the problem is based on the assumption that the Canadian textile and clothing industries experience constant returns to scale, in which case $\alpha+\beta=1$. Then

$$\text{Log}(L)+((1-\beta)/\beta)\cdot\text{Log}(K)-(1/\beta)\cdot\text{Log}(Y) =$$
$$-(1/\beta)\cdot\text{Log}(A)-(\lambda/\beta)\cdot t-(\gamma/\beta)\cdot\text{Log}(U)$$

where $\beta$ becomes now equal to the labour share of value-added in current dollars. This equation therefore can be estimated with the a priori information on $\beta$.

Hence, the basic empirical equations for employment are

$$\text{Log}(\text{ECLOTH})+(0.371/0.629)\cdot\text{Log}(\text{KCLOTK})-(1/0.629)\cdot$$
$$\text{Log}((\text{VCLOTH}+\text{VKNTFB})/\text{VCLOTP}) = a+d\cdot\text{TIME}+g\cdot\text{Log}(\text{UTLZCE})$$

for clothing, where

$$a = -(1/0.629)\cdot\text{Log}(A_C)<0$$
$$d = -(\lambda/0.629)<0$$
$$g = -(1/0.629)<0$$

and

$$\text{Log}(\text{ETEXTL})+(0.45/0.55)\cdot\text{Log}(\text{KTEXTK})-(1/0.55)\cdot$$
$$\text{Log}((\text{VTEXTL}-\text{VKNTFB})/\text{VTEXTP}) = a'+d'\cdot\text{TIME}+g'\cdot\text{Log}(\text{UTILZE})$$

for textiles, where

$$a' = -(1/0.55) \cdot \text{Log}(A_T) < 0$$

$$d' = -(\lambda/0.55) < 0$$

$$g' = -(1/0.629) < 0$$

The values for $\beta$ were calculated as average labour shares of income for the 1961-76 period for both textiles and clothing [4].

Wage rates in textiles and clothing are assumed to follow closely the rate in overall manufacturing. Hence the change in the wage rate in the industry is primarily explained by overall manufacturing wages, which are introduced exogenously in the model. There is, however, an endogenous factor that also influences the wage rates in the model. The relative productivity performance of the industry, defined in the model as the ratio of real value-added per employee of the industry over that of overall manufacturing, also influences the wage determination.

The specification of investment basically draws on the standard neo-classical theory of investment, in that gross investment is determined primarily by current and past revenue per user cost of capital and replacement investment demand. Departing from the standard neo-classical approach, however, it is assumed in the model that replacement investment occurs as a constant proportion of gross rather than net capital stock. Hence, a linear specification of the investment function will be

$$I = a + \Sigma b_i \Delta((Y \cdot YP)/UCC)_{-i} + d \cdot K_{-1}$$

where Y is real output, YP is price and UCC is user cost of capital and $K_{-1}$ is gross capital stock lagged one period. The term $d \cdot K_{-1}$ represents replacement investment demand with the unknown constant d being empirically determined.

This modification is based on the following considerations. First, the capital stock variable included in the employment equation implicitly defining a production function is the gross capital stock concept, and consistency requires that capital stock be defined as such throughout the model. In the real world, capital goods are kept productive, through repairs and maintenance, until such time as the goods are scrapped and replaced usually in their entirety. As a factor of production, therefore, gross capital stock should be regarded as more relevant, in comparison to net stock in which case the worn-out portion of a capital good is assumed to be left out of the production process.

Secondly, gross investment as published in Fixed Capital Flows and Stock (Statistics Canada, Catalogue 13-211, Annual and 13-568, Occasional) is a National Income Account concept which excludes repairs and maintenance as not representing expenditures. This suggests that gross fixed investment as published will be better explained by a capital stock series that does not reflect capital consumption allowance, that is, gross capital stock. Specifically, to the extent that replacement investment in large part represents expenditures to replace obsolete capital assets being scrapped, it will be more appropriate to explain the replacement component of gross fixed investment by gross rather than net capital stock.

Thirdly, depreciation, as reported in the above publication, is based on the assumption of straight-line depreciation of the gross (undepreciated) capital stock. Each year's depreciation is equivalent to gross capital stock divided by a fixed service life with the depreciation rate implicitly defined as a reciprocal of the service life. This compares to the assumption in the neoclassical formulation of exponential depreciation, based on which replacement is postulated to occur as a constant fraction of net capital stock[5]. This suggests that the use of the net capital stock as measured by Statistics Canada to explain replacement will not be strictly valid as a neo-classical formulation. In general, estimation of net capital stock requires an assumption regarding the distribution of depreciation over time. Hence, depending on the validity of the assumption, the use of net capital stock can become more prone to statistical errors than gross capital stock.

For similar reasons given above, the CANDIDE macromodel also adopts the gross capital concept in explaining replacement investment and other relevant variables[6].

The identities for capital stock accordingly define the capital accumulation process based on the gross capital concept. An investment made at time t(or t-L) is assumed to be scrapped at t+L (or t) disappearing from the body of capital stock. L denotes the fixed service life of K. It is noted that until the end of its service life, no depreciation takes place on a capital good. The service lives 23 and 30 years as specified in the identities are based on the publication Fixed Capital Flows and Stock.

The identities for the user costs of capital offer a mechanism through which alternative investment incentive schemes are introduced into the model. The basic identity is

$$UCC = \frac{PI \cdot ((1-RTAX \cdot (CCA/DEP)) \cdot d + R)}{(1-RTAX)}$$

where:

| | |
|---|---|
| UCC | user costs of capital |
| PI | investment deflator |
| RTAX | effective corporate income tax rate |
| CCA | amount of writeoffs legally allowed |
| DEP | actual book depreciation |
| d | average rate of physical decay as estimated in the investment equation |
| R | interest rate or opportunity cost of borrowing |

Footnotes to Chapter IV

[1] The segmentation of the model into blocks is done mainly for the mechanical convenience it offers. The block segmentation "modularizes" each block such that the process of model testing, revision and simulation can be conducted independently for each block, making the whole repetitive process extremely efficient. Identification and correction of a trouble-causing variable or sector can be easily achieved through this block segmentation.

[2] For instance, see Bodkin and Tanny, eds., CANDIDE Model 1.1.

[3] In 1978, consumer expenditures on women's clothing including children's clothing were $3.9 billion in 1971 dollars, as compared to $2 billion spent for consumption of men's and boy's clothing. From Statistics Canada, National Income and Expenditure Accounts 1964-1978, Catalogue 13-201 Annual, p.78.

[4] $\beta$ for clothing was calculated as 1961-76 average of WCLOTH/VCLOTH, and $\beta$ for textile, WTEXTL/VTEXTL.

[5] See Jorgenson, "Anticipations and Investment Behavior".

[6] For instance, see White, CANDIDE Model 1.0: Business Fixed Investment.

# CHAPTER V. ESTIMATION OF THE MODEL

## 1. Estimation Methods and Data

### (1) Estimation Methods

The model described in the previous chapter contains a total of 35 stochastic equations. The unknown parameters of these equations define quantitatively the extent of the influence of explanatory variables on dependent variables. In the actual estimation, all the equations are specified as either linear or log-linear function of parameters. The highly simultaneous nature of the model means that the use of the OLS method will introduce elements of bias into the system. This is because, in the equations of a simultaneous system, the correlations between disturbances and current endogenous "explanatory" variables violate one of the assumptions required for OLS to produce unbiased parameter estimates. The recognition of the simultaneity biases thus calls for such methods as the two- or three-stage least squares (2SLS and 3SLS, respectively) or the limited- or full-information maximum likelihood (LIML and FIML, respectively) methods. These methods are known to provide asymptotically consistent estimators. However, reality offers only a finite sample and a practical question concerns the small sample properties. This question becomes particularly relevant in the present study since the maximum number of observations available for estimating the model is only

16. With a sample of this size, will there be a large difference in estimates from OLS and a consistent estimator? That is, will there be a significant bias-correction when the latter method is used? Which method will give better prediction performance for the model as a _system_?

To address these questions, the model has been estimated using both OLS and a simultaneous estimation method, specifically 2SLS, and two sets of parameter estimates have been obtained. Below some experiments with the _ex ante_ simulation performance of these two sets of parameters are reported.

In principle, 2SLS requires, in the first stage, estimation of endogenous variables as functions of all of the predetermined variables included in the model. Given only 16 observations for the model estimation, however, this approach is not possible. A widely-used alternative approach in such cases is to reduce the number of predetermined variables to a few, through the calculation of principal components, while retaining information about their variance. Adopting a procedure similar to that used by Klein [1], the following steps were taken for the 2SLS estimation of the model. First, a calculation of principal components was made using all 52 exogenous variables [2] included in the model. Table V-1 shows the eigenvalues and explanatory contributions of thus-calculated principal components.

TABLE V-1

| Principal Component | Eigen Value | % Contribution to Total Variability | Cumulative Percentage |
|---|---|---|---|
| 1 | 31.8361 | 61.22 | 61.22 |
| 2 | 7.1744 | 13.80 | 75.02 |
| 3 | 4.1429 | 7.97 | 82.99 |
| 4 | 2.3313 | 4.48 | 87.47 |
| 5 | 1.6373 | 3.15 | 90.62 |
| 6 | 1.1306 | 2.17 | 92.79 |
| 7 | 0.9918 | 1.91 | 94.70 |
| 8 | 0.8097 | 1.56 | 96.26 |
| 9 | 0.5700 | 1.10 | 97.35 |
| 10 | 0.4304 | 0.83 | 98.18 |
| 11 | 0.2771 | 0.53 | 98.71 |
| 12 | 0.2356 | 0.46 | 99.17 |
| 13 | 0.1854 | 0.36 | 99.52 |
| 14 | 0.1494 | 0.29 | 99.81 |
| 15 | 0.0978 | 0.19 | 100.00 |
| 16-52 | 0.0000 | 0.00 | 100.00 |

It is noted that the first 15 principal components exhaust all the variations in the exogenous variables, with the first seven explaining 95%. Secondly, the first-stage estimation was conducted with principal components serving as the only variables explaining the explanatory endogenous variables. The first-stage estimation experimented with the first four, five, six and seven principal components. Thirdly, the second-stage estimation was conducted using the instrumental variable estimation method with the regressed values (or "$\hat{Y}$" values) of the explanatory endogenous variables calculated from the first stage entering as the instrumental variables. Predetermined variables served as their own instruments. Here, the four sets of "$\hat{Y}$" values corresponding to the first four, five, six and seven principal components were alternatively used as inputs from the first stage. The same specifications made in OLS estimation were maintained throughout the second-stage procedures.

(2) Data

The model was estimated based on data for the period 1961 to 1976. The relatively short sample period reflects mainly the availability of the sub-industry data on shipments, input materials, value-added and inventories, which constitute the major part of the sub-industry data. These data are available only from 1961, with 1976 as the latest year available at the time of estimation. These data are from the Census of Manufacturers, contained both in the CANSIM database and in published printed materials. Data for apparent domestic consumption (ADC) were constructed using shipments data from the above, and exports and imports data from the Statistics Canada publications Exports and Imports by Commodity (Catalogue 65-202 and 65-203). The ADC thus constructed was further modified with sales tax and tariffs. Thus, the ADC concept in the model differs slightly from what is normally referred to as domestic disappearance. Also, the shipments in the model are net of exports while the original shipments data include exports.

As specified in the model, ADC deflators were constructed as weighted averages of import prices and industry selling prices (ISPIs) modified for sales tax and tariff rates. However, in the case of curtains and draperies, no proper ISPI data were available. Consequently, the consumer price index (CPI) for curtains and draperies was substituted as the ADC deflator and its ISPI was calculated residually using the CPI, the import price and the market share of domestic shipments and imports. While import deflators for clothing and intermediate products (fibres, yarns and fabrics) were obtained directly from the Statistics Canada data, import deflators for the rest of the commodities were taken from the unit value indexes based on volume and value of imports from the Exports and Imports by Commodity publications. Tariff rates are calculated as total customs duties paid for all the individual items belonging to each commodity category, divided by the value of imports of all the individual import items. Thus the tariff rate is a value-weighted average of all the individual rates. Further, the tariff rates are nominal ones and no quota effect is included in the rates. Foreign landed import prices are derived by dividing import deflators by the Canadian exchange rate with the U.S. dollar.

A detailed description of the data sources, accounting identities, and the data used in the estimation is provided in Appendix B.

## 2. Empirical Results

### (1) 2SLS and OLS estimates

As noted earlier, the model was estimated using both OLS and 2SLS methods[3]. Further, in the 2SLS estimation, four different sets of parameter estimates were produced with each corresponding to four, five, six and seven principal components used in the first stage.

The two-stage estimation results obtained using the first six or seven principal components produced results far superior to that using four or five principal components. Furthermore, the results obtained when using six principal components were very similar to those obtained using seven. The 2SLS empirical results reported below are, therefore, those with six principal components with the exception of wage equations for which empirical results with seven principal components are reported. The estimation with six principal components failed to produce the correct sign for one of the variables included in the clothing wage equation, whereas the use of seven components resulted in the expected sign with a significant t. Furthermore, the overall fit of the textile wage equation was substantially improved when seven principal components were used.

As an overall comment, it appears that the OLS estimates differ little from those obtained by 2SLS. All the equation specifications made in OLS were also found to hold in 2SLS and the standard errors were of the same magnitude for almost all of the equations. Nevertheless, there were differences. First, coefficient estimates do differ somewhat between 2SLS and OLS. Although the differences are generally small in magnitude, there are a few equations (e.g. import and consumption of clothing, employment, wage rates and prices) where the differences in coefficient estimates are notable. Secondly, there was a slight deterioration in the measures of coefficient significance (t-statistics) and goodness of fit ($\bar{R}^2$) for 2SLS estimates. This may have been caused by the limited explanatory capability inherent in the small number of principal components.

(2) Theoretical Conformity, Significance and Elasticities

This section presents discussions of the empirical equations, focusing mainly on the conformity of the empirical findings to the hypotheses involved, statistical inferences and elasticity implications of the coefficient estimates. A complete listing of the equations estimated by the OLS and 2SLS methods is found at the end of this chapter.

Statistical inferences made in the discussions are based on various test statistics such as t-, F- and DW scores. It should be noted here that in many cases these tests are not strictly valid. For instance, a t-test for a parameter estimate from OLS will not hold when one or more explanatory endogenous variables are present in the equation concerned, due to the simultaneity bias (and inconsistency) involved in the estimate. Nor will the t-test apply to a parameter estimate from 2SLS with a finite sample, as is the case with the model, since the bias will not have disappeared in this small sample case[4]. The same point will apply to F and DW tests. Therefore, the test statistics, and hence inferences based on them, should be regarded as valid only in approximation.

Consumption

In estimating consumption equations, both linear and log-linear functional forms were tested for each equation. Except for clothing consumption, the log-linear form, with its implication of constant price and income elasticities, generally produced results judged less satisfactory than the ones from the linear specification.

Consumption of clothing was estimated as a first-difference log-linear function. Although the expected signs were obtained for all the variables included in the clothing equation, the coefficient estimate for the relative price term has a relatively low t-statistic, compared to those of other variables. Nevertheless, the one-tail t-statistic for the price term is statistically significant at 10% level for both 2SLS and OLS estimates. The women's participation rate included in the equation to capture the changing pattern in per capita clothing consumption is found to enter the equation only with a lag, but with a strong t. The calculated F ratio, used for the joint test of significance for all the estimated coefficients, was 4.0 for both 2SLS and OLS estimates, which exceeds the critical value, at 5%, of 3.5.

It is noted that while the estimated demand response of clothing with respect to income is inelastic, that with respect to price is highly elastic, especially in the 2SLS case. The price elasticity of 1.95 in the 2SLS equation is about 60% larger than the OLS one of 1.2. From the statistical point of view, the overall tests suggest the empirical equation for clothing consumption specified and estimated as in the above is a valid one. Nevertheless, the general fit is not as good as one might have expected. Among other problems, this may be attributable to the fact that the construction of the consumption deflator for clothing was based on the industry selling price (ISPI) of men's wear, since women's and therefore the total clothing ISPI are not published. To the extent that the ISPI of women's wear moves in a manner which differs substantially from that of men's wear, its exclusion may have introduced an error into the equation, and produced the low t-scores for the price term. Further, if this caused a problem, one may not be certain whether the use of 2SLS has brought an improvement over OLS.

The rest of the empirical consumption equations are supported by much better test statistics than clothing. All the signs for estimated coefficients are as expected, further strengthened by highly significant t-scores.

While relative price variables were specified in all the other ADC equations, in the intermediate products equations they enter in absolute form. Various attempts to deflate the price of intermediate products failed, reflecting the minimal degree of substitutability inherent in textile raw materials. Demand for cordage and twine was estimated for the period 1961-1974, because the relevant ISPI for 1975 and 1976 was not available.

The inclusion of the stock of housing in the equations for carpets and curtains produced no improvement.

Table V-2, which follows, gives a comparison among demand elasticities with respect to price and activity (income) of the textile and clothing products. Demand for clothing, carpets, curtains and other textile products is price elastic, whereas demand for industrial goods (i.e., cordage and twine and intermediate products such as fibres, yarns and fabrics) shows a very inelastic price response. The low price elasticity found for the intermediate products agrees with some of the U.S. findings[5]. On the other hand, the demand for the intermediate products responds with an approximately unitary elasticity to a change in industrial activity.

It may be recalled from the previous chapter that the coefficients of the ADC consumption equations contain a scale factor of 1/(1-d); the elasticities of ADC will differ from those of consumption at the final user level by this factor. The implication is then that the actual elasticities at the final user level will be lower than those in Table V-2. This may be particularly true of the consumer products, such as clothing, and, to some extent, carpets and curtains, which require a relatively large inventory stock at the retail level.

TABLE V-2

CONSUMPTION (ADC) ELASTICITIES[1]

| | Price | | Activity | |
|---|---|---|---|---|
| | 2SLS | OLS | 2SLS | OLS |
| Clothing | -1.955 | -1.200 | 0.642 | 0.623 |
| Carpets | -1.052 | -1.049 | 1.724 | 1.728 |
| Curtains | -1.652 | -1.748 | 1.132 | 1.091 |
| Cordage | -0.292 | -0.295 | 0.360 | 0.362 |
| Others | -1.948 | -2.106 | 0.455 | 0.402 |
| Intermediate Products | -0.216 | -0.221 | 0.953 | 0.955 |

[1]Calculated based on mean values and relevant coefficient estimates. Elasticities for clothing are the estimated coefficients.

Imports

The behavioral hypotheses underlying the specification of import demand equations are generally confirmed by the empirical findings. The expected signs were obtained in all of the equations; t-scores were generally high; high values of $\bar{R}^2$ were produced; and no serious autocorrelation problem was observed. A hypothesis of particular interest concerns the influence of the capacity constraint, as a long-run shift variable, on the import demand. It was argued that in the long run the ability of the domestic industry to serve the domestic market sets the lower as well as the upper-bound for the equilibrium level of imports, and that the capital stock representing capacity will be negatively related to the level of imports. The empirical results suggest that there is a significant negative correlation between import demand and production capacity and this was found to hold in most of the import equations.

The coefficient estimates for the capacity term allow for the following partial equilibrium analysis of the demand for clothing imports. In 1976, the clothing industry operated with a capital stock worth $529 million (in 1971 dollars) and imports of clothing stood at $486 million (in 1971 dollars). Based on these 1976 values, the 2SLS coefficient estimate of -1.183 for the capital stock variable gives an elasticity of -1.3. Now suppose the real capital stock is assumed to increase by $10 million, or 1.9%, from the 1976 base, through new capital spending in the clothing industry. Given the above elasticity, this will then be translated into a $12 million decrease in the amount of imported clothing. How does one link the $10 million increase in capital stock with the $12 million decrease in imports of clothing? First, the net increase in capital stock will generate additional output which will be, through a resultant price reduction, substituted for imports, thereby initially decreasing imports by the amount of the direct investment-induced output increase.

Secondly, the import substitution away from imports will further stimulate the industry and to the extent that labour supply is highly elastic (i.e., unemployed workers exist), this will lead to an additional increase in product supply. This, in turn, will lower the domestic price, resulting in the increased consumption of home-made apparel at the expense of imports.

The following numerical example supports this explanation. Based on 1976 value added of $922 million in the industry, the increase of $10 million in capital stock implies that there will be a $7 million increase in real output, with a capital input elasticity of output of 0.371 as hypothesized in the model. The initial investment-induced output increase then accounts for the first $7 million of total import substitution (12 million), leaving $5 million as the additionally occurring import substitution. Similar inferences can be made for the textiles products.

In the import equation of clothing, the results indicate that there is a lagged adjustment with a coefficient of about 0.5, implying that completion of the adjustment process takes more than two years. The dummy variable D72 accounts for the introduction, in 1971, of a quota on clothing, in particular on men's and boy's shirts, the main impact of which began to be felt in 1972.

The specification of the import equation for the commodity category of "other" is somewhat different from the previous equations, in that imports are estimated as a fraction of total consumption. The unitary elasticity implied in the ratio form suggests that the foreign supply will grow at the same rate as the domestic supply, thus already incorporating the capacity effect in it. However, it was felt that to the extent that excess capacity varies from period to period, it may influence the relative position of imports in total consumption. In this case, the excess capacity may be regarded as a "pressure" variable, in that as it increases, it will tend to increase the domestic resistance to foreign imports, as buy-Canadian campaigns and lobbying activities intensify. The variable representing excess capacity is found to be negatively correlated with imports of the "other" category with a significant t-statistic.

Table V-3 below compares price and activity elasticities implied in the empirical import equations.

TABLE V-3[1]

IMPORT ELASTICITIES

| | Price | | Activity | |
|---|---|---|---|---|
| | 2SLS | OLS | 2SLS | OLS |
| Clothing | -1.733 | -1.403 | 2.893 | 2.655 |
| Carpets | -0.156 | -0.143 | 0.888 | 0.938 |
| Curtains | -0.611 | -0.614 | 1.929 | 1.923 |
| Cordage | -1.021 | -0.946 | 0.680 | 0.743 |
| Other | -0.283 | -0.327 | 1.000 | 1.000 |
| Intermediate Products | -0.636 | -0.570 | 1.651 | 1.619 |

[1]Calculated based on mean values and relevant coefficient estimates.

Intermediate Inputs

Estimation of the equations for intermediate input demand produced excellent statistical results: all the equations, except the one for cordage and twine, had $\bar{R}^2$s of 0.995 or higher, with significant t-scores. The $\bar{R}^2$ for cordage and twine was 0.97. The equation for cordage and twine includes a dummy variable that accounts for the extraordinary increase in the raw materials price in the 1974-75 period, which inflated the nominal raw materials demand beyond what can properly be captured by the variations in the nominal gross output.

The excellent fit displayed by all the intermediate input demand equations is important in that it will enhance reliability in determining values-added, which will improve the performance in deriving employment, investment and wage rates.

The input materials demand elasticities with respect to gross output, evaluated at means are presented in Table V-4 below.

TABLE V-4

ELASTICITIES OF RAW MATERIALS DEMAND WITH[1] RESPECT TO GROSS OUTPUT

| | 2SLS | OLS |
|---|---|---|
| Clothing | 0.976 | 0.976 |
| Carpets | 1.004 | 1.003 |
| Curtains | 0.928 | 0.927 |
| Cordage | 1.540 | 1.490 |
| Others | 0.902 | 0.899 |
| Intermediate Products | 1.032 | 1.031 |

[1]Calculated based on mean values.

## Prices

It has been hypothesized in this thesis that output price, or the value-added deflator, is determined in both clothing and textile industries basically as a mark-up of unit labour cost, with the mark-up factor being further modified by the demand condition and the import price. This hypothesis is empirically supported for both industries.

From the coefficient estimates, it can be inferred that although the mark-up factor varies with the condition of the market and the price of imports, the extent of their influences is relatively small. In the case of clothing, a 1% change in capacity utilization brings a change of 0.1% in the value-added deflator, and a 1% increase in the current import price will increase the value-added deflator to the same extent (0.1%), but in the next period. While the value-added deflator for non-clothing textiles responds similarly to changes in the import price, its response to a change in the capacity utilization rate is much stronger than clothing, with an elasticity of 0.2.

Reflecting the difference in labour intensity between the clothing and textile industries, the elasticity of the value-added deflator with respect to the unit labour cost is slightly higher in clothing, with an elasticity of 0.9, as shown below in Table V-5.

The specification of the industry selling prices as functions of the value-added deflator and intermediate input price also received solid empirical support, with the exception of carpets. The industry selling price of carpets was estimated with only a value-added deflator and the lagged dependent variable was also used as an explanatory variable. The intermediate input price, when included, registered the wrong sign with a high t-statistic.

TABLE V-5

ELASTICITY OF VALUE-ADDED DEFLATOR[1]

| | Clothing | | Textiles | |
|---|---|---|---|---|
| | 2SLS | OLS | 2SLS | OLS |
| Unit labour cost | 0.932 | 0.938 | 0.822 | 0.780 |
| Capacity utilization rate | 0.089 | 0.078 | 0.202 | 0.241 |
| Import price | 0.012 | 0.012 | 0.008 | 0.008 |

[1]Calculated based on mean values.

Employment

The empirical form of the employment equation derived in this chapter was:

$$Log(L)+m\cdot Log(k)-bLog(y) = a+d\cdot t+g\cdot Log(U)$$

where:

$$m = (1-\beta)/\beta$$
$$b = 1/\beta$$
$$a = -(1/\beta)Log(A)<0$$
$$d = -(\lambda/\beta)<0$$
$$g = -(\gamma/\beta)<0$$

This derivation was based on the hypothesis of constant returns to scale (CRS) for the implicit production function. As suggested in the previous chapter, the above equation was estimated with a given value of $\beta$ which is equal to labour's income share under the CRS assumption.

In the estimation, the parameter for the capacity utilization variable was alternatively constrained to have the same value as m, which produced better results for textiles, but the opposite was true for clothing. The empirical results show that for both clothing and textile industries, CRS is a reasonable assumption. All the signs are as expected; the t-scores suggest a high level of statistical significance, as do the $\bar{R}^2$ values.

Based on the coefficient estimates and values of $\beta$, the implicit values of $\lambda$, the coefficient of the time variable, are calculated as 0.024 for textiles, and 0.014 (OLS) or 0.015 (2SLS) for clothing. The textile equation contains only one exogenous variable on its right-hand side, hence no 2SLS application was necessary. The parameter $\lambda$ represents the growth in productivity attributable to an unknown source, which might be referred to as "technical change". Based on this interpretation, the productivity increase brought by technical change is 2.4% per annum in the textile industry and 1.4% in the clothing industry.

Wage Rates

The estimation of the wage rate equations suggests that there is a high correlation between overall manufacturing wages and those in clothing in textiles. Further, relative productivity performance is found to influence wage determination in both clothing and textiles.

The dummy variable for 1976 in the textile equation accounts for an unusual jump in the wage rate in that year, reflecting the wage settlement after the labour strike that occurred in the textile industry.

Investment

The initial linear specification of the investment equations failed to produce satisfactory coefficient estimates. Either the wrong signs were obtained (textiles investment) or the overall fit was poor (clothing investments). As an alternative, the following specification was used for estimation.

$$I-d\cdot K_{-1} = a+\Sigma b_i \Delta((Y\cdot YP)/UCC)_{-i}$$

which implies the equation is estimated with the coefficient for K constrained to a pre-set value. The value for d is the rate of depreciation implicit in the Statistics Canada estimation of annual capital consumption allowance. This is basically equivalent to adopting the Statistic Canada's estimate as the relevant net investment data for which annual capital consumption or depreciation is calculated based on gross capital stock and a fixed capital service life (a straight-line depreciation of the undepreciated gross stock). Hence, the transformed series $I-d\cdot k_{-1}$ will be approximately equal to net investment as estimated by Statistics Canada.

The maximum number of lags used in the estimation was two, which mainly reflects the limited number of degrees of freedom afforded by the data.

Reasonable empirical support for the above specification is indicated by the overall results for both clothing and textiles. For the clothing equation, the lags were constrained to be Almon-distributed with degree 2. Statistics indicate that Almon variables, as well as "unscrambled" lag variables, are significant in both 2SLS and OLS estimations.

No pre-constrained lag structure was found to be satisfactory for the textiles equation. Accordingly, no restriction was imposed on the lag structure. As it turned out, in the textile industry, the variable (Y·P)/UCC has no influence on investment in the current period, only starting to affect it after a delay of one period.

Capacity Utilization Rate

The empirical results obtained here suggest that the present formulation for capacity utilization gives a good approximation to the actual capacity utilization rate calculated based on the output/capital ratio method.

The capacity-output/capital ratios implicit in the coefficient estimates are:

| | Clothing | Textiles |
|---|---|---|
| 2SLS | 2.09 | 0.361 |
| OLS | 2.10 | 0.366 |

This again illustrates the striking difference in the production methods between the two industries.

In the following, a fully detailed listing of the equations estimated by the OLS and 2SLS methods is presented. Each equation is displayed such that its OLS and 2SLS parameter estimates can be directly compared. The test statistics included are t-scores, F-scores, $\bar{R}^2$, standard error of estimation (SEE) and Durbin-Watson statistics (DW). In addition, the mean value of each dependent variable (Mean) is indicated for each equation so that the relative magnitude of the estimation error can be gauged. For notational convenience, the D operator denoting first difference (e.g.,$D(X_t)=X_t-X_{t-1}$) and Q operator denoting growth rate or relative change (e.g.,$Q(X_t)=(X_t-X_{t-1})/X_{t-1}$) are used.

# EMPIRICAL EQUATIONS

## Consumption: Clothing

### 2SLS

$$D(\log((CCLOTH/CCLOTP)/POP)) = \underset{(1.43)}{-0.0246693} + \underset{(2.09)}{0.64181}D(\log(YD/POP))$$

$$\underset{(1.40)}{-1.95460}D(\log(CCLOTP/CPI)) + \underset{(2.05)}{0.78310}D(\log(WPARTR))\langle -1 \rangle$$

$$\underset{(2.10)}{-0.15926}D74$$

| | | |
|---|---|---|
| $\bar{R}^2=0.41$ | SEE=0.02 | DW=2.41 |
| Mean=0.02 | F=4.00 | Years=1962-76 |

### OLS

$$D(\log((CCLOTH/CCLOTP)/POP)) = \underset{(1.39)}{-0.022346} + \underset{(2.34)}{0.67384}D(\log(YD/POP))$$

$$\underset{(1.62)}{-1.20062}D(\log(CCLOTP/CPI)) + \underset{(2.22)}{0.62297}D(\log(WPARTR))\langle -1 \rangle$$

$$\underset{(2.71)}{-0.12034}D74$$

| | | |
|---|---|---|
| $\bar{R}^2=0.46$ | SEE=0.02 | DW=2.54 |
| Mean=0.02 | F=4.01 | Years=1962-76 |

Consumption: Carpets and Floor Coverings

2SLS

$$CCARPT/CCARPP = \underset{(0.39)}{66.275} + \underset{(4.15)}{0.044098}(IR+BLDGCK) - \underset{(2.41)}{157.791}\ CCARPP/PGNE$$

$\bar{R}^2$=0.98 SEE=17.95 DW=1.39
Mean=202.496 Years=1963-76

OLS

$$CCARPT/CCARPP = \underset{(0.40)}{65.340} + \underset{(4.30)}{0.044155}(IR+BLDGCK) - \underset{(2.49)}{157.429}\ CCARPP/PGNE$$

$\bar{R}^2$=0.98 SEE=17.95 DW=1.40
Mean=202.496 Years=1963-76

Consumption: Curtains and Draperies

2SLS

$$CCURTN/CCURTP = \underset{(1.51)}{62.113} + \underset{(2.81)}{0.0061337}(IR+BLDGCK) - \underset{(1.79)}{64.619}\ CCURTP/PGNE$$

$\bar{R}^2$=0.97 SEE=3.64 DW=0.60
Mean=40.872 Years=1961-76

OLS

$$CCURTN/CCURTP = \underset{(1.38)}{67.69} + \underset{(2.96)}{0.0059131}(IR+BLDGCK) - \underset{(2.08)}{68.365}\ CCURTP/PGNE$$

$\bar{R}^2$=0.97 SEE=3.64 DW=0.60
Mean=40.872 Years=1961-76

Consumption: Cordage and Twine

2SLS

CCORDG/CCORDP=22.927+0.00010958 GNEXPK
(6.77) (2.64)

-4.23742 CCORDP/PGNE
(3.15)

$\bar{R}^2$=0.50 SEE=2.54 DW=1.62
Mean=24.614 Years=1961-74

OLS

CCORDG/CCORDP=22.95976+0.00011002 GNEXPK
(6.84) (2.68)

-4.27802 CCORDP/PGNE
(3.48)

$\bar{R}^2$=0.50 SEE=2.54 DW=1.62
Mean+24.614 Years=1961-74

Consumption: Others including Automotive Fabrics and Home Furnishings

2SLS

COTHER/COTHEP=1299.468+0.0042374 YD
(4.31) (2.86)

-757.272 OTHEP/PGNE
(4.52)

$\bar{R}^2$=0.95 SEE=38.70 DW=1.02
Mean=521.212 Years=1961-76

OLS

COTHER/COTHEP=1409.427+0.0037449YD
(5.34) (2.82)

-818.752COTHEP/PGNE
(5.61)

$\bar{R}^2$=0.95 SEE=38.44 DW=1.14
Mean=521.212 Years=1961-76

Consumption: Intermediate Products including Fibres, Yarns and Fabrics

2SLS

CFYACM/CFYCMP = 381.304+1543.252AINDXK
(7.28) (32.44)

-245.122CFYCMP
(4.34)

$\bar{R}^2$=0.99 SEE=26.88 DW=2.15
Mean=1446.17 Years=1961-76

OLS

CFYACM/CFYCMP = 384.759+1545.993AINDXK
(7.00) (28.30)

-249.743CFYCMP
(4.48)

$\bar{R}^2$=0.99 SEE=31.01 DW=2.16
Mean=1446.17 Years=1961-76

Imports: Clothing

2SLS

MCLOTH/MCLOTP=449.008+0.35694CCLOTH/CCLOTP
(1.35) (2.01)

-333.3746(MCLOTP(1+TARIF1))/ISPCLT
(2.04)

-1.18302KCLOTK+0.47488(MCLOTH/MCLOTP)<-1>
(1.32) (2.22)

-77.5747D72
(3.63)

$\bar{R}^2$=0.98 SEE=15.73 DW=2.00
Mean=240.071 Years=1962-76

OLS

MCLOTH/MCLOTP=361.8713+0.32751 CCLOTH/CCLOTP
(2.18) (5.11)

-269.83473(MCLOTP(1+TARIF1))/ISPCLT
(2.52)

-1.0766KCLOTK+0.53258(MCLOTH/MCLOTP)<-1>
(2.76) (3.40)

-74.974D72
(3.70)

$\bar{R}^2$=0.98 SEE=15.34 DW=1.84
Mean=240.71 Years=1962-76

## Imports: Carpets and Floor Coverings

### 2SLS

MCARPT/MCARPP = 7.10745+0.11249CCARPT/CCARPP
(1.68) (5.57)

-2.55115(MCARPP(1+TARIF2))/ISPCRP
(1.08)

-0.076953KTEXTK(VCARPT/VTEXTL)
(2.53)

+0.47905(MCARPT/MCARPP)<-1>
(5.61)

$\bar{R}^2$=0.99 SEE=1.36 DW=2.18
Mean=24.3 Years=1962-76

### OLS

MCARPT/MCARPP = 6.85263+0.11856CCARTP/CCARPP
(1.66) (6.18)

-2.33148(MCARPP(1+TARIF2))/ISPCRP
(1.00)

-0.081207KTEXTK(VCARPT/VTEXTL)
(2.81)

+0.44879(MCARPT/MCARPP)<-1>
(5.43)

$\bar{R}^2$=0.99 SEE=1.35 DW=2.04
Mean=24.3 Years=1962-76

Imports: Curtains and Draperies

2SLS

$$MCURTN/MCURTP = \underset{(5.88)}{3.94925} + \underset{(5.90)}{0.17950}CCURTN/CCURTP - \underset{(4.92)}{1.35412}(MCURTP(1+TARIF3))/ISPCRT - \underset{(3.60)}{0.16392}KTEXTK(VCURTN/VTEXTL)$$

$\bar{R}^2$=0.95 SEE=0.39 DW=2.07
Mean=3.803 Years=1961-76

OLS

$$MCURTN/MCURTP = \underset{(6.0)}{3.97369} + \underset{(6.14)}{0.17892}CCURTN/CCURTP - \underset{(4.97)}{1.36058}(MCURTP(1+TARIF3))/ISPCRT - \underset{(3.78)}{0.16359}KTEXTK(VCURTN/VTEXTL)$$

$\bar{R}^2$=0.95 SEE=0.39 DW=2.07
Mean=3.803 Years=1961-76

Imports: Cordage and Twine

2SLS

MCORDG/MCORDP = 11.962827+0.27860429 CCORDG/CCORDP
(1.71) (1.36)

-7.7951758(MCORDP(1+TARIF4)/ISPCOR)
(2.11)

+16.523940D73
(3.62)

| | | |
|---|---|---|
| $\overline{R}^2$=0.51 | SEE=2.92 | DW=1.52 |
| Mean=9.691 | | Years=1961-76 |

OLS

MCORDG/MCORDP = 10.658488+0.30449595 CCORDG/CCORDP
(1.85) (1.70)

-7.2219573(MCORDP(1+TARIF4)/ISPCOR)
(2.23)

+15.952677D73
(3.78)

| | | |
|---|---|---|
| $\overline{R}^2$=0.51 | SEE=2.92 | DW=1.43 |
| Mean=9.691 | | Years=1961-76 |

Imports: Other including Automotive Fabrics, Home Furnishings

2SLS

(MOTHER/MOTHEP)/(COTHER/COTHEP)=0.14189
(6.02)

-0.019087(MOTHEP(1+TARIF6))/ISPOTH
(1.01)

-0.12419(1-UTILZE)+0.023749D75
(5.44) (2.85)

$\bar{R}^2$=0.75 SEE=0.008 DW=1.82
Mean=0.08508 Years=1961-76

OLS

(MOTHER/MOTHEP)/(COTHER/COTHEP)=0.14231
(6.31)

-0.022119(MOTHEP(1+TARIF6))/ISPOTH
(1.23)

-0.11211(1-UTILZE)+0.024866D75
(5.21) (3.04)

$\bar{R}^2$=0.75 SEE=0.008 DW=1.79
Mean=0.08508 Years=1961-76

Imports: Intermediate Products including Fibres, Yarns and Fabrics

2SLS

MFYACM/MFYCMP=839.666+0.59079 CFYACM/CFYCMP
(3.59) (18.37)

-291.618(MFYCMP(1+TARIF7))/ISPFYC
(1.90)

-0.81176KTEXTK(VFYACM/VTEXTL)
(4.06)

$\bar{R}^2$=0.97 SEE=23.74 DW=2.11
Mean=517.38 Years=1961-76

OLS

MFYACM/MFYCMP=687.786+0.57435 CFYACM/CFYCMP
(3.44) (20.48)

-261.4256(MFYCMP(1+TARIF7))/ISPFYC
(1.93)

-0.67616KTEXTK(VFYACM/VTEXTL)
(4.22)

$\bar{R}^2$=0.98 SEE=22.97 DW=1.90
Mean=517.38 Years=1961-76

Intermediate Input Demand: Clothing

2SLS

RAWCLT=22.820+0.52848(SCLOTH+XCLOTH+INVCLT)
(4.05) (178.0)

$\bar{R}^2$=0.999 SEE=7.6 DW=1.13
Mean=966.02 Years=1961-76

OLS

RAWCLT=23.57+0.52806(SCLOTH+XCLOTH+INVCLT)
(4.20) (178.62)

$\bar{R}^2$=0.999 SEE=7.6 DW=1.13
Mean=966.02 Years=1961-76

Intermediate Input Demand: Carpets and Floor Coverings

2SLS

RAWCRP=-0.4035+0.63008(SCARPT+XCLOTH+INVCRP)
(0.40) (135.67)

$\bar{R}^2$=0.999 SEE=2.3 DW=2.40
Mean=111.15 Years=1961-76

OLS

RAWCRP=-0.3824+0.62996(SCARPT+XCLOTH+INVCRP)
(0.38) (136.01)

$\bar{R}^2$=0.999 SEE=2.3 DW=2.4
Mean=111.15 Years=1961-76

Intermediate Input Demand: Curtains and Draperies

2SLS

RAWCRT=1.4448+0.52714(SCURTN+XCURTN+INVCRT)
(6.02) (88.32)

$\bar{R}^2$=0.998 SEE=0.46 DW=0.68
Mean=20.02 Years=1961-76

OLS

RAWCRT=1.4712+0.52639(SCURTN+XCURTN+INVCRT)
(6.16) (88.58)

$\bar{R}^2$=0.998 SEE=0.46 DW=0.67
Mean=20.02 Years=1961-76

Intermediate Input Demand: Cordage and Twine

2SLS

RAWCOR=-6.1894+0.90566(SCORDG+XCORDG+INVCOR)
(6.18) (19.27)

-4.84239(D74+D75)
(7.04)

$\bar{R}^2$=0.96 SEE=0.84 DW=1.46
Mean=12.57 Years=1961-76

OLS

RAWCOR=-5.5784+0.87625(SCORDG+XCORDG+INVCOR)
(6.13) (20.63)

-4.6998(D74+D75)
(7.15)

$\bar{R}^2$=0.97 SEE=0.83 DW=1.39
Mean=12.57 Years=1961-76

Intermediate Input Demand: Other including Auto Fabrics, Home Furnishings

2SLS

RAWOTH=31.322+0.51359(SOTHER+XOTHER+INVOTH)
(7.76) (75.24)

$\bar{R}^2$=0.997 SEE=6.32 DW=0.69
Mean=310.92 Years=1961-76

OLS

RAWOTH=31.536+0.51319(SOTHER+XOTHER+INVOTH)
(7.83) (75.43)

$\bar{R}^2$=0.997 SEE=6.31 DW=0.69
Mean=310.92 Years=1961-76

Intermediate Input Demand: Intermediate Products including Fibres, Yarns and Fabrics

2SLS

RAWFYC=-20.4576+0.59735(SFYACM+XFYACM+INVFYC)
(1.55) (52.00)

$\bar{R}^2$=0.995 SEE=13.59 DW=1.23
Mean=642.89 Years=1961-76

OLS

RAWFYC=-19.8698+0.59682(SFYACM+XFYACM+INVFYC)
(1.51) (52.15)

$\bar{R}^2$=0.995 SEE=13.59 DW=1.22
Mean=642.89 Years=1961-76

Value-Added Deflator: Clothing

2SLS

$$VCLOTP = \underset{(1.01)}{-0.037287133} + \underset{(21.65)}{1.4874104}ULCCLT$$

$$+\underset{(1.53)}{0.13841390}UTLZCE$$

$$+\underset{(1.59)}{0.39155668}(MCLOTP-ISPCLT)\langle -1 \rangle$$

$\bar{R}^2=0.995$ SEE=0.016 DW=1.60
Mean=1.0997 Years=1962-76

OLS

$$VCLOTP = \underset{(0.87)}{-0.031295801} + \underset{(22.38)}{1.4969116}ULCCLT$$

$$+\underset{(1.40)}{0.12140677}UTLZCE$$

$$+\underset{(1.54)}{0.37727437}(MCLOTP-ISPCLT)\langle -1 \rangle$$

$\bar{R}^2=0.995$ SEE=0.016 DW=1.61
Mean=1.0997 Years=1962-76

Value-Added Deflator: Non-Clothing Textiles

2SLS

VTEXTP = -0.042353+1.49778ULCTXT
(0.33) (8.40)

+0.42862(MTEXTP-ISPTXT)<-1>+0.38107UTILZE
(1.38) (1.92)

$\bar{R}^2$=0.93 SEE=0.05 DW=1.63
Mean=1.389 Years=1962-76

OLS

VTEXTP = -0.039171+1.42168ULCTXT
(0.31) (8.74)

+0.48406(MTEXTP-ISPTXT)<-1>+0.45379UTILZE
(1.59) (2.56)

$\bar{R}^2$=0.93 SEE=0.05 DW=1.57
Mean=1.389 Years=1962-76

Industry Selling Price: Clothing

2SLS

ISPCLT=-0.18838+0.91632VCLOTP+0.14261CFYCMP
(3.01) (11.62) (1.34)

$\bar{R}^2$=0.99 SEE=0.02 DW=1.00 Years=1961-76
Mean=0.81729

OLS

ISPCLT=-0.22239+0.86584VCLOTP+0.21211CFYCMP
(3.84) (12.06) (2.20)

$\bar{R}^2$=0.99 SEE=0.02 DW=0.96 Years=1961-76
Mean=0.81729

Industry Selling Price: Carpets and Floor Coverings

2SLS

Q(ISPCRP)=-0.86281+4.75940 Q(VTEXTP(VCARPT/VTEXTL))
(1.48) (5.40)

+0.57068Q(ISPCRP)<-1>
(3.91)

$\bar{R}^2$=0.73 SEE=1.90 DW=2.21 Years=1963-76
Mean=0.98464

OLS

Q(ISPCRP)=-0.68377+4.17638 Q(VTEXTP(VCARPT/VTEXTL)
(1.21) (5.16)

+0.56456Q(ISPCRP)<-1>
(3.96)

$\bar{R}^2$=0.75 SEE=1.85 DW=2.21 Years=1963-76
Mean=0.98464

Industry Selling Price: Curtains and Draperies

2SLS

ISPCRT=0.38284+8.244VTEXTP(VCURTN/VTEXTL)
(5.73) (6.75)

+0.17392CFYCMP
(2.42)

$\bar{R}^2$=0.96 SEE=0.02 DW=1.49
Mean=0.810 Years=1961-76

OLS

ISPCRT=0.35607+7.56046VTEXTP(VCURTN/VTEXTL)
(5.63) (6.61)

+0.20819CFYCMP
(3.09)

$\bar{R}^2$=0.96 SEE=0.023 DW=1.53
Mean=0.810 Years=1961-76

Industry Selling Price: Cordage and Twine

2SLS

ISPCOR=4.34964+16.3708VTEXTP(VCORDG/VTEXTL)
(12.52) (1.68)

+4.2924CFYCMP
(19.25)

$\bar{R}^2$=0.96 SEE=0.15 DW=1.54
Mean=1.4012 Years=1961-76

OLS

ISPCOR=4.31359+16.5308VTEXTP(VCORDG/VTEXTL)
(12.58) (1.77)

+4.26208CFYCMP
(19.25)

$\bar{R}^2$=0.96 SEE=0.15 DW=1.53
Mean=1.4012 Years=1961-76

Industry Selling Price: Other including Automotive Fabrics, Home Furnishings

2SLS

ISPOTH=-0.13201+0.28296VTEXTP(VOTHER/VTEXTL)
(1.44) (1.35)

+0.86021CFYCMP
(6.73)

$\bar{R}^2$=0.97 SEE=0.03 DW=1.69
Mean=1.0783 Years=1961-76

OLS

ISPOTH=-0.13253+0.25692VTEXTP(VOTHER/VTEXTL)
(1.51) (1.30)

+0.86866CFYCMP
(7.20)

$\bar{R}^2$=0.97 SEE=0.03 DW=1.68
Mean=1.0783 Years=1961-76

Industry Selling Price: Intermediate Products

2SLS

$$ISPFYC=0.09956+0.31742VTEXTP(VFYACM/VTEXTL)$$
(0.91) (2.32)

$$+0.061783D73+0.46373ISPCHM$$
(2.22) (5.03)

$$+0.17886MFYCMP(1+TARIF7)$$
(1.26)

$\bar{R}^2=0.972$ SEE=0.03 DW=2.80
Mean=1.09566 Years = 1961-76

OLS

$$ISPFYC=0.087576+0.33903VTEXTP(VFYACM/VTEXTL)$$
(0.83) (2.68)

$$+0.063122D73+0.46496ISPCHM$$
(2.29) (5.05)

$$+0.17277MFYCMP(1\div TARIF7)$$
(1.22)

$\bar{R}^2=0.972$ SEE=0.03 DW=2.75
Mean=1.09566 Years = 1961-76

Employment: Clothing

2SLS

Log(ECLOTH)+(0.371/0.629)Log(KCLOTK)

-(1/0.629)Log((VCLOTH+VKNTFB)/VCLOTP)

=-2.19787-0.024352TIME-0.79738Log(UTLZCE)
(25.33) (6.07) (5.48)

$\bar{R}^2$=0.99 SEE=0.02 DW=2.00
Mean=-2.1132 Years=1961-76

OLS

Log(ECLOTH)+(0.371/0.629)Log(KCLOTK)

-(1/0.629)Log((VCLOTH+VKNTFB)/VCLOTP)

=-2.23547-0.022663TIME-0.86093Log(UTILZCE)
(31.75) (6.86) (7.31)

$\bar{R}^2$=0.99 SEE=0.02 DW=1.99
Mean=-2.1132 Years=1961-76

Employment: Non-Clothing Textiles

OLS

Log(ETEXTL)+(0.45/0.55)Log(KTEXTK·UTILZE)

-(1/0.55)Log((VTEXTL-VKNTFB)/VTEXTP)=

-0.85203-0.044207TIME
(33.97) (17.04)

$\bar{R}^2$=0.95 SEE=0.05 DW=0.82
Mean=-1.2278 Years=1961-76

Wage Rates: Clothing

2SLS*

Q(WCLOTH/ECLOTH)=0.010794+0.83922Q(MAWA/MAET)
(1.17) (7.83)

+0.02483Q(PDC/(MAY/MAET))
(0.07)

$\bar{R}^2$=0.81 SEE=0.02 DW=2.12
Mean=0.0758 Years=1962-76

* 7 principal components used

OLS

Q(WCLOTH/ECLOTH)=0.010666+0.84313Q(MAWA/MAET)
(1.27) (8.69)

+0.26513Q(PDC/(MAY/MAET))
(1.79)

$\bar{R}^2$=0.84 SEE=0.01 DW=2.68
Mean=0.0758 Years=1962-76

Wage Rates: Non-Clothing Textiles

2SLS*

Q(WTEXTL/ETEXTL)=0.02764+0.51594Q(MAWA/MAET)
(3.21) (5.22)

+0.27652Q(PDT/(MAY/MAET))+0.06015D76
(1.77) (3.88)

$\bar{R}^2$=0.81 SEE=0.01 DW=2.24
Mean=0.0747 Years=1962-76

* 7 principal components used

OLS

Q(WTEXTL/ETEXTL)=0.03042+0.49981Q(MAWA/MAET)
(4.18) (5.85)

+0.11372Q(PDT/(MAY/MAET))+0.06411D76
(1.31) (4.84)

$\bar{R}^2$=0.85 SEE=0.01 DW=2.57
Mean=0.0747 Years=1962-76

Investment: Clothing

2SLS

(ICLOTH/ICLOTP)-0.0439KCLOTK<-1>=7.5653
(5.34)

+0.0054655D((VCLOTH+VKNTFB)/UCCCLT)
(2.19)

+0.0065889D((VCLOTH+VKNTFB)/UCCCLT)<-1>
(3.24)

+0.0047670D((VCLOTH+VKNTFB)/UCCCLT)<-2>
(2.58)

$\bar{R}^2$=0.45 SEE=5.11 DW=2.03
Mean=7.59 Years=1964-76
Almon distribution of degree 2
(t-statistics for Almon variables=2.23,-1.46)

OLS

(ICLOTH/ICLOTP)-0.0439KCLOTK<-1>=7.5626
(5.34)

+0.0056676D((VCLOTH+VKNTFB)/UCCCLT)
(2.39)

+0.0065889D((VCLOTH+VKNTFB)/UCCCLT)<-1>
(3.29)

+0.0047670D((VCLOTH+VKNTFB)/UCCCLT)<-2>
(2.58)

$\bar{R}^2$=0.45 SEE=5.11 DW=2.03
Mean=7.59 Years=1964-76
Almon distribution of degree 2
(t-statistics for Almon variables=2.96,-1.46)

<u>Investment: Non-Clothing Textiles</u>

<u>OLS</u>

(ITEXTL/ITEXTP)-0.0338KTEXTK<-1>= 39.912

+0.011684D((VTEXTL-VKNTFB)/UCCTXT)<-1>
(2.41)

+0.012347D((VTEXTL-VKNTFB)/UCCTXT)<-2>
(1.82)

+37.066D65
(2.35)

| | | |
|---|---|---|
| $\bar{R}^2$=0.58 | SEE=14.93 | DW=1.91 |
| Mean=42.92 | | Years=1964-76 |

<u>Value-added: Knitted Fabrics</u>

<u>2SLS</u>

VKNTFB=-55.571+0.24384VFYACM
(7.63) (16.16)

| | | |
|---|---|---|
| $\bar{R}^2$=0.95 | SEE=7.20 | DW=2.16 |
| Mean=58.45 | | Years=1961-76 |

<u>OLS</u>

VKNTFB=-54.85+0.24229VFYACM
(7.59) (16.19)

| | | |
|---|---|---|
| $\bar{R}^2$=0.95 | SEE=7.20 | DW=2.14 |
| Mean=58.45 | | Years=1961-76 |

Capacity Utilization Rate: Clothing

2SLS

$$UTLZCE = -0.059847 + 0.47815((VCLOTH+VKNTFB)/VCLOTP)/KCLOTK$$
(3.0) (38.3)

$\bar{R}^2$=0.99 SEE=0.009 DW=1.18
Mean=0.699 Years=1961-76

OLS

$$UTLZCE = -0.058424 + 0.47725((VCLOTH+VKNTFB)/VCLOTP)/KCLOTK$$
(2.99) (39.1)

$\bar{R}^2$=0.99 SEE=0.009 DW=1.18
Mean=0.699 Years=1961-76

Capacity Utilization Rate: Non-Clothing Textiles

2SLS

$$UTILZE = -0.098833 + 2.76821((VTEXTL-VKNTFB)/VTEXTP)/KTEXTK$$
(6.17) (51.74)

$\bar{R}^2$=0.99 SEE=0.007 DW=2.04
Mean=0.724 Years=1961-76

OLS

$$UTILZE = -0.088769 + 2.73437((VTEXTL-VKNTFB)/VTEXTP)/KTEXTK$$
(5.88) (54.22)

$\bar{R}^2$=0.99 SEE=0.007 DW=1.93
Mean=0.724 Years=1961-76

Footnotes to Chapter V

[1] See Klein, "Estimation of Interdependent Systems in Macroeconometrics".

[2] Ideally, lagged endogenous variables should also be included since they can be regarded as being predetermined. There are such lagged dependent variables in the model; however, they were not included in calculation of the principal components. The main reason was the resulting general loss of an additional observation in the second estimation stage was regarded as more costly than the additional information to be gained from including the lagged dependent variables.

[3] The computer software used for estimations included MASSAGER and MOSAIC system packages, developed and maintained by Informetrica Limited, Ottawa, Ontario.

[4] For instance, see Koutsoyanis, p.382.

[5] See, for example, Lewis.

# CHAPTER VI. APPLICATION OF THE MODEL

This chapter presents the results of various simulation experiments with the empirical model developed in the previous chapters. The simulation experiments that are discussed in this chapter are:

1. Ex-post simulations
   (1) Sample period dynamic simulation: 1964-1976
   (2) Ex-post forecast: 1964-1978
2. Ex-ante simulations
   (1) Reference forecast: 1977-1990
   (2) Alternative scenarios: Impact studies
      a. Removal of quota on clothing imports: 1981-1990
      b. Complete removal of all tariffs on textile and apparel imports: 1983-1990
      c. Policy incentives: 1981
      d. Exchange rate revaluation: 1981-1990

The main purpose of the sample-period dynamic simulation is to evaluate the model as a system in its ability to trace the history observed in the sample data. If the stochastically built system embodied in the present model is to claim validity, it should be able to duplicate closely and explain the variations displayed in the historical data. To see if this is the case, the model is solved[1] for the period 1964-1976, using actual values for the exogenous variables included in the model, and the calculated lagged values of endogenous variables. The simulated values of endogenous variables are then compared with their actual counterparts. This sample-period simulation is conducted for both the OLS and 2SLS models to provide a direct comparison between the performances of the two models.

In another ex-post simulation, the model is also dynamically solved for the extended period of 1964-1978, adding two years, 1977 and 1978, outside the sample-period range (ex-post forecast).

Although the lack of sub-industry data limited the latest sample period to 1976, most of the exogenous variables relating to macroeconomic environments and some of the major-industry data (such as imports, real value-added, investment, and employment for clothing and total textiles) are available for 1977 and 1978. This simulation provides an opportunity to test the model's predictive capability outside the sample period. Again, the test was conducted using both the OLS and 2SLS models.

As a demonstration that the present model can be a useful forecasting device, a medium-term ex-ante forecast experiment is conducted for the period 1977-1990. Given the future values of the exogenous variables as assumptions, the model translates this exogenous information into industrial activities, prices and demand in the medium future, providing an indication of the industry's prospects. The assumptions regarding the exogenous macroeconomic variables, e.g., income, manufacturing wage, CPI, exchange rate, etc., are themselves the forecasts of a large macroeconometric model, developed by Informetrica Limited, Ottawa[2]; this choice suggests that the consistency between exogenous assumptions is well maintained. Aside from the structural property of the model, the future shape of the industry pictured in the forecasts is directly dependent on what assumptions are made regarding the exogenous variables relating to macroeconomic environments, tariffs, taxes, etc. The forecast termed here as the Reference Forecast incorporates a set of assumptions that can be viewed as the most likely scenario concerning the future events exogenous to the model. In this sense, the forecast based on the most likely scenario can serve as a reference against alternative forecasts that result from different scenarios, while the forecast itself also offers useful future information on the industry.

With this Reference Forecast as background, several alternative ex-ante simulation experiments are made. The purpose here is three-fold. First, an introduction of a shock to the model by way of altering one or a few exogenous variables enables one to analyze the properties of the model, especially the magnitude of endogenous reactions and dynamic stability. Secondly, the efficacy of different policy measures can be examined by changing the assumed values of policy variables such as sales and corporate income tax rates. Thirdly, focusing on the question of trade protection, an attempt is made to predict the medium-term prospects of the industry, in the cases of partial and complete dismantling of the protection being accorded the industry today. A scenario in which a substantial appreciation in the value of the Canadian dollar is assumed to occur is also considered.

The OLS model is principally used for the ex-ante simulations. As will be discussed shortly, the sample-period dynamic simulations reveal that the OLS model generally results in smaller errors than the 2SLS model. Thus, the OLS model was chosen for the ex-ante forecasting and simulation experiments. However, in the alternative scenario of the one-year removal of the quota on clothing imports, the 2SLS model was also used for simulation, mainly to compare the dynamic properties and the magnitude of endogenous responses of the two models.

1. Ex-post Simulations

(1) Sample-period dynamic simulation: 1964-1976

The sample period dynamic simulation was conducted for the period 1964-1976, the maximum common range of the estimation period of all the behavioral equations.

The summary results of the simulation are presented in Table VI-1, where the sample-period performances of the endogenous variables are evaluated in terms of the magnitude of residual errors. Table VI-1 offers a direct comparison of the predictive abilities of the OLS and the 2SLS models within the sample period. Three summary measures of simulation errors are included in Table VI-1: RXMSE, which denotes root mean square error; AVABS, average absolute error; and AVABSP, average absolute error as percent of actual value. The variables shown in the table represent two major industry categories, clothing and total non-clothing textiles. The full-detail residual analysis including sub-industry details and other variables is presented in Appendix C. The residual-error analysis, as summarized in Table VI-1, suggests first that the models trace the historical events quite well and, secondly, that the OLS model performs better than the 2SLS model. At the major industry aggregate level, the average absolute errors are less than 5% of the actual values in most variables and, among these, there are many that display errors within less than the 2% range, in both the OLS and 2SLS cases. The model's accuracy is well reflected in the performance of such summary indicators as market shares, unit labour cost, labour productivity, and the activity index (AINDXK). The variables that show relatively inferior performance are imports, especially of clothing, and investments. The relatively large average error shown by the equation for clothing imports can be traced to clothing consumption which the model underestimated by a large margin in the simulation for the 1966-68 period. This error is largely transmitted to clothing imports for the

TABLE VI-1

SAMPLE PERIOD DYNAMIC SIMULATIONS: 1964-76
Summary Measures of Residual Errors

| | RXMSE | | AVABS | | AVABSP | |
|---|---|---|---|---|---|---|
| | OLS | 2SLS | OLS | 2SLS | OLS | 2SLS |
| CCLOTH | 45.1 | 78.4 | 38.6 | 70.2 | 1.79 | 3.17 |
| CTEXTL | 157.1 | 166.0 | 118.1 | 130.0 | 3.19 | 3.60 |
| MCLOTH | 39.9 | 54.1 | 33.2 | 43.8 | 16.40 | 21.95 |
| MTEXTL | 52.0 | 54.7 | 43.5 | 44.1 | 5.61 | 5.46 |
| SCLOTH | 27.4 | 36.4 | 21.9 | 27.1 | 1.27 | 1.44 |
| STEXTL | 96.2 | 101.6 | 77.5 | 85.5 | 3.71 | 4.21 |
| VCLOTH | 10.1 | 15.5 | 8.3 | 10.6 | 0.97 | 1.07 |
| VTEXTL | 48.6 | 49.3 | 37.8 | 40.8 | 3.92 | 4.35 |
| VCLOTP | 0.027 | 0.038 | 0.020 | 0.031 | 1.67 | 2.75 |
| ISPCLT | 0.021 | 0.034 | 0.018 | 0.031 | 1.72 | 3.07 |
| VTEXTP | 0.052 | 0.051 | 0.037 | 0.035 | 2.57 | 2.39 |
| ISPTXT | 0.025 | 0.026 | 0.020 | 0.020 | 1.74 | 1.78 |
| CCLOTP | 0.018 | 0.028 | 0.014 | 0.026 | 1.20 | 2.23 |
| CFYCMP | 0.019 | 0.019 | 0.013 | 0.013 | 0.94 | 0.90 |
| ECLOTH | 2.1 | 3.5 | 1.9 | 3.2 | 1.53 | 2.56 |
| ETEXTL | 3.2 | 3.1 | 2.6 | 2.5 | 3.61 | 3.46 |
| ICLOTH | 4.5 | 4.5 | 3.7 | 3.7 | 13.01 | 13.1 |
| ITEXTL | 12.3 | 12.4 | 10.3 | 10.3 | 10.95 | 11.0 |
| ULCCLT | 0.019 | 0.033 | 0.015 | 0.029 | 2.17 | 4.25 |
| ULCTXT | 0.036 | 0.035 | 0.032 | 0.030 | 4.17 | 3.90 |
| PDC | 0.12 | 0.13 | 0.09 | 0.10 | 1.35 | 1.48 |
| PDT | 0.37 | 0.37 | 0.32 | 0.32 | 4.26 | 4.29 |
| UTLZCE | 0.031 | 0.043 | 0.025 | 0.037 | 3.33 | 4.95 |
| UTILZE | 0.047 | 0.046 | 0.039 | 0.039 | 5.01 | 5.02 |
| SHRCLT | 0.021 | 0.029 | 0.017 | 0.023 | 1.98 | 2.60 |
| SHRTXT | 0.014 | 0.014 | 0.010 | 0.010 | 1.33 | 1.38 |
| AINDXK | 0.042 | 0.047 | 0.034 | 0.038 | 3.33 | 3.80 |

Note: RXMSE = Root mean sqr. err.; AVABS = Avrg. absolute error; AVABSP = AVABS as %.

same period, affecting the overall average percentage error.

In the case of investment, the errors come mainly from the equations themselves. The absolute errors, both in level and percentage terms, are of the same magnitude as those evaluated on a single-equation basis (see empirical equations for ICLOTH and ITEXTL).

The finding that the 2SLS model performs worse than the OLS model seems rather surprising. With very few exceptions the 2SLS errors are larger than the OLS ones, and for some equations the discrepancy is quite substantial. For instance, the 2SLS-simulated clothing consumption displays an average error of $70 million in absolute terms, which is nearly twice as large as the OLS error.

This result seems to contradict the general view that, in a perfectly controlled experimental environment, the forecasting accuracy based on OLS estimates is in general inferior to that of consistent estimators including 2SLS[3].

The following facts provide some, but not exhaustive, explanations. First, as noted earlier, the extent of bias correction by using 2SLS is severely limited by the small sample size available for model estimation. Secondly, while 2SLS produces a better forecast in the absence of any problem other than simultaneity, it does not necessarily do so when other problems coexist. The model is not a perfect one in that its behavioral equations may still suffer from such problems as specification errors, multicolinearity, autocorrelation, and data measurement errors, despite all the efforts to avoid them. It is not clear that the use of 2SLS, intended mainly for correcting the simultaneity bias, should produce a model which performs better when other problems are present. Thirdly, there is a question of whether the use of a few principal components as instrumental variables was able to serve the purpose for which it was intended in the 2SLS estimation.

In any case, given the model structure, data and specification, it is here found that the model estimated by 2SLS performs slightly less well than the OLS one. Accordingly, the OLS model is chosen as the principal device with which to conduct various ex-ante simulations.

(2) Ex-Post Forecast: 1964-1978

The simulation experiment conducted here is the same as in the previous section, except that the simulation period is extended by two years beyond the sample period, up to 1978. Thus, the simulated values for 1977 and 1978 constitute the first two years of forecasts outside the sample period. At the same time, they are the last two years of the fifteen-year forecast period that begins in 1964. In the simulation, actual values for 1977 and 1978 are supplied for most of the exogenous variables. The simulated values of endogenous variables in 1977 and 1978 are compared to actual values or reasonable estimates of the endogenous variables, based on latest information available.

This extended-period, *ex-post* dynamic simulation serves two purposes. First, it provides a unique opportunity for a more stringent test of the model by concentrating on its predictive performance in the non-sample period. Secondly, the experiment allows one to detect any sudden break, structural or otherwise, that either starts in the last years of the sample period or in the 1977-78 period. This is particularly important, since a failure to recognize the break, if any, will result in heavily biased *ex-ante* forecasts, especially when the forecasts are of a long-term nature.

Import of clothing is a good case in point. The introduction announced in November 1976 of a global quota on clothing imports began to take effect in 1977, reducing the volume of imports by as much as 20% in that year. Since the estimated equation for clothing imports is based only on the period to 1976, it does not reflect this event and therefore will tend to over-predict clothing imports outside the sample range.

However, the case of clothing imports is unique in that the "abnormal" deviation is an expected one as its source is fully known, i.e., the quota, and furthermore, the magnitude of the expected deviation can be reasonably estimated. Hence, it is not necessary to wait for the full system simulation to reveal such a deviation in clothing imports, which will in turn lead to the biased predictions of other related variables. The *a priori* incorporation of the quota as an exogenous change will easily eliminate the source of the biases attributable to the resultant reduction in apparel imports.

The following procedures adopted for the purpose of quantifying the quota essentially convert the non-tariff barrier to what is called a tariff-equivalent. First, an estimation of the quota-induced reduction of clothing imports is made. Secondly, based on the coefficient estimates of the empirical equation for clothing imports, and 1977-78 information on domestic and import prices, a tariff equivalent of the quota is calculated.

For the estimation of the quota effect on clothing imports, the clothing equation was re-estimated for the period 1962-78 with two additional observations (1977 and 1978), using basically the same specification as the earlier one. It was fortunate that data for all the variables included in the equation were available for both 1977 and 1978. However, in this estimation, a dummy variable with a value of 1 for the years 1977 and 1978 and of zero for all other years was included in the equation.

*Ceteris paribus*, the magnitude of the quota-induced import reduction will be reflected in the coefficient estimate of the dummy variable. This is based on the assumption that there is no behavioral difference between the periods 1961-76 and 1977-78, and hence from the equation point of view, the quota effect will be equivalent to a change in the intercept term. The following are the estimation results. The estimation method used is OLS.

$$
\begin{aligned}
MCLOTH/MCLOTP = \; & \underset{(2.27)}{360.97} + \underset{(7.23)}{0.34374}(CCLOTH/CCLOTP) \\
& - \underset{(2.63)}{269.11728}(MCLOTP(1+TARIF2))/ISPCLT \\
& - \underset{(3.14)}{1.2197}KCLOTK + \underset{(4.42)}{0.49032}(MCLOTH/MCLOTP)\langle -1 \rangle \\
& - \underset{(4.32)}{75.14946}D72 - \underset{(4.48)}{79.71231}(D77+D78)
\end{aligned}
$$

$\bar{R}^2=0.98$    SEE=14.68    DW=2.15
Mean=257.42    Years=1962-78

The results show that the coefficient estimates are of approximately the same magnitude as in the 1962-76 estimation, indicating a robustness of the equation specification. This also confirms the assumption that no structural changes occurred in the 1977-78 period. The estimated coefficient for the dummy variable, D77+D78, suggests that the special protective measure introduced in late 1976 brought a reduction of $80 million per year in imported apparel in 1971 dollar terms ($150 in nominal terms).

This $80 million reduction in imported clothing is in turn equivalent to an increase in the nominal clothing tariff rate from 22% to 51%, an increase of 29 percentage points. This may be illustrated as follows. Assuming the $80 million reduction is entirely due to the change in the nominal tariff rate, this may be expressed as:

$$\frac{\Delta(\text{MCLOTH}/\text{MCLOTP})}{\Delta((\text{MCLOTP}(1+\text{TARIF1}))/\text{ISPCLT})} = -269$$

or $$-80 = -269\Delta((\text{MCLOTP}(1+\text{TARIF1}))/\text{ISPCLT}).$$

The value -269 comes from the OLS coefficient estimate for the price term. Evaluating at 1977 values for MCLOTP (import price of clothing) and ISPCLT (ISPI of clothing),

$$\begin{aligned}\Delta\text{TARIF1} &= (80/269)(\text{ISPCLT}/\text{MCLOTP}) \\ &= (0.297)\cdot(1.674/1.717) \\ &= (0.297)\cdot(0.975) \\ &= 0.290\end{aligned}$$

Evaluated at 1978 values of MCLOTP and ISPCLT, ΔTARIF1 or the change in the implicit nominal tariff rate is 0.277[4].

In summary, the above procedure estimates first the volume of clothing imports that fall under the quota restriction ($80 million in constant dollars), and secondly converts it into a change in implicit nominal tariffs based on the price elasticity of import demand, approximating the change in the domestic (protected) price of clothing imports due to the quota restriction. It is shown that the present regime of protection including the newly introduced quota, in effect, imposes nominal tariff rates of 51% (1977) and 50% (1978) as compared to the prequota actual tariff rate of 22% (both in 1977 and 1978). In the subsequent simulations, these become the "actual" tariff rates on clothing imports for the years 1977 and 1978. After 1978, it is assumed that the tariff rate will remain at the 1978 level, i.e., 50%.

Although the approach taken in the above is a widely-used method in quantifying a non-tariff barrier and analysing its subsequent impacts, the following should be noted as its qualifications. Given that the actual nominal tariff rate without the quota element remains constant, the above is to assume that the tariff-equivalent of the quota will not vary over the forecast period. This will not be correct in a strict sense. As evident from the above formula, when the price of products made domestically (ISPCLT) relative to imports (MCLOTP) changes, ΔTARIF1 or the tariff-equivalent will also change. ISPCLT is endogenously determined in the model, implying that the tariff-equivalent of the quota will be affected by its solution values which in turn will depend on all other variables in the model. Hence, treating the tariff-equivalent exogenously, as the model does, will not be strictly valid. Further, there may be a problem caused by the change in weights of the quota items in the aggregate clothing imports. For example, as import demand, growing over time, is increasingly absorbed by non-quota clothing imports, the relative weights of the quota items in overall clothing imports will decline, as long as the quantity restriction remains at the same level. That is, the tariff-equivalent of the quota will be somewhat smaller.

In Tables VI-2 and VI-3, the predicted values for 1977 and 1978 are compared to their actual values or those estimated from partial data, for both OLS and 2SLS simulations.

While both the OLS and the 2SLS models are able to predict with respectable accuracy for most of the variables, there are some notable exceptions. In particular, the model fails to predict correctly both clothing investment and textile investment. In 1978, the calculated value of clothing investment is larger than the actual value by $23 million, or 58%, in nominal terms. In the case of textiles, the error is almost 100% of the actual value. The same pattern is observed for 1977, although the magnitude is smaller. This indicates that there is an element of discontinuity in investment in the clothing and textile industries. Indeed, the actual data display a drastic change towards the end of the 1961-1976 sample period. The real investment in these industries fell somewhat in 1975, and then fell by approximately 40% in 1976. The decline continued in 1977 with investment falling by another 40%. Obviously, the coefficient estimates of the empirical equations do not adequately incorporate this unusual change, and the errors thus are transmitted to the forecast.

TABLE VI-2

OLS EX-POST FORECAST: 1977-78

| | 1977 | | | 1978 | | |
|---|---|---|---|---|---|---|
| | Actual | Calcu-lated | Percent Error | Actual | Calcu-lated | Percent Error |
| CCLOTH | 4507 | 4572 | 1.44 | 5047 | 5127 | 1.59 |
| CTEXTL[1] | 5241 | 5752 | 9.75 | 5758 | 6498 | 12.85 |
| MCLOTH | 671 | 674 | 0.45 | 734 | 713 | -2.86 |
| MTEXTL | 1071 | 1380 | 28.85 | 1278 | 1600 | 25.20 |
| SCLOTH | 3269 | 3324 | 1.68 | 3765 | 3883 | 3.13 |
| STEXTL | 3047 | 3386 | 11.13 | 3490 | 3828 | 9.68 |
| VCLOTK[2] | 880 | 945 | 7.38 | 1010 | 1080 | 6.93 |
| VTEXTK[2] | 745 | 838 | 12.48 | 815 | 907 | 11.29 |
| ISPCLT | 1.78 | 1.66 | -6.74 | 1.96 | 1.73 | -11.74 |
| ISPTXT | 1.50 | 1.53 | 2.00 | 1.60 | 1.66 | 3.75 |
| ECLOTH[1] | 121 | 126 | 4.13 | 122 | 136 | 11.48 |
| ETEXTL[1] | 65 | 72 | 10.77 | 66 | 74 | 12.12 |
| ICLOTH | 36 | 54 | 50.00 | 40 | 63 | 57.50 |
| ITEXTL | 84 | 138 | 64.28 | 100 | 195 | 95.00 |
| ULCCLT[1] | 1.16 | 1.10 | -5.45 | 1.10 | 1.11 | 0.90 |
| ULCTXT[1] | 1.00 | 1.02 | 2.00 | 0.99 | 1.04 | 5.05 |
| SHRCLT | 0.830 | 0.831 | 0.12 | 0.837 | 0.845 | 0.96 |
| SHRTXT | 0.740 | 0.710 | -4.05 | 0.732 | 0.705 | -3.69 |

[1] "Actual" values are estimated on the basis of incomplete data.

[2] VCLOTK and VTEXTK denote value-added in constant dollars. Although they are not model variables, they represent a combined effect of nominal value-added and value-added deflator since they are calculated as VCLOTK= VCLOTH/VCLOTP and VTEXTK=VTEXTL/VTEXTP. They are included here to illustrate sources of simulation errors.

Source: See Appendix B for source of actual values.

TABLE VI-3

2SLS EX-POST FORECAST: 1977-78

| | 1977 | | | 1978 | | |
|---|---|---|---|---|---|---|
| | Actual | Calcu-lated | Percent Error | Actual | Calcu-lated | Percent Error |
| CCLOTH | 4507 | 4487 | -0.44 | 5047 | 5278 | 4.58 |
| CTEXTL | 5241 | 5720 | 9.14 | 5758 | 6571 | 14.12 |
| MCLOTH | 671 | 655 | -2.38 | 734 | 758 | 3.27 |
| MTEXTL | 1071 | 1375 | 28.38 | 1278 | 1614 | 26.29 |
| SCLOTH | 3269 | 3311 | 1.28 | 3765 | 4003 | 6.32 |
| STEXTL | 3047 | 3365 | 10.44 | 3490 | 3876 | 11.06 |
| VCLOTK | 880 | 929 | 5.57 | 1010 | 1106 | 9.50 |
| VTEXTK | 745 | 827 | 11.01 | 815 | 911 | 11.78 |
| ISPCLT | 1.78 | 1.68 | -5.62 | 1.96 | 1.72 | -12.24 |
| ISPTXT | 1.50 | 1.54 | 2.67 | 1.60 | 1.66 | 3.75 |
| ECLOTH | 121 | 124 | 2.48 | 122 | 139 | 13.93 |
| ETEXTL | 65 | 72 | 1.54 | 66 | 74 | 12.12 |
| ICLOTH | 36 | 53 | 47.22 | 40 | 64 | 60.00 |
| ITEXTL | 84 | 138 | 64.29 | 100 | 195 | 95.00 |
| ULCCLT | 1.16 | 1.11 | -4.31 | 1.10 | 1.11 | 0.90 |
| ULCTXT | 1.00 | 1.03 | 3.00 | 0.99 | 1.04 | 5.05 |
| SHRCLT | 0.83 | 0.835 | 0.60 | 0.837 | 0.841 | 0.48 |
| SHRTXT | 0.74 | 0.710 | -4.11 | 0.732 | 0.706 | -3.55 |

One explanation for this drastic change is that the accelerated import penetration and the uncertainties caused primarily by the increased trade liberalization movement, especially in respect of the uncertain outcome of the Tokyo round GATT negotiations, may have caused the industry to hold off planned investment during the period.

The model's over-prediction of investment is also partly attributable to real output (VCLOTK and VTEXTK), which, being over-predicted, feeds errors into the investment equations.

The overestimation of clothing output results mainly from the price side. The model underestimates the industry selling price of 12% in 1978, which indicates that the clothing value-added deflator is being underestimated, thus producing a higher-than-actual real value-added.

On the other hand, the over-prediction of textiles output results primarily from the consumption side. The predicted value of consumption of total non-clothing textiles in 1978 is higher than the actual by 13% based on the OLS model, and 14% based on the 2SLS model. A careful examination reveals that the root cause of this problem is in the consumption equations for the two commodity categories "other" and "intermediate products", both of which overestimated consumption from 1975.

In overall comparison, the 2SLS model shows a better performance in the year 1977, whereas the OLS model performs better in 1978 (Table VI-3).

2. Ex-Ante Simulations

(1) Reference Forecast

Assumptions

To use the model to produce medium-term forecasts requires a forecast of certain variables which this model treats as exogenous, but which define the macroeconomic environment in which the industry operates. As noted above, the future macroeconomic environment underlying the present Reference Forecast is drawn from a forecast produced by a large-scale econometric model of the Canadian economy developed by Informetrica Limited, Ottawa.

The economy summarized in Table VI-4 may be characterized as the one that is sluggish, with a below-potential growth performance and suffering from a continued high inflation rate in the near term. Growth picks up in the middle part of the 1980s, before it slows down slightly towards 1990. The recent downward trend primarily caused by energy-related inflation and a U.S. recession is expected to continue through 1981, thus leading to a weak economy in the 1980-81 period. The economy is expected to move strongly again in the period 1982-85, mainly as a result of an expected strong surge in private investment, especially in energy-related areas, as reflected in the growth rate of nonresidential construction expenditures in the same period. On the average, the economy grows, as measured by real GNP, at an annual rate of 3.3% throughout the 1980s.

Table VI-4 below highlights the major macro-assumptions most relevant to the model.

TABLE VI-4

MACRO-ECONOMIC ENVIRONMENTS: 1979-1990
(percent change)

| | 1979 | 1980-81[1] | 1982-85[1] | 1986-90[1] |
|---|---|---|---|---|
| Real GNP | 3.2 | 2.3 | 3.8 | 3.7 |
| Real Disposable Income | 3.0 | 2.7 | 3.3 | 3.1 |
| Construction Expenditures | | | | |
| Residential | -7.6 | -0.6 | 1.7 | 0.5 |
| Non-Residential | 3.0 | -1.2 | 8.1 | 6.5 |
| Employment, Manufacturing | 4.3 | 1.9 | 1.2 | 1.2 |
| Wage per Worker, Manufacturing | 6.8 | 9.1 | 9.4 | 7.5 |
| Population | 1.0 | 1.0 | 0.9 | 0.9 |
| Women's Participation Rate (level) | 0.477 | 0.480 | 0.489 | 0.505 |
| Exchange Rate (level) | 0.85 | 0.87 | 0.89 | 0.92 |
| GNP Deflator | 9.8 | 9.2 | 7.2 | 5.4 |
| CPI | 9.2 | 9.2 | 7.3 | 5.7 |
| Unemployment Rate (level) | 7.6 | 8.2 | 7.6 | 6.3 |

Source: Post-Workshop II-79 Forecast, Informetrica Limited, Ottawa. December 1979.

[1]Annual average

This rate is two percentage points below that of the 1970s.

Several implications for the clothing and textile industry can be drawn from these macroeconomic prospects. For instance, following the pattern of growth in the economy, the industry will show relatively strong growth in the early half of the forecast period and then slow down in the latter period. Also, because of negative growth in residential construction in the next few years, the sectors producing carpets, floor coverings, curtains and draperies will experience the same negative, or notably slow, growth.

The value of the Canadian dollar is assumed to go up through the forecast period, suggesting that textile and clothing imports will increase again, cutting into the domestic producers' market shares. Among the industry-specific exogenous variables, the most crucial factor that is generally believed to determine the future of the Canadian textile and clothing industry is undoubtedly the level of protection that is accorded the industry. The assumption made in this respect is that of status quo; in the next ten years, the industry will receive the same level of protection as it does today. Accordingly, all the tariff rates through 1990 were set at the 1978 level[4]. As noted previously, there is an official enquiry currently being conducted to determine whether the special protection given in the form of a global quota should be removed or maintained for a prolonged period. At least from this point of view, the status quo assumption may seem somewhat optimistic since, depending on the outcome of the enquiry, the quota may soon be dismantled. However, it may be argued that the short-run concern about employment on the government side and the industry's more visible and organized advocacy may easily win over the long-run issues of consumer welfare and industrial rationalization for at least a while. Hence, in this scenario, the quota is assumed to stay in place through to 1980. The possible removal of the quota and its effect are covered as an alternative scenario. The status quo assumption is also made for sales and corporate income tax rates. In addition, the assumptions recorded in Table VI-5 are made for exports and foreign import prices. The growth rates of exports in current dollars are derived by extrapolating against past export trends. The growth rates of import prices draw from the Informetrica Limited forecasts.

In the actual simulation, the model was solved for the period 1977-1990, which implies first that the values of lagged dependent variables required for the solution in 1977 are actuals and secondly that the first two years' solutions will still contain the sources of biases identified in the previous ex-post simulation (1964-1978), if unattended to. Some of these biases are the equation errors, whereas some originate from sources outside the sample period.

TABLE VI-5

INDUSTRY-SPECIFIC ASSUMPTIONS: 1979-1990

(Percent Change)

| | 1979 | 1980-81[1] | 1982-85[1] | 1986-90[1] |
|---|---|---|---|---|
| Exports in current dollars | | | | |
| Clothing | 6.1 | 5.7 | 4.8 | 3.9 |
| Carpets | 15.0 | 9.7 | 7.4 | 5.0 |
| Cordage | 3.0 | 3.0 | 3.0 | 3.0 |
| Others | 4.0 | 4.0 | 4.0 | 4.0 |
| Intermediate Products | 5.2 | 4.3 | 3.2 | 4.0 |
| Import Price (in U.S. dollars) | | | | |
| Clothing | 7.3 | 6.3 | 5.3 | 4.2 |
| Carpets | 6.2 | 5.1 | 4.7 | 4.0 |
| Curtains | 6.2 | 5.1 | 4.7 | 4.0 |
| Cordage | 6.2 | 5.1 | 4.7 | 4.0 |
| Others | 6.2 | 5.1 | 4.7 | 4.0 |
| Intermediate Products | 8.2 | 7.0 | 5.7 | 5.2 |

[1]Annual average.

In any case, with these known biases left uncorrected, the resulting forecasts will be adversely affected, easily giving a distorted picture of the industry's future.

These sources of bias were eliminated by way of introducing the bias values with the opposite sign to the behavioral equations concerned, which is equivalent to changing the intercept term of a behavioral equation. The list of the variables for which these adjustments are made, and the respective adjustment values, are indicated in Appendix C.

## The Canadian Textile and Clothing Industry: Prospects to 1990

The major part of the results of the Reference Forecast are summarily reported in Table VI-6. The full forecast values of all the model variables are presented in Appendix C. The broad picture that emerges from the Reference Forecast is mixed. The clothing sector, despite the continued special quota protection, will suffer a gradual decline in the long run, losing its domestic market share to imports, slowing down production and reducing employment.

In contrast, the textile sector will maintain, or even slightly increase, its domestic market share. By 1990, the clothing industry will see its share shrink from 84% in 1979 to 78%, and its employment, which may reach 127,000 in 1981, will decrease to a level of 121,000. On the other

TABLE VI-6 (Continued)

| | 1979 | 1980-81 | 1982-85 | 1986-90 |
|---|---|---|---|---|
| Activity Index[1] | 7.8 | 4.6 | 3.2 | 2.3 |
| Employment (level) | | | | |
| Clothing | 125 | 127 | 125 | 123 |
| Non-Clothing Text. | 67 | 69 | 70 | 70 |
| Investment[1] | | | | |
| Clothing | -3.3 | 5.4 | 7.7 | 1.7 |
| Non-Clothing Text. | 50.4 | 17.0 | 3.4 | 1.6 |
| Labour Productivity | | | | |
| Clothing | 5.7 | 3.2 | 2.3 | 2.3 |
| Non-Clothing Text. | 5.0 | 4.8 | 4.6 | 4.6 |
| Unit Labour Cost | | | | |
| Clothing | 1.9 | 5.6 | 6.3 | 4.6 |
| Non-Clothing Text. | 2.5 | 2.9 | 3.0 | 2.2 |
| Value-Added Deflator | | | | |
| Clothing | 2.6 | 4.7 | 5.4 | 4.1 |
| Non-Clothing Text. | 5.6 | 2.9 | 2.6 | 2.2 |
| Industry Prices | | | | |
| Clothing | 8.3 | 2.9 | 5.5 | 4.5 |
| Carpets | 2.9 | 1.8 | 0.7 | 0.1 |
| Curtains | 2.4 | 2.5 | 1.2 | 2.7 |
| Cordage | 18.8 | 13.0 | 7.2 | 6.6 |
| Others | 9.6 | 7.4 | 4.7 | 4.5 |
| Inter. Products | 12.8 | 8.2 | 4.6 | 4.3 |

(continued)

TABLE VI-6 (Continued)

| | 1979 | 1980-81 | 1982-85 | 1986-90 |
|---|---|---|---|---|
| Consumption Deflators | | | | |
| Clothing | 10.1 | 4.5 | 5.6 | 5.0 |
| Carpets | 4.5 | 3.0 | 2.0 | 2.1 |
| Curtains | 4.5 | 3.8 | 3.3 | 3.3 |
| Cordage | 12.4 | 10.3 | 7.2 | 7.0 |
| Others | 8.4 | 6.9 | 4.5 | 4.4 |
| Inter. Products | 9.4 | 7.3 | 4.5 | 4.5 |

[1] In real terms
[2] Annual average

hand, the textile industry will employ approximately the same number of people throughout the forecast period, and its average market share will rise slightly from 71% in 1979 to 72% in 1990. As an explanation of these different outlooks for the two industries, real output of the clothing sector is forecast to grow at an annual average rate of 1.5% for the period 1982-1990, in marked contrast to a 4.7% annual growth rate for the textile sector. During the same period, real output of total manufacturing is projected to rise at an annual rate of 5.0%. This suggests that the clothing industry will once again fall behind overall manufacturing in its industrial performance, after a brief surge in 1977-1981, during which time its real output rises by 5.0% every year.

The resurgence of imported apparel is mainly responsible for this rather gloomy outlook for the clothing industry. During 1982-1990, imports of clothing, in real terms, are forecast to grow at an annual rate of 5.6% (a rate still far below the 12% registered in 1967-1976), and real clothing consumption increases at an average rate of 2.2%. This leads to a reduced market share for domestic producers. Three forces are at work to bring this about. First, the maintenance of the clothing quota through 1990 has the effect of maintaining the consumption price at a relatively high level, thus permanently lowering the level of consumption and reducing the overall size of the domestic market. Secondly, it is projected in this forecast that the domestic price of clothing products will rise at an average annual rate of 5% during the 1982-1990 period, while import prices denominated in Canadian dollars will increase at 4% per annum. The relatively high growth of the domestic price then will cause an increase in clothing imports. The projection that the Canadian exchange rate will increase by an average of 7% during the period is partly blamed for the slower growth of the import price.

Lastly, and as is reflected in the unit labour cost of clothing, an inflation-induced wage increase in the overall economy is another factor explaining a higher rate of growth in the prices of home-produced apparel. On the textiles side, the source of strength--although not a substantial one--comes from the sector producing intermediate products such as fibres, yarns and fabrics. This is seen in the market shares of shipments of domestically produced products. Except for cordage and twine, whose industrial share of the overall textile industry is insignificant, the market shares of domestic textiles are projected to decline over the period, while that of the intermediate products sector increases. The intermediate products industry will increase its share to 64% by 1990 from 61% in 1979. The domestic price of intermediate products is projected to increase less rapidly than that of imported products. This reflects the competitive advantage enjoyed by the Canadian producers, who are assumed to continue to pay a lower price than others for oil. Oil is a significant input of the intermediate textile industry. As a result, the imports of intermediate textiles are expected to grow at a slower rate than is overall consumption, producing an increasing share of the market to the domestic intermediate textile sector. During the 1982-1990 period, apparent domestic consumption of intermediate textile products in real terms is projected to rise at an annual rate of 2.3%, in comparison to 1.1% for imported intermediate products. Accordingly, domestic shipments will increase rapidly, at an annual rate of 3% during the period 1982-1990. This rate is higher than the 1.6% experienced by the intermediate sector in 1967-1976. After suffering from low demand in the early period, the industries producing carpets, floor coverings, curtains and draperies will show a strong come-back in the middle part of the 1980s, before starting a declining trend in the latter half of the period.

Overall, this forecast suggests that the medium-term future of the textile and clothing industry will not be very much different from what the industry has been experiencing during the last decade. The effect of stop-gap measures (e.g. quotas) will be short-lived and sooner or later the declining trend of the industry will be revived. In the Reference Forecast, it is estimated that only towards the end of the forecast decade will the industry be able to restore the 1975 level of annual capital spending.

(2) Alternative Scenarios: Impact Studies

a. Removal of Clothing Quotas

Simulations presented here differ from the Reference Forecast in only one aspect: the clothing quota introduced in 1976 is assumed to be taken off beginning in 1981. This simulation studies the impact of removing the quota on the clothing as well as other textile industries. At the same time, it aims to examine the dynamic properties of both the OLS and 2SLS models.

Three experiments are undertaken. First, using the OLS model, the quota is assumed to be taken off only for 1981, and then reinstated for the remaining years. The resulting alternative forecasts are compared to the Reference Forecast to analyze the impacts and the dynamic stability of the model. Secondly, the same simulation is repeated using the 2SLS model. For this experiment, a reference forecast has been produced from the 2SLS model, with which the one-year impacts are compared. Thirdly, using the OLS model, an impact study is conducted with the assumption that the quota-removal is permanent, i.e. for all future years.

It is recalled that the nominal tariff rate for clothing imports includes a tariff-equivalent of the clothing quota, starting with 1977. The nominal tariff rate, excluding the quota part, was 22% in 1978; hence the removal of the quota in the simulation took the form of lowering the quota-inclusive tariff rate from 50% to the 22% level.

Impacts of Removing Clothing Quota in 1981

The removal of the quota on clothing in 1981 is equivalent to an 18.5% reduction in the duty-included import price. *Ceteris paribus*, the price elasticity of -1.4 implicit in the OLS model (see p. 82) suggests that there will initially be an increase of $119 million in imported apparel in constant dollars. Against this partial equilibrium estimate, what will the model predict with all other variables free to respond?

As shown in Table VI-7, the first year impact on clothing imports amounts to $125 million (OLS model), indicating that there is an additional induced effect of $6 million. This induced increase comes mainly from the expanded market size which results in turn from the lower consumption price of apparel.

The removal of the quota reduces the overall clothing consumption price by 3.6%, which induces an increase of $126 million in clothing consumption in real terms. It is interesting to note that, in the first year, the increase of clothing imports is almost the same as that of clothing consumption. In other words, the net increase in consumption is entirely absorbed by imported clothing. The implication is that as far as the first year is concerned, the quota removal will have virtually no effect on the clothing industry, since demand for domestically-made apparel will remain at the existing level. Also, the effect on the textile industry is minimal in the first year.

In the second year, however, both the clothing and the textile industries are adversely affected. In the year 1982, imports of clothing further increase by $52 million (that is, they are $52 million higher than in the Reference Case), as a result of the lagged response built into the clothing import equation. This, with no further increase in the level of consumption, replaces domestic production, raising unit labour cost and lowering productivity. The domestic price (industry selling price) increases, pushing up the consumption price, which then discourages

TABLE VI-7

IMPACTS OF REMOVING CLOTHING QUOTA IN 1981

(Impact Case minus Reference Forecast Case)

| | 1981 | | 1982 | | 1981-90 | |
|---|---|---|---|---|---|---|
| | OLS | 2SLS | OLS | 2SLS | OLS | 2SLS |
| Consumption, Clothing | 126 | 165 | -56 | -103 | 32 | 23 |
| Imports, Clothing | 125 | 162 | 52 | 46 | 225 | 240 |
| Shipments, Clothing | 1 | 3 | -108 | -149 | -193 | -217 |
| Output, Clothing | -3 | -2 | -53 | -72 | -98 | -106 |
| Consumption, Intermediates | -4 | | -53 | | -98 | |
| Imports, Intermediates | -2 | -1 | -22 | -30 | -40 | -1 |
| Shipments, Intermediates | -2 | -1 | -31 | -44 | -58 | -65 |
| Output, Total Textiles | -1 | 0 | -11 | -16 | -22 | -26 |
| Unit Labour Cost, Clothing | 0 | 0 | 1.0 | 1.4 | 0 | 0 |
| Industry Price, Clothing | 0 | 0 | 0.4 | 0.8 | 0 | 0 |
| Consumption Deflator, Clothing | -3.6 | -3.7 | 1.6 | 1.8 | 0 | 0 |
| Employment, Clothing | -0.3 | -0.1 | -4.0 | -6.1 | -7.8 | -9.2 |
| Employment, Textiles | 0 | 0 | -0.6 | -0.8 | -1.1 | -1.3 |

Note: The differences are as percent of Reference Forecast values for unit labour costs and prices. Employment numbers are differences in thousands of people. All others are in millions of 1971 dollars.

consumption. The clothing industry is forced to cut back shipments by $108 million in the second year. As a result, real output goes down by $53 million and 4,000 employees are laid-off.

The textile sector, faced with the reduced demand for its products from the clothing sector, also suffers similar consequences. Accumulated over 1981-1990, the one-year removal of the quota will increase apparel imports by $225 million and reduce output of clothing by $98 million with a loss of 8,000 man-years.

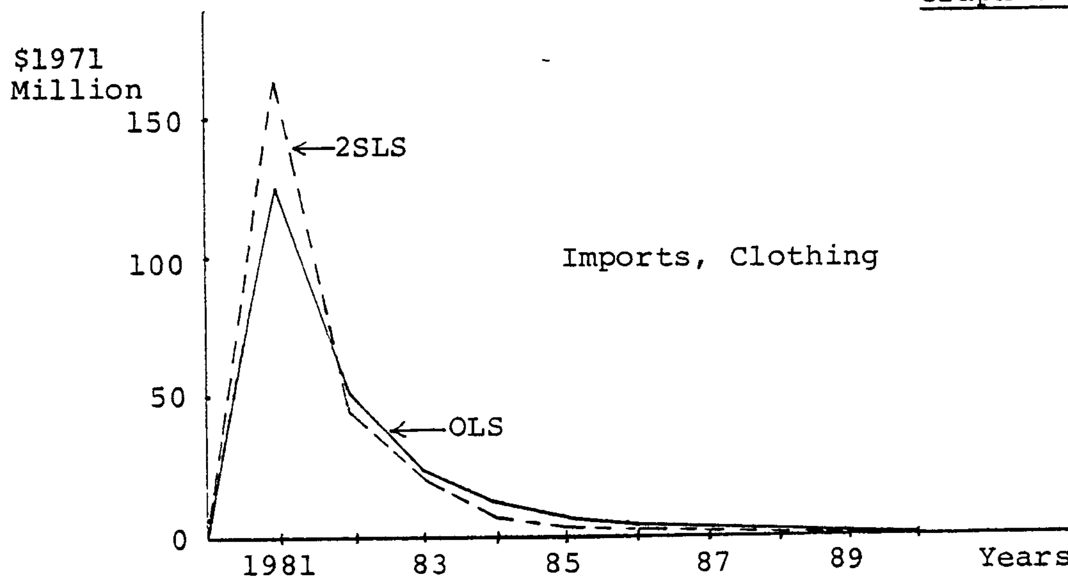
Reflecting its higher elasticities, the 2SLS model shows impacts that in general are higher than the OLS ones. Nevertheless, the general picture remains the same.

In the graphs which follow, the present models are shown to be dynamically stable both in the OLS and 2SLS cases. After receiving the shock in 1981, most of the variables quickly converge to the pre-shock state within five years.

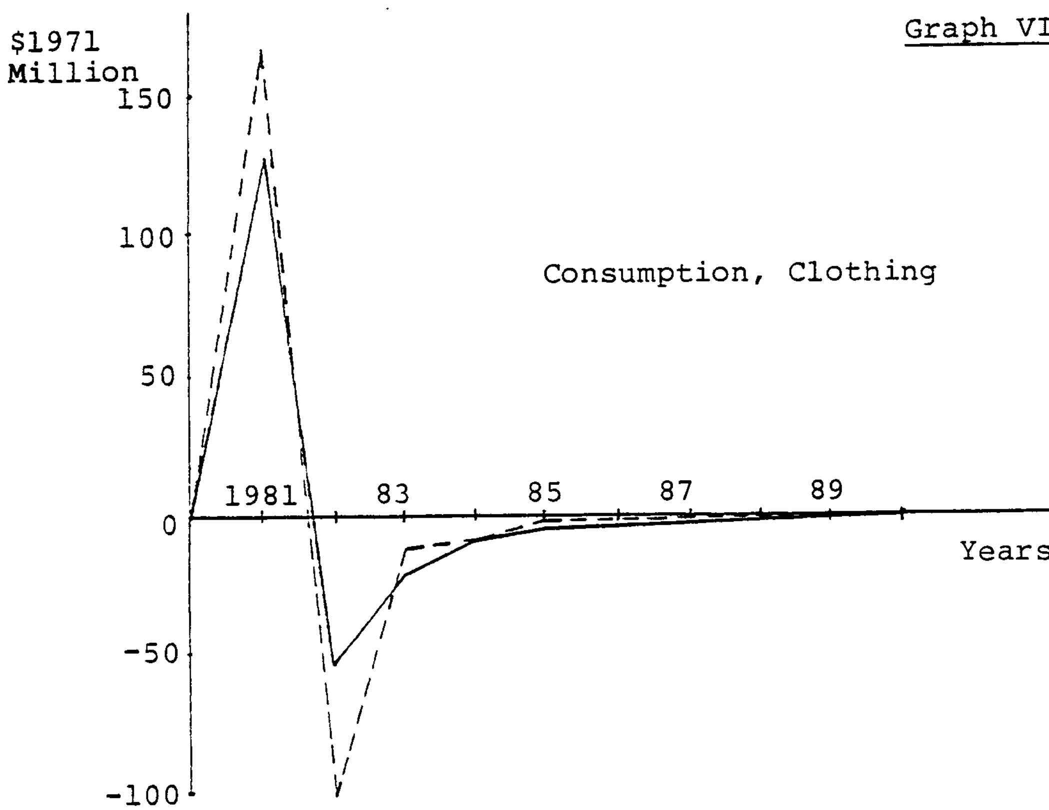
There is an indication that price variables oscillate before converging to the pre-shock state. In the graphs, the solid lines trace the OLS impacts, whereas the broken lines indicate those of the 2SLS model.

Impacts of One-Year Quota Removal
for Selected Variables

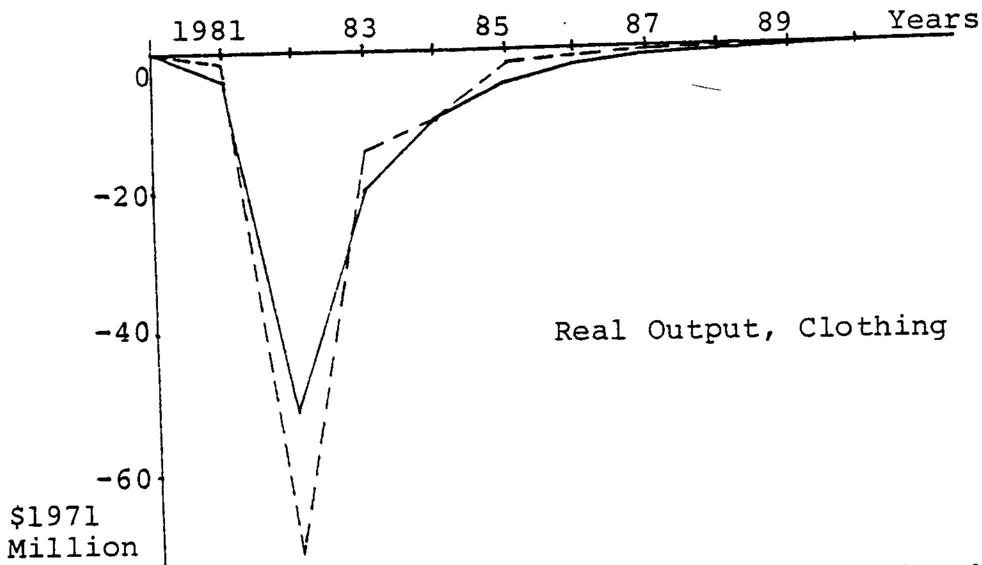
Graph VI-1



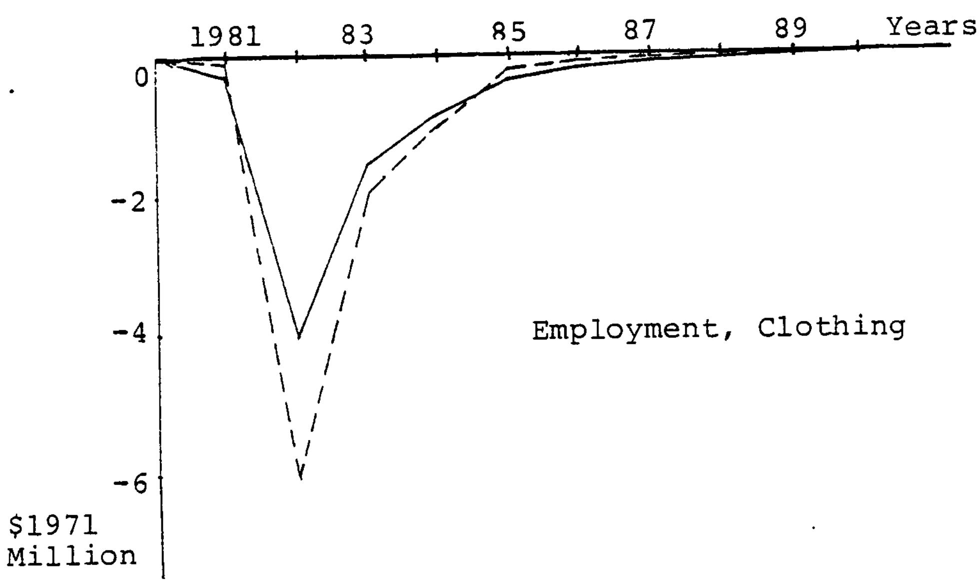

Graph VI-2



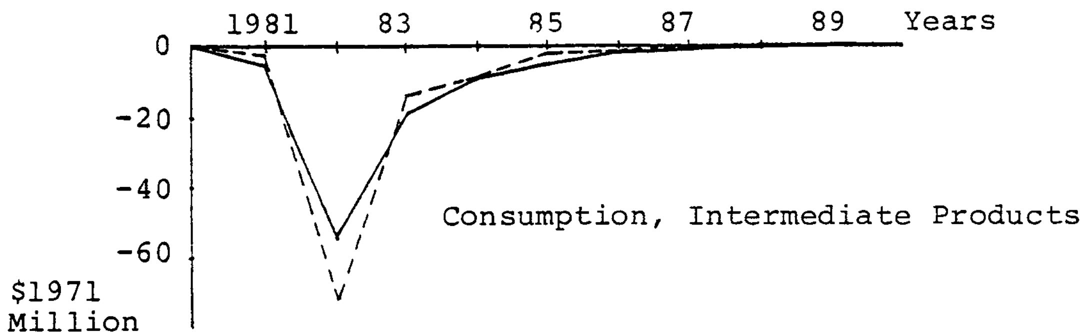
Graph VI-3



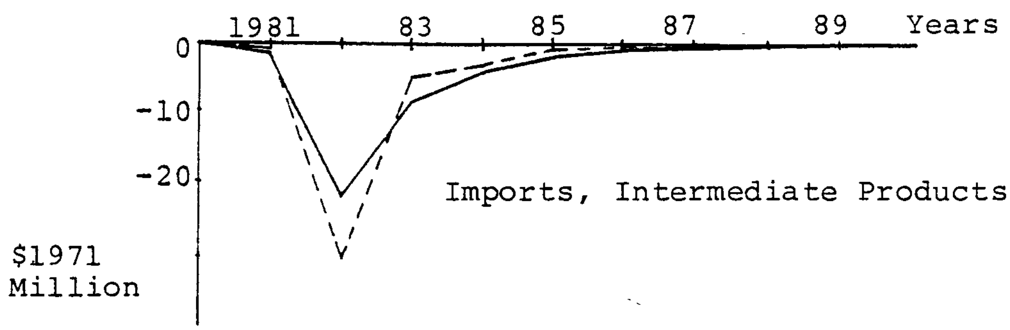

Graph VI-4



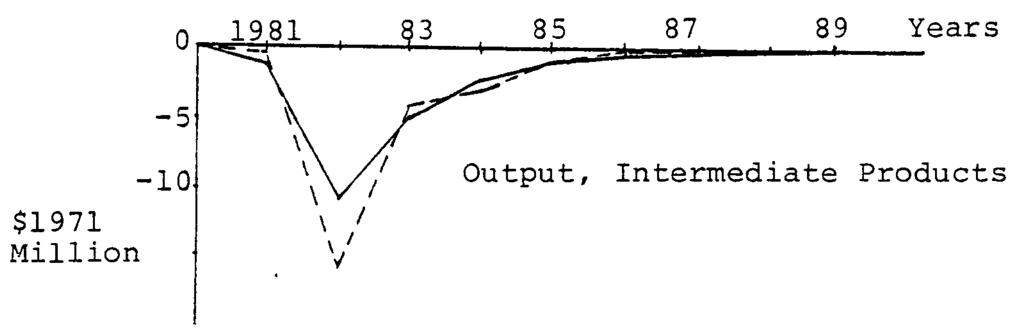
Graph VI-5



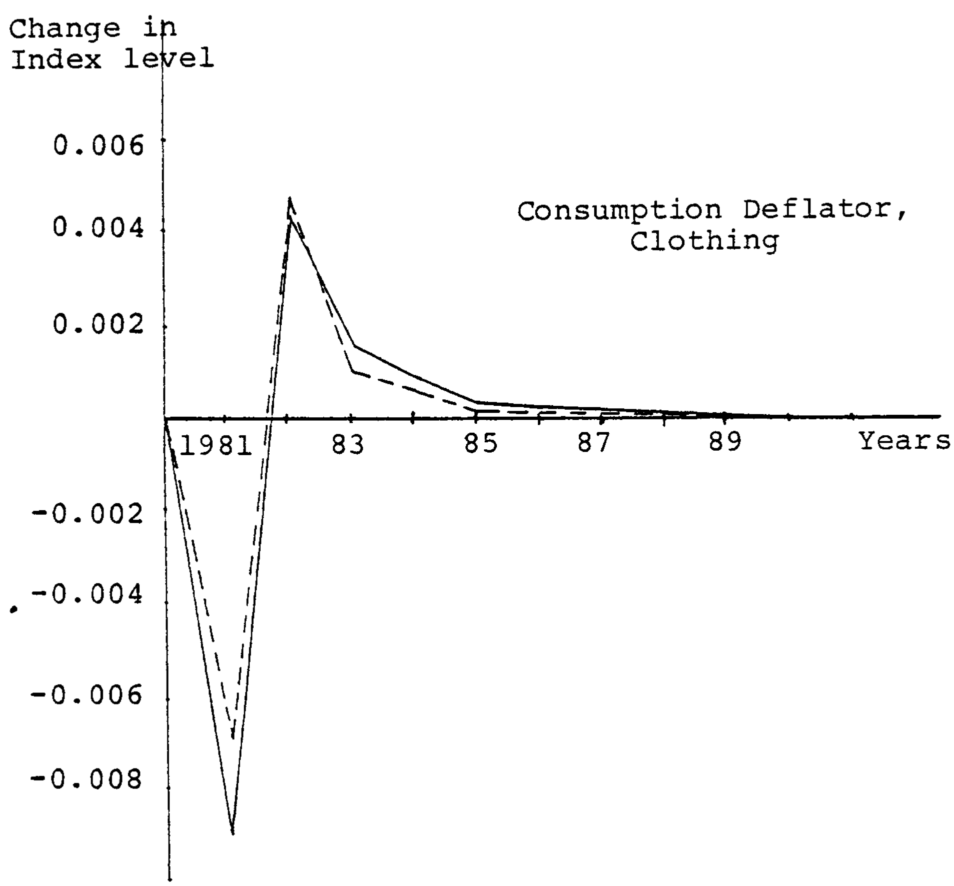

Graph VI-6



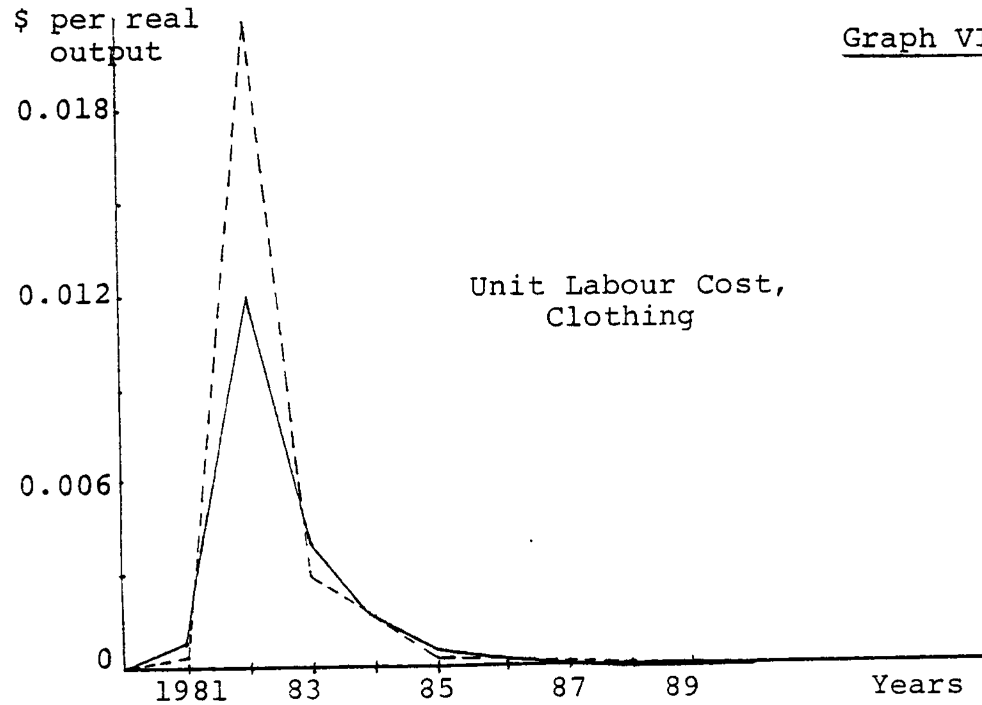

Graph VI-7



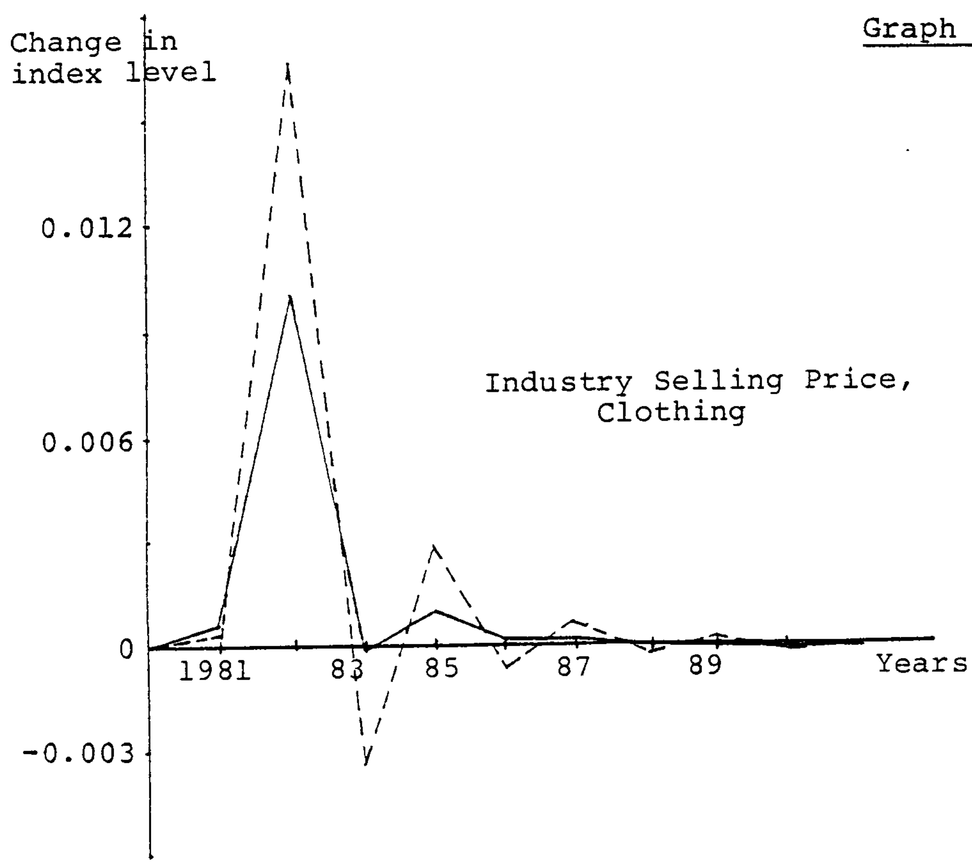
Graph VI-8


Change in
Index level
0.006
0.004
0.002
-0.002
-0.004
-0.006
-0.008
1981
83
85
87
89
Years
Consumption Deflator,
Clothing

Graph VI-9




Graph VI-10



Permanent Removal of the Quota

Major impacts caused by the permanent removal of the clothing quota in 1981 are summarized in Table VI-8.

It is apparent from the model's prediction that the permanent removal of the quota will hurt the Canadian clothing industry to a great extent. Accumulated over the 1981-1990 period, the industry will lose real output worth about $600 million or 43,000 man-years. Its market share in 1990 will stand at 71% of the apparent domestic consumption, which is smaller by seven percentage points than in the Reference Case. Compared to the 1979 share of 84%, however, it is a loss of thirteen percentage points in a decade. The number of employees in the clothing industry decreases to 117,000 in 1990, or 10,000 lower than the 1980 level. Although the textile industry is also adversely affected, mainly in the intermediate sector, the overall damage is not as extensive as in clothing. The reduced demand for imported fibres and fabrics as a result of the production cutback in clothing partially offsets the adverse effects felt on the producers of intermediate products. From the consumer's point of view, the removal of the quota brings a net gain of about $1.3 billion in increased consumption, an amount far exceeding the value of the foregone clothing output (value-added) of $600 million.

TABLE VI-8

IMPACTS OF REMOVING QUOTA PERMANENTLY

(Impact Case minus Reference Case)

| | 1981 | 1982 | 1983 | 1981-90 |
|---|---|---|---|---|
| Consumption, Clothing | 126 | 109 | 111 | 1331 |
| Imports, Clothing | 125 | 188 | 223 | 2435 |
| Output, Clothing | -3 | -44 | -59 | -581 |
| Consumption, Intermeds. | -4 | -44 | -60 | -592 |
| Imports, Intermediates | -2 | -18 | -25 | -243 |
| Output, Total Textiles | -1 | -9 | -13 | -141 |
| Unit Labour Cost, Clothing | 0 | 1.0 | 1.1 | 0.8 |
| Industry Price, Clothing | 0 | 0.4 | 0.4 | 0.4 |
| Consumption Deflator, Clothing | -3.6 | -3.0 | -3.0 | -3.8 |
| Employment, Clothing | -0.3 | -3.3 | -4.5 | -42.5 |
| Employment, Textiles | 0 | -0.5 | -0.6 | -6.0 |
| Investment, Clothing | -0.1 | -0.9 | -1.5 | -6.2 |
| Investment, Textiles | 0 | -0.2 | -0.3 | -1.0 |
| Market Share, Clothing | -0.04 | -0.06 | -0.07 | -0.07 |

Notes: The differences are as percent of Reference Forecast values for unit labour costs and prices.
Employment numbers are differences in thousands of people. All others are in millions of 1971 dollars.
Market share for 1981-90 is the difference in percentage points in the year 1990 between the Impact and Reference cases.

b. The Case of No Protection

The scenario here concerns a case in which the protection being accorded the Canadian textile and clothing industry today is assumed to be completely and permanently dismantled, beginning in 1983. This is a case which is very unlikely to occur.

However, there is ample indication that some day in the future, the wave of trade liberalization will leave Canada no choice but to dismantle completely the protective wall built around the textile and clothing industry. At the same time, this question is at the heart of the current debate. Will the industry collapse overnight if all tariffs are removed? Whose arguments are right, and to what extent? Who will be the losers, and who will be the winners, if the protection is gone?

The present simulation should be able at least to provide some answers to these questions. It should be noted here that, ideally, the removal of the protective wall should be treated reciprocally, i.e., Canada's textile and clothing exports should also be free of trade barriers. This implies that the values of exports should be adjusted upwards. This study does not make such an adjustment, not knowing how large an adjustment to make. Hence, the outcome of this impact simulation can be regarded as being rather on the conservative side.

Table VI-9 shows the major results of this scenario.

On the clothing side, the complete removal of protection raises the annual level of apparel consumption by an average of $430 million in 1971 dollars, as compared to the base case, i.e., the Reference Forecast. Accumulated over the period of 1983-1990, Canadians will be able to consume an additional total of $3.5 billion worth of apparel products. This occurs because the consumption price is lowered each year for the period by as much as 10%. One-half of this price reduction is accounted for by the abolition of the clothing tariff with another half coming from the reduced material cost of clothing production as a result of now-tariff-free materials imports.

However, the more elastic response of clothing imports more than offsets this net increase in consumption, thus replacing domestic shipments by an accumulated total of $750 million during the period. Consequently, the market share of the domestic clothing producers plunges. By 1990, the market share of the domestic shipments in apparent domestic consumption reaches 63% or fourteen percentage points below what it was in the Reference Case. This change in the market share, taken alone, seems to suggest that the complete removal of protection will indeed have a devastating effect on the industry.

TABLE VI-9

THE CASE OF NO PROTECTION: 1983-90
(Impact Case minus Reference Case)

| | | 1983 | 1983-90 |
|---|---|---|---|
| Consumption, | Clothing | 423 | 3446 |
| | Textile End-Products | 83 | 607 |
| | Intermediate Products | 40 | -926 |
| Imports, | Clothing | 279 | 4194 |
| | Textile End-Products | 10 | 28 |
| | Intermediate Products | 78 | 137 |
| Output, | Clothing | 37 | -613 |
| | Total Textiles | -32 | -785 |
| Employment, | Clothing | 2.0 | -50.5 |
| | Total Textiles | -1.6 | -34.9 |
| Investment, | Clothing | 0.6 | -9.3 |
| | Total Textiles | -1.0 | -5.4 |
| Productivity, | | | |
| | Clothing | 0.6 | -2.1 |
| | Total Textiles | -0.1 | -0.3 |
| Industry Prices, | | | |
| | Clothing | -2.2 | -0.7 |
| | Textiles | -5.6 | -5.7 |
| Unit Labour Costs, | | | |
| | Clothing | -0.5 | 1.6 |
| | Textiles | 0.1 | 0.3 |
| Market Shares, | | | |
| | Clothing | -0.07 | -0.14 |
| | Textile End-Products | -0.03 | -0.00 |
| | Intermediate Products | -0.04 | -0.03 |

Notes: For prices, unit labour costs and productivity, the differences between cases are in terms of percent of the level values of the Reference Case, with 1983-90 referring to the comparison in the year 1990.

Market shares are in terms of percentage points. All others are in millions of 1971 dollars.

However, when one considers the fact that the complete removal of tariffs on imported clothing introduces a price shock twice as large as in the previous simulation (the case of permanently removing the quota), the overall impacts on the industry are not as damaging as is suggested by the market share. For instance, accumulated over the 1983-90 period, the lost value of output amounts to $600 million, which is approximately the amount suggested in the above simulation involving the removal of the quota.

The ameliorating factor is the reduced materials cost. The complete removal of tariffs imposed on imported fibres, yarns and fabrics results in a 2% decrease in the industry selling price each year, reflecting a comparably reduced production cost. Nevertheless, the increased import penetration produces all the expected adverse impacts in the long run: declines in productivity; increases in unit labour costs; cutbacks in capital spending and a reduction in employment.

In summary, Canadian consumers experience an increase in apparel consumption of $3.5 billion (1971 dollars); 8,000 people employed by the clothing industry lose their jobs; and $600 million (1971) worth of output is foregone by the clothing industry for the 1983-90 period.

Measured in value of output lost, the sector producing non-clothing textile products is hurt more severely.

Over the period 1983-90, the textile industry will lose an accumulated total of $785 million, as compared to $613 million in clothing.

It is not difficult to trace the major cause. It comes from the intermediate sector, which receives a double blow from the dismantling of the trade barriers. First, the shrinking domestic clothing industry leads to a weaker demand for domestically-made, as well as foreign-made materials. Then, with the tariff taken off imported fabrics, the clothing industry increasingly turns to foreign sources for their materials supply, which further cuts into the domestic market.

Over the simulation period, ADC of domestically-produced intermediate products decreases by an accumulated total of $900 million. As a result, the industry producing textiles is forced to reduce its employment by 5,000 in 1990 as compared to the Reference Case, which occurs despite the relatively low labour content in its production process.

By the end of the coming decade, the Canadian textile and clothing industry as a whole will employ 13,000 fewer workers than is projected in the Reference Case. If trade protection is completely removed, $1.4 billion worth of real output will be lost; a total increase of $4 billion in real terms ($13 billion in current dollars) in imported textile and clothing products will occur; and net consumption will rise by $4 billion. The government will lose $7.8 billion of its otherwise collectible nominal tariff revenues.

c. Policy Incentives

The impact analysis of two policy incentive measures intended to boost the textile and clothing industry is conducted in this section. The first such incentive is directed to stimulating the market, namely a sales tax cut. It is assumed here that in 1981 alone the government takes three percentage points off the current retail sales tax rates on textile and clothing products, as follows:

| | Reference Case (%) | Impact Case (%) |
|---|---|---|
| Clothing | 5.2 | 2.2 |
| Carpets | 6.5 | 3.5 |
| Curtains | 6.3 | 3.3 |
| Others | 6.6 | 3.3 |

The second incentive is directed towards stimulating business capital spending: it is assumed that the effective corporate income tax rate will be reduced in the year 1981 by 50% for both the textile and the clothing industries, such that effective corporate income tax rates for 1981 are as follows.

| | Reference Case (%) | Impact Case (%) |
|---|---|---|
| Clothing | 37.8 | 18.9 |
| Textiles | 55.2 | 27.6 |

The results of these two impact simulations are summarised in Table VI-10 and VI-11.

TABLE VI-10

IMPACTS OF SALES TAX CUTS: 1981
(Impact Case minus Reference Case)

| | 1981 | 1982 | 1981-90 |
|---|---|---|---|
| Consumption Prices | | | |
| Clothing | -2.7 | 0.4 | 0.0 |
| Carpets | -2.8 | 0.1 | 0.0 |
| Curtains | -2.6 | 0.0 | 0.0 |
| Others | -2.6 | 0.0 | 0.0 |
| Intermediates | 0.1 | 0.0 | 0.0 |
| Consumption | | | |
| Clothing | 93 | -15 | 72 |
| Textile End-Products | 27 | 0 | 27 |
| Intermediate Products | 50 | -14 | 30 |
| Imports | | | |
| Clothing | 29 | 11 | 47 |
| Textile End-Products | 5 | 0 | 5 |
| Intermediate Products | 32 | -6 | 23 |
| Output | | | |
| Clothing | 33 | -13 | 13 |
| Textiles | 14 | -2 | 10 |
| Employment | | | |
| Clothing | 2.6 | -0.9 | 1.1 |
| Textiles | 1.0 | -0.1 | 0.8 |

Notes: For consumption prices, the differences between cases are in terms of percent of the level values of the Reference Case. Employment is in terms of level difference in thousand workers. All others are level differences in millions of 1971 dollars.

TABLE VI-11

IMPACTS OF CORPORATE INCOME TAX CUT: 1981

(Impact Case minus Reference Case)

| | 1981 | 1982 | 1981-90 |
|---|---|---|---|
| Investment | | | |
| Clothing | 7 | 2 | 2 |
| Textiles | 0 | 16 | 2 |
| Output | | | |
| Clothing | 3 | 7 | 34 |
| Textiles | 0 | 7 | 22 |
| Employment | | | |
| Clothing | 0.7 | 1.2 | 4.9 |
| Textiles | 0 | 0.4 | 1.2 |
| Imports | | | |
| Clothing | -6 | -10 | -46 |
| Textiles | 1 | -2 | -1 |
| Consumption | | | |
| Clothing | 2 | 6 | 28 |
| Intermediate Products | 2 | 13 | 48 |

Note: For units of measurement, see Notes for Table VI-10.

The three-percentage-point retail sales tax cuts result in lowering the consumption prices of the relevant consumer products by 2.6%, as compared to the Reference Case. As expected, this stimulates consumption; consumption of clothing goes up by $93 million in the impact year in constant dollars, which is equivalent to 3.4% of the

1981 consumption level projected in the Reference Forecast; consumption of textiles, excluding intermediate textile products, increases by $27 million in constant dollars, a 2.2% increase from the level forecast in the Reference Case. The consequent increase in production of clothing and textiles of end-product categories (i.e., textiles excluding intermediate goods) leads to a higher demand for fibres, yarns and fabrics, benefiting the sector producing these. Hence, real consumption of intermediate products goes up by $53 million, a 2.4% increase over the 1981 level projected in the Reference Forecast. However, the increased demand for intermediate products pushes up its consumption price slightly.

The textile and clothing industry as a whole is able to provide 3.6 thousand additional jobs in the impact year. As shown in the table, however, the first year impacts are moderated slightly in the subsequent years, due to price increases responding to an overall demand pressure.

The model suggests that if the corporate income tax rates applicable to the textile and clothing industries are cut by one-half, the clothing industry will respond by increasing its real capital spending by $7 million, or 27%, and the textile industry by $16 million, or 15%. However, in the case of the textile industry, the investment impact will begin only in the second year, reflecting the lagged response incorporated in the model. The expanded production capacity brings a higher level of domestic shipments and output, substituting for imported products. Over the period of 1981-90, the domestic industry replaces imports by its products by an amount of $47 million. However, this import substitution comes mostly from the clothing side, suggesting a low degree of import substitutability, especially on the textiles materials side. There is an increase of 6,000 jobs, indicating that output-induced effects overshadow factor substitution between capital and labour.

Based on the above two policy simulation experiments, can one say something about the relative efficacy of the policy measures under consideration? The corporate income tax cut generates a revenue loss to the government of approximately $460 million in current dollars. On the other hand, based on 1981 current values of consumption as projected in the Reference Case, the three-percentage-points retail sales tax cut is estimated to cost the government about $300 million. From a long-term point of view, then, the investment incentive can be regarded as relatively more effective, since $460 million in tax expenditures foregone can have an employment effect of 6,000, whereas the sales tax cut can create only 2,000, with a $300 million revenue loss.

d. The Case of Exchange Rate Revaluation

The case in this section involves a scenario that assumes that in the next decade the value of the Canadian dollar will be at par with the U.S. dollar, as shown in Table VI-12.

Table VI-12

EXCHANGE RATES: 1981-90

(US dollar/Cdn dollar)

| | Reference Case | Impact Case | Percent Change |
|---|---|---|---|
| 1981 | 0.870 | 1.000 | 14.9 |
| 1982 | 0.880 | 1.000 | 13.6 |
| 1983 | 0.890 | 1.000 | 12.4 |
| 1984 | 0.900 | 1.000 | 11.1 |
| 1985 | 0.910 | 1.000 | 9.9 |
| 1986 | 0.920 | 1.000 | 8.7 |
| 1987 | 0.920 | 1.000 | 8.7 |
| 1988 | 0.920 | 1.000 | 8.7 |
| 1989 | 0.920 | 1.000 | 8.7 |
| 1990 | 0.920 | 1.000 | 8.7 |

There are two qualifications required for this alternative assumption about the exchange rate. First, ideally, the new exchange rate implies that the other macroeconomic assumptions underlying the Reference Case have to be adjusted accordingly, for consistency. For instance, the higher value of the Canadian dollar will lower the rate of domestic inflation (CPI and PGNE), which in turn will be reflected in a slower wage rate growth. This will then result in a lower unit labour cost in the industry, with its consequent effects on prices and imports. However, such complementary adjustments of macro-assumptions were not made here.

Secondly, the exchange rate revaluation will imply that exports, which are exogenous in the present model, will also change. In this scenario, however, the nominal values of exports are left unchanged from the reference case, with an implicit assumption that exports respond to price change with a unitary elasticity.

The resultant effects are very similar to the case of complete tariff removal, although the magnitude of impacts is relatively small. This is expected, however, with an annual import price reduction (due to the exchange rate appreciation) equivalent to half of that implied in the case in which all the tariffs were assumed to be taken off. (See Table VI-13).

TABLE VI-13

IMPACTS OF THE EXCHANGE RATE REVALUATION

(Impact Case minus Reference Case)

| | 1981 | 1981-90 |
|---|---|---|
| Imports | | |
| Clothing | 101 | 1550 |
| Textile End-Products | 8 | 100 |
| Intermediate Products | 53 | 452 |
| Consumption | | |
| Clothing | 148 | 1457 |
| Textile End-Products | 78 | 556 |
| Intermediate Products | -10 | 188 |
| Market Shares | | |
| Clothing | -0.01 | -0.03 |
| Textile End-Products | -0.002 | -0.002 |
| Intermediate Products | -0.003 | -0.001 |
| Output | | |
| Clothing | -13 | -240 |
| Textiles | -36 | -40 |
| Employment | | |
| Clothing | -1.7 | -20.6 |
| Textiles | -1.9 | -0.6 |
| Industry Prices | | |
| Clothing | -1.7 | -2.7 |
| Textiles | -5.0 | -3.3 |

Note: For units of measurent, see notes for previous tables.

Footnotes to Chapter VI

[1] The computer system used for all the simulation experiments is the SIMSYS system developed and maintained by Informetrica Limited, Ottawa. At the solution stage, the model was solved through an iterative procedure known as the Gauss-Seidel method.

For reference, see M.C. McCracken and C.A.Sonnen, Simulation System for Econometric Models.

[2] Informetrica Limited, Post-Workshop II-79 Forecast: Key Assumptions and Summary. December 1979.

[3] See for example, Johnston, pp. 408-420.

[4] Nominal tariff rates for 1977 and 1978 are actuals for clothing and intermediate products, whereas all other products were assumed to have the same rates as in 1976. With official duty rates unchanged and with an assumption that there has been no drastic change in the commodity composition in each category of imports, this is not an unreasonable postulation. In fact, the nominal tariff rates for clothing and intermediate products are virtually unchanged from the 1976 levels.

# CHAPTER VII. CONCLUSIONS

This thesis has investigated the Canadian textile and clothing industry, focusing on the structure of the industry, the markets it faces, linkages between the market and the industry and the sensitivity of the industry to external factors. The investigation was an econometric one: a relatively large econometric model has been developed, estimated, interpreted, tested and experimented with.

A total of 35 behavioral equations have been specified and estimated. Both OLS and 2SLS estimation methods were employed, the latter in recognition of the simultaneous nature of the model. Estimation results have been closely scrutinized for their conformity with theoretical expectations, statistical significance and elasticity implications. The major findings revealed at the model estimation stage include the following. First, the 2SLS and the OLS methods produced different coefficient estimates, but the differences generally were small. The differences were notable for equations for clothing imports and consumption, the wage rate and value-added deflators, and these differences have elasticity implications. Second, the hypotheses underlying the specification of behavioral equations have, in general, been empirically confirmed. On the consumption side, the empirical results confirm the view that the behaviour of apparent domestic consumption will not be particularly different from that of demand at the final user level. Furthermore, relatively high elasticities found for consumer products suggest that demand for inventory purposes is a significant factor in explaining apparent domestic consumption.

It is noted that the 2SLS-estimated elasticities for clothing consumption are higher than those from the OLS version of model. Imports of textile and clothing products have been found to respond negatively to relative price and a capacity constraint. Import of clothing is elastic in its price response, while other textile products are generally price-inelastic. As in consumption, the elasticity of clothing imports is higher in the 2SLS case. The hypothesis that the capacity constraint plays a role in determining the level of imports has also received empirical support. It has been shown that price determination in the Canadian textile and clothing industry is consistent with the mark-up pricing hypothesis. The value-added deflator, or the combined factor price of labour and capital, is mostly explainable by unit labour cost, as is reflected in the strong statistical correlation between them. Nevertheless, there is an indication that market conditions affect industry pricing, although not to a great extent. Furthermore, the industry takes into account the movement of competing import prices in its determination of the mark-up factor. The hypothesis of constant returns to scale has found empirical support in the production activity of both textiles and clothing. Although one may argue that this is not true for a sub-industry such as the one producing synthetic fibres, it appears that at the aggregate textile industry level, constant returns to scale applies.

The coefficient estimates for the time variable in the employment functions suggest that the contribution of technological change to output growth is 2.4 percent in the textile and 1.4 percent in the clothing sector, reflecting the more capital-intensive nature of the former's production process.

Wage movements in the Canadian textile and clothing industry closely follow those of the overall manufacturing industry. However, the relative productivity performance between the industry and manufacturing as a whole has been found to explain the deviation of the industry's wage rate from the average in manufacturing. The traditionally low level of earnings in the apparel sector can be explained to an extent by this finding.

The empirical equations for capacity utilization are found to be a good mechanism for approximating capacity utilization rates. The empirical coefficients imply that the capacity-output/capital ratios are 2 for clothing and 0.4 for textiles, amply indicating the large capital requirements for producing textile products.

The model has been tested for its validity and functional characteristics by means of full-system dynamic simulations conducted over the sample period. The model has been found to perform well in this respect. It traces history with only a small margin of error for most variables. However, there are equations which performed rather poorly. Investment equations registered an average error of around 10 percent. The error shown in the equation for clothing imports reflects in a major way the tight transmission mechanism existing between many variables in the model.

In a simulation which focuses on the predictive capability of the model outside the sample period, it was found that while the model predicted 1977 and 1978 industry values with reasonable accuracy, it was wide of the mark in predicting investment in those years.

A clear discontinuity in investment that begins towards the end of sample period has been found. This break is identified as the major cause of the bias displayed in the investment equations. Another source of upward bias is on the consumption side of the model. The equations for "other" and "intermediate products" categories overestimate actual consumption; this also affects other areas of the model.

In the process of quantifying the 1976 clothing quota, it has been suggested that the quota has had the effect of implicitly raising the nominal tariff rate from 22 to 51 percent in 1977; this more than doubles the nominal tariff rate. The resultant increase in the cost of imported apparel has caused an $80 million annual reduction in clothing imports in 1971 constant dollars.

Another significant finding from the sample period simulations is that, on the whole, the OLS model performs better than the 2SLS model, which overestimates the endogenous responses for some variables such as consumption and import of clothing. In turn, this spreads the errors over several related areas of the model. It thus suggests that the elasticities of clothing imports and consumption estimated by 2SLS are too high. They are substantially higher than those of the OLS model.

In the first <u>ex-ante</u> application of the model, a medium-term forecast of the Canadian textile and clothing industry has been produced to 1990. The prospects suggested by this forecast are not very bright ones: the clothing industry will soon resume its declining trend. Despite the continuing special quota protection assumed for the forecast period, clothing imports are projected to increase at an annual average rate of 5.7 percent in 1971 dollars during

1980-90, while the domestic market grows annually at the rate of only 2.3 percent. Consequently, employment in the clothing sector decreases by six thousand (by 1990) with minimal expansion of production capacity and production performance falling far behind that of overall manufacturing. The market share of domestic clothing producers will have dropped by seven percentage points by 1990. As in the past, the cost of labour will likely continue to be the major source of problems the Canadian apparel producers will face.

While the picture of the textile industry is not as bleak as that of clothing, no spectacular growth is foreseen for this industry in the medium term either. At best, the textile industry will be able to maintain a market share that is approximately equal to the present level.

This forecast has been used as a reference base for impact studies that were conducted. The model reacts as expected to the shocks introduced in the form of partial or complete removal of protection currently accorded the textile and clothing industries. Imports increase sharply and the consequent damage to the domestic industry is substantial. However, it is clear that there will not be an overnight collapse. If all tariffs were removed from textile and apparel imports starting in 1983, there would be an increase of $4.3 billion worth of imports in

1971 constant dollars over the period 1983-90, or an annual average of $500 millions. This will be eventually translated into $1.4 billion in lost real output, a drop of 14 percentage points in market share (clothing), an employment reduction of 13 thousand and $15 million in withdrawn real capital spending.

Measured in terms of foregone value of output, the textile (specifically the intermediate sector) industry is hurt more severely. While the removal of tariffs on imported fibres, yarns and fabrics moderates the adverse impacts felt on clothing, this will aggravate already lowered demand for the domestically-made intermediate textiles due to the production cutback in the clothing industry, since the latter will increasingly substitute for lower-priced imported materials.

From the point of view of consumers, the complete dismantling of trade barriers allow consumption of an additional $3.4 billion in 1971 dollars over the period 1983-90, or an annual average of $450 million worth of apparel. Against this, the clothing industry will lose $600 million overall, or $80 million in its annual output; 8 thousand workers employed by the clothing industry will lose their jobs.

The simulation experiments in which a one-year shock has been introduced in the form of a clothing quota removal indicates that the model is dynamically stable. After the shock, the model (both the OLS and the 2SLS versions) converges to the pre-shock paths within four to five years.

To see how the model would respond to a policy incentive measure designed to stimulate the industry, two policy simulations have been made. A sales tax cut of three percentage points has been shown to produce an expected effect; consumption of clothing and textile end products increases by $120 million in 1971 dollars in the impact year due to a resultant 3 percent reduction in consumption price. The intermediate sector also benefits, with an increased demand for its products. There is an employment increase of 3.6 thousand jobs.

The model suggests that if the current corporate income tax rate is cut by 50 percent, there will be increased capital spending in the first two years of $25 million in 1971 dollars, or 15% for the industry as a whole. Over the period of ten years, real output additions of $56 million result.

The tax expenditures of these incentives are estimated to be $295 million for the sales tax cuts and $462 million for the investment incentive (both in current dollars). In a relative sense, the investment incentive would be the more effective measure in the long-run.

However one can see that the net benefit to the industry is not a very substantial one, considering the cost of the incentives to the government.

In the last ex-ante simulation, the value of the Canadian dollar is assumed to be at par with the U.S. dollar in the coming decade. This simulation gives an indication of what the magnitude of imports will be if that or a similar situation becomes reality.

The prospects of the Canadian textile and clothing industry suggested in the reference forecast reflect a particular view of the future macro-economy. Given different macroeconomic assumptions, the model will produce prospects different from those of the reference forecast. As an illustration, the future of the Canadian economy may be worse than the one assumed in the reference forecast, in which case the outlook of the industry would be even more pessimistic. Recent U.S. moves towards unprecedentedly high interest rate levels to curb inflation may induce a deeper and more prolonged recession in the U.S. economy, which in turn will provide significant downward pressure on the growth of the Canadian economy. Should there be another series of explosive world oil-price increases, this would make the macro assumptions in the reference forecast appear to be extremely optimistic. If a more pessimistic view of the economy is incorporated as alternative macro-assumptions in the model, the following inferences may be made, based on our previous simulation results. The weaker economy will hurt the industry by reducing the market size, and through price-wage inflation, it will further weaken the relative competitiveness of the industry vis-a-vis imported textile and apparel products.

The apparel industry, with its extremely high labour content in production, will find it tougher to survive against the accelerating import penetration with ever increasing unit labour cost. The textile-producing sector will subsequently be affected as well.

On the other hand, this pessimistic scenario regarding the macroeconomy will make it less likely that the government will remove the protection currently enjoyed by the industry, at least in the near future. It is even possible that the extent of protection will be expanded before it is reduced. Given this increased protection as an extra assumption, then, the model suggests that the damage from the weaker economy would be moderated to an extent. If the weakness in the economy were translated into a further devaluation of the Canadian dollar, this would also become a mitigating factor for the industry.

Overall, the simulation experiments in the study suggest that trade barriers relating to clothing constitute only a short-run stop-gap measure. They will not be able to reverse the secular tide of decay, indicating, therefore, that the industry's concerns about long-term survival are real. On the other hand, as seen in the above impact studies, the loss of consumer welfare under the present protection regime is not small. The average consumer could consume 15 percent more apparel annually if there were no tariffs. In 1971 dollars, the average consumer is projected to consume $115 worth of clothing in 1981 in the reference forecast. If tariffs on all clothing and textile imports are removed, the consumer will benefit by being able to consume an additional $18 worth of clothing in 1981. By keeping the protection wall, each Canadian consumer is losing this $18 of potential gain annually. The heightening of the wall will undoubtedly further increase the consumer's loss. This amply illustrates the nature of the dilemma faced by policy makers.

Throughout the simulation stage, the present model has displayed a remarkable degree of consistency, stability and predictability, suggesting that it qualifies well as a dynamic, structural and simultaneous economic system that can be used either as a forecasting tool or frame of reference in analysis. Nevertheless, there are areas in which improvement can be made. First, expansion of the intermediate sector of the textile industry will not only give a better accounting of the sectoral flows but also allow one to construct a better mechanism of price formation and to identify the domestic and import content of requirements for intermediate textile products. For instance, the intermediate sector may be broken down into synthetic fibres, synthetic yarns and fabrics, natural fibres (wool and cotton), wool and cotton yarns and fabrics, knitted fabrics, and processed fabrics.

Secondly, the model may also be improved by a further disaggregation of clothing and "other". Clothing may be divided into men's, women's and children's and other apparel, whereas "other" may be broken into automotive fabrics and accessories, and home furnishings including other miscellaneous products. This disaggregation, plus that of the intermediate sector, would introduce input-output relationships that are far richer than those in the present model. However, there are a number of severe difficulties with the data which will have to be overcome first.

Lastly, endogenization of exports would eliminate the problem of having to adjust their values in ex-ante simulations, with alternative exchange rate, tariff rates, or other relevant variables.

APPENDIX A

# GLOSSARY OF VARIABLES

## Exogenous Variables

BLDGCK = Building components of expenditures on non-residential construction, $1971 millions

CPI = Consumer price index, 1971=100.0

GNEXPK = Gross national expenditures, $1971 millions

ICLOTP = Investment deflator, clothing, 1971=1.0

INVCLT = Inventory change, clothing, $ millions

INVCOR = Inventory change, cordage and twine, $ millions

INVCRP = Inventory change, carpets and floor coverings, $ millions

INVCRT = Inventory change, curtains and draperies, $ millions

INVFYC = Inventory change, fibres, yarns and fabrics, $ millions

INVOTH = Inventory change, other, $ millions

IR = Expenditures on residential construction, $1971 millions

ISPCHM = Industry selling price, chemical products

ITEXTP = Investment deflator, non-clothing textiles 1971=1.0

LCCA = Legal capital consumption allowance, non-clothing textiles (as relative to actual depreciation)

LCCAC = Legal captial consumption allowance, clothing (as relative to actual depreciation)

MAET = Employment, total manufacturing, thousands

MAWA = Wages and salaries, total manufacturing, $ millions

MAY = Value-added, manufacturing, $1971 millions

MCLTFP = Landed import price in U.S. $, clothing

MCORFP = Landed import price in U.S. $, cordage

MCRPFP = Landed import price in U.S. $, curtains

MFYCFP = Landed import price in U.S. $, fibres, yarns and fabrics

MOTHFP = Landed import price in U.S. $, other

PGNE = GNE deflator, 1971=1.0

POP = Population, thousands

REXN = Exchange rate, Canadian $ per U.S. $

RINDB = Industrial bond rate, %

SCRAPK = Capital scrappages, non-clothing textiles, 1971 millions

SCRPCK = Capital scrappages, clothing, $1971 millions

TARIF1 = Tariff rate, clothing

TARIF2 = Tariff rate, carpets and floor coverings

TARIF3 = Tariff rate, curtains and draperies

TARIF4 = Tariff rate, cordage and twine

TARIF6 = Tariff rate, other

TARIF7 = Tariff rate, fibres, yarns and fabrics

TAXMFC = Manufacturers sales tax rate, clothing

TAXMFG = Manufacturers sales tax rate, all other commodity categories

TXPRFC = Corporate income tax rate, clothing

TAXPRF = Corporate income tax rate, non-clothing textiles

TAXRS1 = Retail sales tax rate, clothing

TAXRS2 = Retail sales tax rate, carpets and floor coverings

TAXRS3 = Retail sales tax rate, semi-durable home furnishing

TAXRS4 = Retail sales tax rate, non-durable home furnishings

TIME = Time variable

WPARTR = Women's labour participation rate.

XCARPT = Exports, carpets $ millions

XCLOTH = Exports, clothing, $ millions

XCORDG = Exports, cordage and twine, $ millions

XFYACM = Exports, fibres, yarns and fabrics, $ millions

XOTHER = Exports, other, $ millions

YD = Disposable income, $1971 millions

<u>Endogenous Variables</u>

AINDEX = Activity index, weighted average of indexed values-added of clothing and end-product textiles

AINDXK = AINDEX in real terms

CCLOTH = Apparent domestic consumption (ADC), clothing, in current million dollars ($CM)

CCARPT = ADC, carpets and floor coverings, $CM

CCURTN = ADC, curtains and draperies, $CM

CCORDG = ADC, cordage and twine, $CM

COTHER = ADC, other including automotive accessories and home furnishings, $CM

CFYACM = ADC, intermediate products including fibres, yarns, fabrics, $CM

CTEXTL = ADC, non-clothing textiles total, $CM

CCLOTP = ADC deflator, clothing

CCARPP = ADC deflator, carpet and floor coverings

CCURTP = ADC deflator, curtains and draperies

CCORDP = ADC deflator, cordage and twine

COTHEP = ADC deflator, other incl. auto. fab. acc. home furnishings

CFYCMP = ADC deflator, intermediate prods., incl. fibres, yarns and fabrics

ECLOTH = Employment, clothing, thousands

ETEXTL = Employment, non-clothing textile total, thousands

ICLOTH = Investment, clothing, $CM

ITEXTL = Investment, non-clothing textile total, $CM

ISPCLT = Industry selling price(ISPI), clothing

ISPCRP = ISPI, carpets and floor coverings

ISPCRT = ISPI, curtains and draperies

ISPCOR = ISPI, cordage and twine

ISPOTH = ISPI, other incl. auto. fab. acc. and home furnishings

ISPTXT = ISPI, non-clothing textile total

ISPFYC = ISPI, intermediate products. incl. fibres, yarns and fabrics

KCLOTK = Capital stock, clothing, $1971 Mill.

KTEXTK = Capital stock, non-clothing textile total, $1971 Mill.

MCLOTH = Imports, clothing, $CM

MCARPT = Imports, carpets and floor coverings, $CM

MCURTN = Imports, curtains and draperies, $CM

MCORDG = Imports, cordage and twine, $CM

MOTHER = Imports, other incl. auto, fabric acc. and home furn., $CM

MFYACM = Imports, intermediate products including fibres, yarns and fabrics, $CM

MTEXTL = Imports, non-clothing textile total, $CM

MCLOTP = Import price, clothing, in Canadian (CDN) $

MCARPP = Import price, carpets and floor coverings, in CDN $

MCURTP = Import price, curtains and draperies, in CDN $

MCORDP = Import price, cordage and twine, in CDN $

MOTHEP = Import price, other incl. auto. fab. acc. and home furnishings, CDN $

MFYCMP = Import price, intermediate prods. incl. fibres, yarns and fabrics, in CDN $

MTEXTP = Import price, non-clothing textile total, in CDN $

PDC = Labour productivity, clothing

PDT = Labour productivity, non-clothing textile total

PROFTC = Returns to capital after tax, clothing, $CM

PROFIT = Returns to capital after tax, non-clothing textile total, $CM

RAWCLT = Intermediate input demand, clothing, $CM

RAWCRP = Intermediate input demand, carpets and floor coverings, $CM

RAWCRT = Intermediate input demand, curtains and draperies

RAWCOR = Intermediate input, cordage and twine, $CM

RAWOTH = Intermediate input, other incl. auto. fab. acc. & home furn., $CM

RAWFYC = Intermediate input, intermediate prods., incl. fibres, yarns, fabrics, $CM

SCLOTH = Domestic shipments, clothing, $CM

SCARPT = Domestic shipments, carpets and floor coverings, $CM

SCURTN = Domestic shipments, curtains and draperies, $CM

SCORDG = Domestic shipments, cordage and twine, $CM

SOTHER = Domestic shipments, other incl. fabric acc. and home furn., $CM

SFYACM = Domestic shipments, intermediate prods. incl. fibres, yarns, fab., $CM

STEXTL = Domestic shipments, non-clothing textile total, $CM

SHRCLT = Market share of domestic shipments (MSDS), clothing

SHRCRP = MSDS, carpets and floor coverings

SHRCRT = MSDS, curtains and draperies

SHRCOR = MSDS, cordage and twine

SHROTH = MSDS, other including auto. fab. acc. & home furnishings

SHRFYC = MSDS, intermediate products incl. fibres, yarns and fabrics

SHRTXT = MSDS, non-clothing textile total

TARIFT = Import-value-weighted tariff rate, non-clothing textile total

UCCCLT = User cost of capital, clothing

UCCTXT = User cost of capital, non-clothing textile total

ULCCLT = Unit labour cost, clothing

ULCTXT = Unit labour cost, non-clothing textile total

UTLZCE = Capacity utilization rate, clothing

UTILZE = Capacity utilization rate, non-clothing textile total

VCLOTH = Value-added, clothing, $CM

VCARPT = Value-added, carpets and floor coverings, $CM

VCURTN = Value-added, curtains and draperies, $CM

VCORDG = Value-added, cordage and twine, $CM

VOTHER = Value-added, other incl. auto. fab. acc. and home fur., $CM

VFYACM = Value-added, intermediate prods., incl. fibres, yarns, fabrics, $CM

VKNTFB = Value-added, knitted fabrics, $CM

VTEXTL = Value-added, non-clothing textile total, $CM

VCLOTP = Value-added deflator, clothing

VTEXTP = Value-added deflator, non-clothing textile

WCLOTH = Wages and salaries, clothing, $CM

WTEXTL = Wages and salaries, non-clothing textile total, $CM

# APPENDIX B

DATA SOURCES AND ACCOUNTING IDENTITIES

| | |
|---|---|
| BLDGCK | Calculated from StatCan Cat. 13-568(Occasional), Fixed Capital Flows and Stocks, 1978. |
| CCLOTH | (SCLOTH + MCLOTH (1+TARIF1)) (1+TAXRS1) (1+TAXMFC) |
| CCARPT | (SCARPT + MCARPT (1+TARIF2)) (1+TAXRS2) (1+TAXMFG) |
| CCURTN | (SCURTN + MCURTN (1+RARIF3)) (1+TAXRS3) (1+TAXMFG) |
| CCORDG | (SCORDG + MCORDG (1+TARIF4)) (1+TAXMFG) |
| COTHER | (SOTHER + MOTHER (1+TARIF6)) (1+TAXRS4) (1+TAXMFG) |
| CFYACM | (SFYACM + MFYACM (1+TARIF7)) (1+TAXMFG) |
| CCLOTP | Weighted average of ISPCLT and MCLOTP, modified by sales taxes and tariffs. |
| CCARPP | Weighted average of ISPCRP and MCARPP modified by sales taxes and tariffs. |
| CCURTP | CPI of linen and draperies (CANSIM D 626256) |
| CCORDG | Weighted average of ISPCOR and MCORDP modified by sales taxes and tariffs. |
| COTHEP | Weighted average of ISPOTH and MOTHEP modified by sales taxes and tariffs. |
| CFYCMP | Weighted average of ISPFYC and MFYCMP modified by sales taxes and tariffs. |
| CPI | StatCan Cat. 22-001 (Monthly), The Consumer Price Index, various issues. |
| ECLOTH | CANSIM (D 902266 + D 902617) (1971-76), (D 343096 + D 343097) (1961-70); StatCan Cat. 11-003, Canadian Statistical Review (1977 and 1978). |
| ETEXTL | CANSIM D 901996 (1971-76), D 343095 (1961-70); StatCan Cat. 11-003, Canadian Statistical Review (1977 and 1978). |

GNEXPK StatCan Cat. 13-201 (Annual), National Income and Expenditure Account, various issues.

INVCLT = VCLOTH - (SCLOTH + XCLOTH - RAWCLT)

INVCRP = VCARPT - (SCARPT + XCARPT - RAWCRP)

INVCRT = VCURTN - (SCURTN + XCURTN - RAWCRT)

INVCOR = VCORDG - (SCORDG + XCORDG - RAWCOR)

INVOTH = VOTHER - (SOTHER + XOTHER - RAWOTH)

INVFYC = VFYACM - (SFYACM + XFYACM - RAWFYC)

IR StatCan Cat. 13-201 (Annual), National Income and Expenditure Account, Various Issues.

ISPCHM ISPI for chemical products (StatCan. Cat. 62-543 (Occasional), Industry Selling Price Indexes: Manufacturing 1956-1976, Cat. 62-011, Industry Price Indexes (for 1977 and 1978). (Monthly)

ISPCLT ISPI of men's clothing, CANSIM D 626289; StatCan Cat. 62-022, Industry Price Indexes (for 1977 and 1978).

ISPCRP ISPI of carpets, CANSIM D 565701 (1971 base), D 605311 (1961 base).

ISPCRT Calculated residually from consumption and import price of curtains and draperies.

ISPCOR ISPI of cordages and twines, converted from 1961 to 1971 base; StatCan Catalogue 62-002, Prices and Price Indexes, various issues.

ISPOTH Calculated residually from ISPI for total textile, CANSIM D 514500 (1971 base), D 608053 (1961 base);and ISPCRP, ISPCRT, ISPCOR and ISPFYC.

ISPTXT CANSIM D 514500 (1971 base), D 608053 (1961 base); StatCan Cat. 62-011, Industry Price Indexes (for 1977 and 1978).

ISPFYC Weighted average of ISPI's for cotton yarn and cloth mills (CANSIM D 564501 (1971 base), D605257 (1961 base)); wool yarns and cloth mills (CANSIM D 564801 (1971)), D 605276 and D 605271 (1961));and synthetic textile mills (StatCan. 62-002, Prices and Price Indexes, various issues, 1961 base data converted to 1971 base).

ICLOTP Investment deflator of clothing industry (StatsCan Cat. 13-568 (Occassional), Fixed Capital Flows and Stocks, 1978).

ITEXTP Investment deflator of textile industry (StatsCan Cat. 13-568 (Occassional), Fixed Capital flows and Stocks, 1978).

LCCA Capital cost allowance for tax write-off purpose divided by actual depreciation calculated with the depreciation rate of 3.38% obtained from StatCan Cat. 13-508 and current gross capital stock of textile industry (StatCan Cat. 61-208, Corporations Taxation Statistics and Cat. 13-568, Fixed Capital Flows and Stocks, 1978).

LCCAC Same as above, Clothing. Depreciation of 4.39%.

MAET StatCan Cat. 71-201, Historical Labour Force Statistics - actual data, seasonal factors, seasonally adjusted data, various issues.

MAWA StatCan Cat. 72-206(Annual), Employment Earnings and Hours, Seasonally Adjusted Series, various issues.

MAY StatCan Cat. 61-213(Annual), Real Domestic Product By Industry, various issues.

MCLOTP Import price of clothing (StatsCan, Worksheets, Courtesy of Informetrica Ltd.).

MCARPP Unit value index based on volume and value of carpet imports (StatsCan, Cat. 65-203, Imports by Commodity, Various issues).

MCURTP Unit value index based on volume and value of curtain imports, StatsCan Cat. 65-203, Imports by Commodity, various issues.

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|---|---|
| MCORDP | Unit value index based on volume and value of cordage and twine, StatsCan Cat. 65-203, Imports by Commodity, various issues. |
| MOTHEP | Unit value index based on volume and value of other textile imports (StatCan Cat. 65-203, Imports by Commodity, various issues). |
| MFYCMP | Weighted average of import price of yarns and import price of fibres and fabrics (StatsCan., Worksheets, Courtesy of Informetrica) |
| MCLTFP | MCLOTP/REXN |
| MCRPFP | MCARPP/REXN |
| MCRTFP | MCURTP/REXN |
| MCODFP | MCORDP/REXN |
| MOTHFP | MOTHEP/REXN |
| MFYCFP | MFYCMP/REXN |
| MCLOTH | Sum of SITC categories 78000-78999 (StatCan Cat. 65-203, Import By Commodity) |
| MCARPT | Sum of SITC categories 84000-84499 (StatCan Cat. 65-203) |
| MCURTN | Sum of SITC categories 84500-84599 (StatCan Cat. 65-203) |
| MCORDG | Sum of SITC categories 36903-39649 (StatCan Cat. 65-203) |
| MOTHER | Sum of SITC categories 84600-84999 plus 96151-96159 (StatCan Cat. 65-203) |
| MFYACM | Sum of SITC categories 24209-38999 excluding MCORDG (StatCan Cat. 65-203) |
| PGNE | StatCan Cat. 13-201 (Annual), National Income and Expenditure Account, various issues. |
| POP | StatCan Cat. 71-201 (Annual), Historical Labour Force Statistics - actual data, seasonal factors, seasonally adjusted date, various issues. |

RAWCRP Energy cost, carpets (D 919611 (1971-76), D 341308 (1961-70)) + Total materials cost, carpets (D 919615 (1971-76), D 343608 (1961-70))

RAWCOR Energy cost, cordage (D 918963 (1971-76), D 341305 (1961-70)) + Total materials cost, cordage (D 918967 (1971-76), D 343605 (1961-70))

RAWFYC Energy cost, cotton yarn and cloth mills (D 917910 (1971-76), D 341299 (1961-70)) + Total materials cost, cotton yarn and cloth mills (D 917914 (1971-76), D 343599 (1961-70)) + Energy cost, wool yarn and cloth mills (D 918180 (1971-76), ((D 341300+D 341601) (1961-70)) + Total materials cost, wool yarn and cloth mills (D 918184 (1971-76), (D 343600+D 343601) (1961-70)) + Energy Cost, MM fibres, yarns and cloth mills (D 918396 (1971-76), D 341302 (1961-70)) + Total Materials Cost, MM fibres, etc (D 918400 (1971-76), D 343602 (1961-70)) + Energy cost, knitting (D 902250 (1971-76), D 341256 (1961-70))· (1-SHARE1) + (Total materials cost, knitting (D 902254 (1971-76), D 343557 (1961-70))· (1-SHARE 1)

RAWCRT (Energy cost, total textiles (D 901980 (1971-76), D 340105 (1961-70)) + Total materials cost, total textiles (D 901984 (1971-76), D 343555 (1961-70)) - RAWFYC - (Energy cost + total materials cost of knitting) · (1-SHARE1) - RAWCRP - RAWCOR) · SHARE2

( SHARE2 is a proportion of manufacturing shipments of curtains in manufacturing shipments in other textile end products including curtains, i.e., manufacturing shipments of curtains, divided by total textile's manufacturing shipments minus manufacturing shipments of carpets, cordage and fibres, yarns and fabrics.)

RAWOTH Energy cost, total textiles (D901980 (1971-76), D 340105 (1961-70)) + Total materials cost, total textiles (D 901984 (1971-76), D 343555 (1961-70)) - RAWCRP - RAWCOR - RAWFYC - RAWCRT + (Energy cost and total materials cost of knitting). (1-SHARE1)

RAWCLT Energy cost, clothing (D 902601 (1971-76), D 341257 (1961-70)) + Total materials cost, clothing (D 902605 (1971-76), D 343557 (1961-70)) + (Energy cost, knitting (D 902250 (1971-76), D 341256 (1961-70)) · SHARE1 + (Total materials cost, knitting (D 902254 (1971-76), D 343557 (1961-70)) · SHARE1

(SHARE1 is a share of knitted wears in total knitting in terms of manufacturing shipments, i.e., knitted wear manufacturing shipments divided by total knitting manufacturing shipments (D 902252 (1971-76), D341946 (1961-70))

REXN Bank of Canada, <u>Bank of Canada Review</u>, various issues.

RINDB Bank of Canada, <u>Bank of Canada Review</u>, various issues.

SCLOTH Total shipments, clothing D 902606 (1971-76), D 344017 (1961-70) + Manufacturing shipments, knitted fabrics (courtesy of Celanese) - Exports, apparel (StatCan Cat. 65-202, <u>Export by Commodity</u>, various issues); StatCan Cat. 11-003 (Monthly), <u>Canadian Statistical Review</u> (for estimates of 1977 and 1978).

SCARPT Total shipments, carpets, etc. (D 919616 (1971-76), D 344068 (1961-70)) - Exports, carpets (StatCan Cat. 65-202)

SCURTN Manufacturing shipments, curtains and draperies (Statistics Canada, Courtesy of Celanese Canada, Montreal) ( Exports of curtains is assumed to be nil.)

SCORDG Total shipments, cordage and twine (D 918968 (1971-76), D 344065 (1961-70)) - Exports, cordage and twine (StatCan Cat. 65-202)

SFYACM — Total shipments, cotton yarn and cloth mills (D 917915 (1971-76), D 344059 (1971-70)) + Total shipments, wool yarn and cloth mills (D 918185 (1971-76), (D 344060 + D 344061) (1961-70) + Total shipments, MM fibres, yarns and cloth mills (D 918968 (1971-76), D 344062 (1961-70)) + (Total shipments, Total knitting - Manufacturing shipments, knitted fabrics) (D 902255 (1971-76), D 344016 (1961-70)) - Exports of fibres, yarns and fabrics(StatCan Cat. 65-202)

STEXTL — SCARPT + SCURTN + SCORDG + SOTHER + SFYACM; StatCan Cat. 11-003, *Canadian Statistical Review* (for estimates of 1977 and 1978).

SCRPCK — Calculated from StatCan Cat. 13-568(Occasional). *Fixed Capital Flows and Stocks*, 1978.

SCRAPK — Same as above.

SHRCLT — SCLOTH/(SCLOTH+MCLOTH)

SHRCRP — SCARPT/(SCARPT+MCARPT)

SHRCRT — SCURTN/(SCURTN+MCURTN)

SHRCOR — SCORDG/(SCORDG+MCORDG)

SHROTH — SOTHER/(SOTHER+MOTHER)

SHRFYC — SFYACM/(SFYACM+MFYACM)

TARIFI — Duties collected for the SITC categories 78000-78999 divided by MCLOTH (StatCan Cat. 65-203, *Imports by Commodity*, various issues).

TARIF2 — Duties collected for the SITC categories 84000-84499 divided by MCARPP (StatCan Cat. 65-203).

TARIF3 — Duties collected for the SITC categories 84500-84599 divided by MCURTN (StatCan Cat. 65-203).

TARIF4 — Duties collected for the SITC categories 36903-39649 divided by MCORDG (StatCan Cat. 65-203).

| | |
|---|---|
| TARIF6 | Duties collected for SITC categories 84600-84999 plus 96151-96159 divided by MOTHER (StatCan Cat. 65-203). |
| TARIF7 | Duties collected for SITC categories 24209-38999 divided by MFYACM (StatCan Cat. 65-203). |
| TAXMFG | StatCan Cat. 68-201, Principal Taxes in Canada, various issues |
| TAXMFC | Same as above except it has zeros after 1974 reflecting abolition of manufacturer's sales tax on clothing in 1974. |
| TAXPRF | Income taxes paid divided by book profit before taxes of textile industry (StatCan Cat. 61-208, Corporations Taxation Statistics, various issues). |
| TXPRFC | Same as above, Clothing |
| TAXRS1 | Statistics Canada, worksheets, courtesy of Informetrica Ltd. |
| TAXRS2 | Same as above |
| TAXRS3 | Same as above |
| TAXRS4 | Same as above |
| UTLZCE | StatCan Cat. 31-003(Quarterly), Capacity Utilization Rates in Canadian Manufacturing, Calculated as 4-Quarter Averages. |
| UTILZE | StatCan Cat. 31-003(Quarterly). Same as above. |
| VCLOTK | Real value-added in clothing, StatCan Cat. 61-213 (Annual), Real Domestic Product By Industry, various issues. |
| VTEXTK | Real value-added in textiles, StatCan Cat. 61-213 (Annual), Real Domestic Product By Industry, various issues. |

VCLOTH Total value-added, clothing (D 902607 (1971-76), D 344247 (1961-70)+ (Total value-added, knitting (D 902256 (1971-76), D 344246 (1961-70))) · SHARE1

VCARPT Total value-added, carpets (D 919617 (1971-76), D 344298 (1961-70))

VCORDG Total value-added, cordage and twine (D 918969 (1971-76), D 344295 (1961-70))

VFYACM Total value-added, cotton yarn and cloth mills (D 917916 (1971-76), D 344289 (1961-70)) + Total value-added, wool yarn and cloth mills (D 918186 (1971-76), (D 344290 + 344291) (1961-70)) + Total value-added, fibres, yarn and cloth mills (D 918402 (1971-76), D 344292 (1961-70)) + (Total value-added, knitting (D 902256 (1971-76), D 344246 (1961-70))· (1-SHARE1)

VCURTN (Total value-added, total textiles (D 901986 (1971-76), D 344245 (1961-70)) - VCARPT - VCORDG - VFYACM + Total value-added, knitting (D 902256 (1971-76), D 344246 (1961-70)· (1-SHARE1))·SHARE2

VKNTFB Total value-added, knitting D 902256 (1971-76), D 344246 (1961-70)). (1-SHARE1)

VOTHER Total value-added, total textiles (D 901986 (1971-76), D 344245 (1961-70)) - VCARPT - VCORDG - VCURTN - VFYACM

VCLOTP Value-added deflator of clothing (StatCan Cat. 61-213(annual), Real Domestic Product By Industry, various issues).

VTEXTP Value-added deflator of textile industry (StatsCan Cat. 61-213(Annual), Real Domestic Product By Industry).

WCLOTH CANSIM (D 902267 + D 902618) (1971-76), (D 343326 + D 343327) (1961-70); StatCan Cat. 72-002, Employment Earnings and Hours (1977 and 1978).

WTEXTL CANSIM D 901997 (1971-76), D 343325 (1961-70); StatCan Cat. 72-002, Employment Earnings and Hours (1977 and 1978).

WPARTR StatCan Cat. 71-201, Historical Labour Force Statistics - calculated from acutual data, seasonal factors, seasonally adjusted data, various issues.

XCLOTH Sum of SITC categories 78000-78999 (StatCan Cat. 65-202, Export By Commodity).

XCARPT Sum of SITC categories 84000-84499 (StatCan Cat. 65-202).

XCORDG Sum of SITC categories 36903-36949 (StatCan Cat. 65-202).

XOTHER Sum of SITC categories 84600-84999 plus 96151-96159 (StatCan Cat. 65-202).

XFYACM Sum of SITC categories excluding XCORDG (StatCan. Cat. 65-202).

YD StatCan. Cat. 13-201(Annual), National Income and Expenditure Account, various issues.

## DATA: ENDOGENOUS VARIABLES (1961-78)

| | LCLOTH | LCARPT | LCURTN | LCURDG | LOTHER | LFYALM | LTEXTL | HCLOTH | HCARPT | HCURTN | HCURDG |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 1264. | 47.27 | 11.83 | 22.14 | 279.9 | 1072. | 1435. | 99.20 | 8.451 | 1.322 | 6.443 |
| 1962 | 1332. | 57.44 | 15.02 | 26.03 | 312.4 | 1230. | 1641. | 93.40 | 9.097 | 1.229 | 7.363 |
| 1963 | 1410. | 61.48 | 16.59 | 35.04 | 348.8 | 1322. | 1784. | 88.90 | 8.851 | 1.107 | 10.349 |
| 1964 | 1517. | 78.63 | 19.24 | 35.94 | 400.8 | 1477. | 2012. | 104.80 | 11.623 | 2.538 | 9.404 |
| 1965 | 1632. | 112.11 | 21.56 | 31.68 | 448.1 | 1490. | 2103. | 106.60 | 13.673 | 3.387 | 9.377 |
| 1966 | 1791. | 130.92 | 27.42 | 31.89 | 516.0 | 1554. | 2261. | 144.90 | 15.146 | 2.972 | 10.345 |
| 1967 | 1870. | 148.45 | 29.95 | 29.67 | 570.1 | 1589. | 2367. | 158.80 | 16.744 | 3.175 | 8.207 |
| 1968 | 2067. | 188.84 | 34.64 | 20.15 | 592.9 | 1660. | 2510. | 211.20 | 20.657 | 3.320 | 7.549 |
| 1969 | 2183. | 229.36 | 40.91 | 28.93 | 674.1 | 1836. | 2809. | 247.70 | 25.874 | 3.296 | 9.621 |
| 1970 | 2221. | 216.85 | 42.34 | 32.70 | 666.5 | 1780. | 2738. | 253.90 | 21.003 | 3.692 | 13.138 |
| 1971 | 2416. | 253.65 | 53.00 | 33.71 | 785.2 | 1939. | 3065. | 294.20 | 23.495 | 3.833 | 14.581 |
| 1972 | 2689. | 341.17 | 61.98 | 38.70 | 897.5 | 2148. | 3447. | 287.50 | 34.576 | 5.721 | 20.115 |
| 1973 | 2997. | 436.95 | 68.28 | 83.45 | 1032.4 | 2420. | 4041. | 355.10 | 48.949 | 6.650 | 61.103 |
| 1974 | 3129. | 510.21 | 78.64 | 76.52 | 1158.5 | 2836. | 4660. | 442.20 | 60.102 | 8.224 | 48.810 |
| 1975 | 3555. | 519.55 | 80.31 | 48.64 | 1180.7 | 2686. | 4515. | 533.60 | 62.809 | 7.107 | 19.786 |
| 1976 | 4190. | 556.77 | 92.46 | 49.85 | 1358.9 | 2973. | 5031. | 750.90 | 68.324 | 8.936 | 26.742 |
| 1977 | 4507. | ***** | ***** | ***** | ***** | ***** | 5241. | 671.10 | 60.170 | 9.301 | ***** |
| 1978 | 5097. | ***** | ***** | ***** | ***** | ***** | 5758. | 734.30 | ***** | ***** | ***** |

| | HOTHER | HFYALM | HTEXTL | SCLOTH | SCARPT | SCURTN | SCURDG | SOTHER | SFYALM | STEXTL | SHRCLT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 17.59 | 314.7 | 348.3 | 995.8 | 29.53 | 8.691 | 13.43 | 224.5 | 614.2 | 890.3 | 0.909 |
| 1962 | 15.99 | 355.1 | 388.7 | 1052.4 | 37.23 | 11.453 | 16.01 | 252.1 | 699.0 | 1015.8 | 0.918 |
| 1963 | 25.48 | 344.6 | 390.4 | 1127.7 | 41.66 | 12.998 | 21.09 | 274.2 | 794.1 | 1144.1 | 0.927 |
| 1964 | 29.53 | 419.7 | 472.8 | 1202.5 | 53.11 | 13.500 | 22.93 | 313.8 | 852.0 | 1255.4 | 0.920 |
| 1965 | 30.90 | 415.1 | 472.4 | 1297.6 | 79.54 | 14.450 | 19.10 | 352.4 | 864.2 | 1329.7 | 0.924 |
| 1966 | 38.29 | 447.0 | 513.7 | 1388.5 | 93.81 | 19.959 | 18.34 | 401.1 | 884.8 | 1419.0 | 0.906 |
| 1967 | 41.03 | 424.1 | 493.3 | 1429.3 | 104.87 | 21.441 | 18.04 | 434.7 | 924.1 | 1503.1 | 0.899 |
| 1968 | 39.75 | 441.8 | 513.0 | 1518.3 | 133.68 | 25.216 | 15.63 | 455.1 | 976.5 | 1606.1 | 0.878 |
| 1969 | 42.03 | 502.3 | 583.2 | 1577.1 | 161.55 | 30.624 | 16.04 | 521.7 | 1057.4 | 1787.4 | 0.864 |
| 1970 | 46.10 | 504.1 | 588.0 | 1608.9 | 156.92 | 31.428 | 15.87 | 512.7 | 998.7 | 1715.7 | 0.864 |
| 1971 | 59.05 | 584.6 | 685.6 | 1728.4 | 185.65 | 40.306 | 15.33 | 549.2 | 1046.2 | 1886.6 | 0.855 |
| 1972 | 75.69 | 690.9 | 827.0 | 1945.6 | 245.09 | 45.656 | 14.17 | 673.4 | 1104.1 | 2082.4 | 0.871 |
| 1973 | 93.77 | 756.1 | 966.5 | 2132.0 | 305.73 | 49.304 | 13.06 | 759.8 | 1267.4 | 2395.4 | 0.857 |
| 1974 | 116.40 | 930.0 | 1163.5 | 2432.9 | 351.67 | 56.062 | 19.16 | 838.9 | 1447.1 | 2712.9 | 0.846 |
| 1975 | 126.87 | 855.8 | 1072.4 | 2751.6 | 357.66 | 59.205 | 23.23 | 852.7 | 1393.5 | 2686.4 | 0.838 |
| 1976 | 117.47 | 992.1 | 1213.6 | 3057.4 | 380.23 | 66.700 | 17.12 | 999.4 | 1488.7 | 2952.1 | 0.802 |
| 1977 | ***** | ***** | 1071.0 | 3269.0 | ***** | ***** | ***** | ***** | ***** | 3269.0 | 0.830 |
| 1978 | ***** | ***** | 1278.0 | 3765.0 | ***** | ***** | ***** | ***** | ***** | 3490.0 | 0.837 |

| | SHRCRP | SHRCKT | SHRCUR | SHROTH | SHRFYC | SHRTXT | KAWCLT | KAWCRP | KAWCRT | KAWCUR | KAWOTH |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 0.778 | 0.868 | 0.676 | 0.928 | 0.661 | 0.719 | 548.6 | 18.49 | 6.284 | 11.410 | 146.0 |
| 1962 | 0.804 | 0.903 | 0.685 | 0.940 | 0.663 | 0.723 | 589.8 | 23.55 | 8.209 | 13.544 | 163.6 |
| 1963 | 0.825 | 0.922 | 0.671 | 0.915 | 0.697 | 0.746 | 640.6 | 26.93 | 9.459 | 19.079 | 179.8 |
| 1964 | 0.820 | 0.842 | 0.709 | 0.914 | 0.670 | 0.726 | 685.4 | 35.39 | 9.767 | 21.703 | 195.6 |
| 1965 | 0.853 | 0.810 | 0.671 | 0.919 | 0.676 | 0.738 | 738.1 | 49.12 | 10.444 | 17.870 | 217.5 |
| 1966 | 0.861 | 0.870 | 0.639 | 0.913 | 0.664 | 0.734 | 785.9 | 64.59 | 14.313 | 16.323 | 251.6 |
| 1967 | 0.862 | 0.871 | 0.685 | 0.914 | 0.685 | 0.753 | 786.5 | 68.05 | 15.005 | 15.361 | 266.7 |
| 1968 | 0.866 | 0.884 | 0.674 | 0.920 | 0.689 | 0.758 | 852.6 | 89.36 | 16.145 | 10.858 | 269.8 |
| 1969 | 0.862 | 0.903 | 0.625 | 0.925 | 0.678 | 0.754 | 899.9 | 104.96 | 19.778 | 10.255 | 313.9 |
| 1970 | 0.882 | 0.895 | 0.547 | 0.918 | 0.665 | 0.745 | 913.1 | 104.90 | 19.631 | 9.343 | 300.8 |
| 1971 | 0.888 | 0.913 | 0.512 | 0.910 | 0.642 | 0.733 | 981.8 | 119.97 | 25.201 | 7.913 | 349.6 |
| 1972 | 0.876 | 0.889 | 0.413 | 0.899 | 0.615 | 0.716 | 1108.6 | 158.77 | 28.256 | 7.604 | 387.6 |
| 1973 | 0.862 | 0.881 | 0.176 | 0.890 | 0.626 | 0.713 | 1249.4 | 193.93 | 30.226 | 6.155 | 455.5 |
| 1974 | 0.854 | 0.872 | 0.282 | 0.878 | 0.609 | 0.700 | 1417.1 | 228.94 | 34.329 | 10.719 | 480.3 |
| 1975 | 0.851 | 0.893 | 0.540 | 0.870 | 0.620 | 0.715 | 1540.6 | 236.90 | 34.951 | 13.644 | 471.4 |
| 1976 | 0.848 | 0.882 | 0.390 | 0.895 | 0.600 | 0.709 | 1718.5 | 253.79 | 38.303 | 9.416 | 544.8 |
| 1977 | ****** | ****** | ****** | ****** | ****** | 0.740 | ****** | ****** | ****** | ****** | ****** |
| 1978 | ****** | ****** | ****** | ****** | ****** | 0.732 | ****** | ****** | ****** | ****** | ****** |

| | KAGFYC | VCLOTH | VCARPT | VCURIN | VCURUG | VOTHLR | VFYALM | VKNTLR | VTEXTL | ATNDEX | LCLOTK |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 358.1 | 465.0 | 11.40 | 4.148 | 6.372 | 96.38 | 279.0 | 17.57 | 397.3 | 0.490 | 1439. |
| 1962 | 414.8 | 484.8 | 14.77 | 5.079 | 7.096 | 109.20 | 314.6 | 23.20 | 451.1 | 0.538 | 1484. |
| 1963 | 466.9 | 515.1 | 16.22 | 6.124 | 9.420 | 116.42 | 355.4 | 26.39 | 503.6 | 0.586 | 1540. |
| 1964 | 511.6 | 558.5 | 20.53 | 6.414 | 8.639 | 128.47 | 396.4 | 31.61 | 560.5 | 0.645 | 1628. |
| 1965 | 537.5 | 598.8 | 33.02 | 6.983 | 8.198 | 145.42 | 390.8 | 34.03 | 585.2 | 0.687 | 1711. |
| 1966 | 553.7 | 651.1 | 36.16 | 8.921 | 9.903 | 156.85 | 394.6 | 39.73 | 606.4 | 0.729 | 1822. |
| 1967 | 573.7 | 668.5 | 41.64 | 9.831 | 9.179 | 174.70 | 402.2 | 40.05 | 637.5 | 0.764 | 1818. |
| 1968 | 602.2 | 725.2 | 51.01 | 11.560 | 7.454 | 193.16 | 430.4 | 50.76 | 693.5 | 0.833 | 1920. |
| 1969 | 639.9 | 764.5 | 65.25 | 13.996 | 7.207 | 222.14 | 487.5 | 59.50 | 796.2 | 0.927 | 1959. |
| 1970 | 612.7 | 778.5 | 59.79 | 14.551 | 8.093 | 222.98 | 460.9 | 59.55 | 766.3 | 0.915 | 1919. |
| 1971 | 667.9 | 841.2 | 68.66 | 18.926 | 8.621 | 262.56 | 470.2 | 77.00 | 828.9 | 1.000 | 2023. |
| 1972 | 707.4 | 956.5 | 93.49 | 22.037 | 7.317 | 302.26 | 511.3 | 63.02 | 936.4 | 1.137 | 2160. |
| 1973 | 807.5 | 1052.6 | 121.54 | 24.071 | 7.736 | 346.83 | 597.8 | 96.07 | 1098.0 | 1.300 | 2230. |
| 1974 | 932.7 | 1193.0 | 130.42 | 27.961 | 12.559 | 391.24 | 712.5 | 108.90 | 1282.7 | 1.496 | 2204. |
| 1975 | 893.2 | 1337.6 | 131.27 | 29.067 | 14.391 | 392.06 | 633.1 | 100.06 | 1199.9 | 1.512 | 2297. |
| 1976 | 986.3 | 1508.5 | 150.38 | 33.395 | 8.805 | 475.00 | 644.9 | 106.07 | 1312.4 | 1.695 | 2469. |
| 1977 | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 2339. |
| 1978 | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 2484. |

| | LCARPK | LCURIK | LCURDK | LOTHEK | LFYCMK | LTEXIK | MCLOIK | MCARPK | MCURIK | MCURDK | MOTHEK |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 32.66 | 14.17 | 17.98 | 256.1 | 948.0 | 1269. | 127.7 | 5.863 | 1.096 | 4.749 | 16.15 |
| 1962 | 40.76 | 17.41 | 21.12 | 279.9 | 1038.6 | 1398. | 119.1 | 6.412 | 0.913 | 4.967 | 14.78 |
| 1963 | 47.07 | 18.72 | 24.17 | 307.0 | 1112.2 | 1510. | 110.7 | 7.832 | 0.760 | 6.065 | 23.70 |
| 1964 | 60.54 | 21.33 | 24.02 | 349.7 | 1223.1 | 1679. | 127.2 | 10.690 | 2.631 | 5.934 | 27.27 |
| 1965 | 82.23 | 23.02 | 24.01 | 387.3 | 1242.9 | 1760. | 127.2 | 9.320 | 3.576 | 7.166 | 30.33 |
| 1966 | 94.53 | 29.87 | 26.83 | 436.9 | 1289.4 | 1681. | 166.6 | 11.982 | 3.664 | 8.660 | 35.28 |
| 1967 | 111.77 | 31.80 | 26.45 | 472.9 | 1325.9 | 1969. | 173.7 | 13.271 | 3.437 | 7.785 | 41.16 |
| 1968 | 144.05 | 35.63 | 23.33 | 492.4 | 1435.1 | 2130. | 224.4 | 17.505 | 4.150 | 6.536 | 40.40 |
| 1969 | 174.39 | 41.83 | 25.15 | 552.0 | 1523.0 | 2316. | 256.2 | 21.793 | 3.652 | 8.234 | 42.08 |
| 1970 | 170.07 | 42.68 | 29.84 | 535.7 | 1485.5 | 2265. | 257.8 | 19.285 | 4.045 | 13.440 | 43.91 |
| 1971 | 209.14 | 53.00 | 29.91 | 649.4 | 1630.8 | 2572. | 294.2 | 23.495 | 3.833 | 14.581 | 59.05 |
| 1972 | 284.47 | 61.25 | 27.55 | 758.6 | 1777.3 | 2909. | 271.9 | 32.560 | 5.314 | 14.962 | 71.44 |
| 1973 | 348.18 | 64.54 | 25.45 | 770.6 | 1837.2 | 3046. | 303.8 | 40.500 | 5.974 | 19.032 | 77.19 |
| 1974 | 369.93 | 65.54 | 18.61 | 656.2 | 1843.3 | 2954. | 319.0 | 48.224 | 6.702 | 12.409 | 64.11 |
| 1975 | 359.98 | 62.70 | 16.66 | 689.1 | 1699.1 | 2828. | 363.6 | 49.320 | 5.246 | 9.092 | 80.01 |
| 1976 | 372.00 | 69.68 | 17.00 | 745.6 | 1728.2 | 2932. | 485.8 | 52.305 | 5.851 | 11.424 | 77.35 |
| 1977 | ******** | ******** | ******** | ******** | ******** | ******** | 390.8 | 58.415 | ******** | ******** | ******** |
| 1978 | ******** | ******** | ******** | ******** | ******** | ******** | 364.2 | ******** | ******** | ******** | ******** |

| | MFYCMK | MTEXIK | SCLOIK | SCARPK | SCURIK | SCURDK | SOTHEK | SFYCMK | STEXIK | VCLOIK | VTEXIK |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 334.7 | 362.5 | 1311. | 27.00 | 15.07 | 13.230 | 240.0 | 613.4 | 906.7 | 539.6 | 330.8 |
| 1962 | 351.7 | 378.8 | 1364. | 34.35 | 16.50 | 16.149 | 265.1 | 686.9 | 1019.1 | 568.8 | 368.4 |
| 1963 | 338.4 | 376.8 | 1429. | 40.03 | 17.96 | 18.066 | 283.3 | 773.8 | 1153.1 | 603.6 | 402.1 |
| 1964 | 398.7 | 445.2 | 1500. | 49.85 | 18.70 | 18.083 | 322.4 | 824.4 | 1233.5 | 635.0 | 442.9 |
| 1965 | 400.1 | 450.5 | 1584. | 72.91 | 20.25 | 16.841 | 357.0 | 842.8 | 1309.8 | 657.7 | 461.4 |
| 1966 | 424.2 | 483.8 | 1656. | 87.55 | 26.20 | 18.169 | 401.6 | 864.2 | 1397.7 | 675.3 | 467.8 |
| 1967 | 425.1 | 490.7 | 1644. | 98.50 | 28.36 | 18.666 | 431.7 | 900.8 | 1478.1 | 665.0 | 479.9 |
| 1968 | 481.0 | 549.6 | 1696. | 126.54 | 31.48 | 16.795 | 452.0 | 954.1 | 1580.9 | 704.1 | 534.7 |
| 1969 | 499.5 | 575.8 | 1703. | 152.60 | 38.18 | 16.911 | 509.3 | 1023.6 | 1740.6 | 726.1 | 606.7 |
| 1970 | 505.2 | 585.9 | 1661. | 151.59 | 38.63 | 16.396 | 491.8 | 980.3 | 1678.7 | 733.8 | 582.5 |
| 1971 | 584.6 | 685.6 | 1728. | 183.65 | 49.17 | 15.328 | 590.4 | 1046.2 | 1886.7 | 784.8 | 657.3 |
| 1972 | 689.1 | 813.4 | 1894. | 251.91 | 55.93 | 12.590 | 687.2 | 1088.2 | 2095.8 | 836.0 | 714.1 |
| 1973 | 711.7 | 854.4 | 1927. | 307.68 | 56.56 | 6.418 | 693.4 | 1125.5 | 2191.5 | 893.0 | 761.3 |
| 1974 | 760.7 | 892.1 | 1885. | 321.71 | 58.84 | 6.401 | 592.1 | 1082.6 | 2061.6 | 883.6 | 745.7 |
| 1975 | 659.4 | 803.0 | 1934. | 310.66 | 57.45 | 7.769 | 609.1 | 1039.7 | 2024.7 | 888.3 | 713.2 |
| 1976 | 714.1 | 861.0 | 1983. | 319.69 | 63.83 | 5.574 | 668.2 | 1014.2 | 2071.5 | 922.1 | 723.4 |
| 1977 | ******** | ******** | 1949. | ******** | ******** | ******** | ******** | ******** | ******** | 880.6 | 744.7 |
| 1978 | ******** | ******** | 2100. | ******** | ******** | ******** | ******** | ******** | ******** | 1010.4 | 815.4 |

| | SHRCLK | SHRCPK | SHRCIK | SHRCOK | SHROIK | SHRFYK | ISPCLT | ISPCRP | ISPCOR | ISPOIH | ISPFYC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 0.911 | 0.822 | 0.923 | 0.736 | 0.957 | 0.647 | 0.759 | 1.040 | 0.983 | 0.932 | 1.002 |
| 1962 | 0.920 | 0.843 | 0.948 | 0.765 | 0.947 | 0.661 | 0.771 | 1.040 | 0.932 | 0.948 | 1.018 |
| 1963 | 0.928 | 0.836 | 0.959 | 0.748 | 0.923 | 0.696 | 0.789 | 1.034 | 1.102 | 0.965 | 1.027 |
| 1964 | 0.922 | 0.823 | 0.877 | 0.753 | 0.922 | 0.674 | 0.801 | 1.064 | 1.248 | 0.971 | 1.032 |
| 1965 | 0.926 | 0.887 | 0.850 | 0.702 | 0.922 | 0.678 | 0.819 | 1.059 | 1.126 | 0.987 | 1.025 |
| 1966 | 0.909 | 0.880 | 0.877 | 0.677 | 0.919 | 0.671 | 0.838 | 1.060 | 0.998 | 0.997 | 1.022 |
| 1967 | 0.904 | 0.881 | 0.892 | 0.706 | 0.913 | 0.679 | 0.863 | 1.053 | 0.963 | 1.007 | 1.027 |
| 1968 | 0.883 | 0.878 | 0.884 | 0.720 | 0.918 | 0.665 | 0.894 | 1.050 | 0.914 | 1.007 | 1.025 |
| 1969 | 0.869 | 0.875 | 0.913 | 0.673 | 0.923 | 0.672 | 0.925 | 1.052 | 0.930 | 1.025 | 1.034 |
| 1970 | 0.866 | 0.887 | 0.905 | 0.550 | 0.918 | 0.660 | 0.968 | 1.033 | 0.968 | 1.042 | 1.020 |
| 1971 | 0.855 | 0.888 | 0.928 | 0.512 | 0.909 | 0.642 | 1.000 | 1.000 | 1.000 | 1.015 | 1.000 |
| 1972 | 0.874 | 0.886 | 0.913 | 0.457 | 0.906 | 0.612 | 1.026 | 0.969 | 1.101 | 0.978 | 1.015 |
| 1973 | 0.864 | 0.884 | 0.907 | 0.252 | 0.900 | 0.613 | 1.104 | 0.900 | 1.521 | 1.093 | 1.129 |
| 1974 | 0.855 | 0.870 | 0.898 | 0.340 | 0.902 | 0.587 | 1.286 | 1.084 | 2.793 | 1.399 | 1.340 |
| 1975 | 0.842 | 0.863 | 0.916 | 0.461 | 0.884 | 0.612 | 1.421 | 1.144 | 2.877 | 1.394 | 1.343 |
| 1976 | 0.803 | 0.859 | 0.916 | 0.328 | 0.896 | 0.587 | 1.541 | 1.103 | 2.963 | 1.495 | 1.472 |
| 1977 | ***** | ***** | ***** | ***** | ***** | ***** | 1.674 | 1.195 | 3.233 | ***** | ***** |
| 1978 | ***** | ***** | ***** | ***** | ***** | ***** | 1.782 | ***** | 3.395 | ***** | ***** |

| | ISPTXT | HCLOIP | HCARPP | HCURIP | HCURUP | HOTHEP | HFYCHP | HTEXIP | LCLOIP | LCARPP | LCURIP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 0.981 | 0.777 | 1.441 | 1.206 | 1.357 | 1.077 | 0.940 | 0.968 | 0.878 | 1.438 | 0.835 |
| 1962 | 0.996 | 0.784 | 1.419 | 1.346 | 1.482 | 1.062 | 1.010 | 1.032 | 0.898 | 1.409 | 0.863 |
| 1963 | 1.009 | 0.803 | 1.150 | 1.457 | 1.701 | 1.075 | 1.018 | 1.044 | 0.916 | 1.264 | 0.886 |
| 1964 | 1.017 | 0.824 | 1.087 | 0.965 | 1.585 | 1.083 | 1.053 | 1.065 | 0.932 | 1.299 | 0.902 |
| 1965 | 1.015 | 0.838 | 1.467 | 0.947 | 1.369 | 1.019 | 1.037 | 1.053 | 0.954 | 1.363 | 0.905 |
| 1966 | 1.014 | 0.870 | 1.264 | 0.811 | 1.195 | 1.065 | 1.054 | 1.064 | 0.983 | 1.315 | 0.918 |
| 1967 | 1.017 | 0.914 | 1.262 | 0.924 | 1.065 | 0.997 | 0.998 | 1.007 | 1.033 | 1.328 | 0.942 |
| 1968 | 1.016 | 0.941 | 1.160 | 0.800 | 1.155 | 0.984 | 0.919 | 0.937 | 1.077 | 1.311 | 0.972 |
| 1969 | 1.027 | 0.967 | 1.187 | 0.902 | 1.168 | 0.985 | 1.006 | 1.014 | 1.114 | 1.315 | 0.978 |
| 1970 | 1.022 | 0.985 | 1.089 | 0.913 | 0.978 | 1.050 | 0.998 | 1.004 | 1.157 | 1.269 | 0.992 |
| 1971 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.195 | 1.213 | 1.000 |
| 1972 | 0.993 | 1.058 | 1.062 | 1.077 | 1.344 | 1.060 | 1.003 | 1.019 | 1.241 | 1.199 | 1.012 |
| 1973 | 1.092 | 1.169 | 1.209 | 1.113 | 3.211 | 1.215 | 1.062 | 1.221 | 1.344 | 1.255 | 1.038 |
| 1974 | 1.311 | 1.386 | 1.246 | 1.227 | 3.933 | 1.816 | 1.223 | 1.397 | 1.420 | 1.379 | 1.200 |
| 1975 | 1.325 | 1.468 | 1.273 | 1.355 | 2.176 | 1.586 | 1.294 | 1.347 | 1.548 | 1.443 | 1.281 |
| 1976 | 1.425 | 1.558 | 1.306 | 1.527 | 2.341 | 1.519 | 1.369 | 1.419 | 1.697 | 1.497 | 1.327 |
| 1977 | 1.500 | 1.717 | 1.506 | ***** | ***** | ***** | ***** | ***** | ***** | ***** | ***** |
| 1978 | 1.600 | 1.911 | ***** | ***** | ***** | ***** | ***** | ***** | ***** | ***** | ***** |

| | LCORDP | COTHLP | CFYCMP | VCLOIP | VTEXIP | TARIFF | ULCCLT | ULCTXT | ECLOTH | LTEXTI | WCLOTH |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 1.232 | 1.093 | 1.131 | 0.862 | 1.201 | 0.128 | 0.568 | 0.679 | 116.0 | 62.75 | 318.3 |
| 1962 | 1.233 | 1.116 | 1.185 | 0.852 | 1.225 | 0.161 | 0.552 | 0.667 | 114.5 | 65.79 | 328.9 |
| 1963 | 1.450 | 1.136 | 1.189 | 0.853 | 1.252 | 0.154 | 0.542 | 0.664 | 114.9 | 68.10 | 343.6 |
| 1964 | 1.496 | 1.146 | 1.208 | 0.880 | 1.265 | 0.146 | 0.555 | 0.672 | 119.4 | 72.22 | 372.3 |
| 1965 | 1.320 | 1.157 | 1.199 | 0.910 | 1.268 | 0.157 | 0.575 | 0.702 | 122.7 | 74.59 | 400.4 |
| 1966 | 1.189 | 1.181 | 1.206 | 0.964 | 1.296 | 0.154 | 0.593 | 0.754 | 123.3 | 75.07 | 424.5 |
| 1967 | 1.122 | 1.206 | 1.199 | 1.005 | 1.328 | 0.170 | 0.626 | 0.775 | 121.1 | 75.49 | 441.5 |
| 1968 | 1.121 | 1.204 | 1.162 | 1.030 | 1.297 | 0.165 | 0.628 | 0.713 | 121.4 | 71.54 | 473.0 |
| 1969 | 1.150 | 1.221 | 1.205 | 1.053 | 1.312 | 0.161 | 0.661 | 0.689 | 123.8 | 73.39 | 517.4 |
| 1970 | 1.096 | 1.244 | 1.198 | 1.061 | 1.316 | 0.170 | 0.674 | 0.732 | 121.2 | 69.71 | 532.7 |
| 1971 | 1.127 | 1.209 | 1.189 | 1.072 | 1.301 | 0.169 | 0.673 | 0.732 | 122.4 | 69.35 | 577.4 |
| 1972 | 1.405 | 1.183 | 1.208 | 1.144 | 1.311 | 0.175 | 0.721 | 0.722 | 126.8 | 74.24 | 642.1 |
| 1973 | 3.279 | 1.340 | 1.317 | 1.179 | 1.442 | 0.172 | 0.731 | 0.774 | 130.2 | 76.86 | 712.7 |
| 1974 | 4.068 | 1.765 | 1.539 | 1.350 | 1.720 | 0.164 | 0.828 | 0.864 | 127.2 | 75.65 | 798.6 |
| 1975 | 2.884 | 1.713 | 1.581 | 1.506 | 1.682 | 0.175 | 0.948 | 0.940 | 125.2 | 71.05 | 905.0 |
| 1976 | 2.933 | 1.823 | 1.720 | 1.636 | 1.814 | 0.178 | 1.034 | 1.027 | 125.2 | 68.21 | 1020.1 |
| 1977 | **** | **** | **** | **** | **** | **** | 1.160 | 1.000 | 121.0 | 65.00 | 1018.0 |
| 1978 | **** | **** | **** | **** | **** | **** | 1.100 | 0.990 | 122.0 | 66.00 | 1110.0 |

| | WTEXTI | ICLOTH | ITEXTI | ICLOIK | ITEXIK | KCLOIK | KTEXIK | UTLZCF | UTILZF | UCLCLT | UCLTXT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 214.6 | 14.70 | 30.00 | 18.90 | 40.80 | 427.0 | 1360. | 0.566 | 0.547 | 0.0951 | 0.0903 |
| 1962 | 233.1 | 15.50 | 40.70 | 18.70 | 52.20 | 435.0 | 1360. | 0.590 | 0.609 | 0.0994 | 0.0940 |
| 1963 | 253.1 | 17.90 | 54.70 | 21.00 | 67.40 | 445.6 | 1383. | 0.621 | 0.655 | 0.0991 | 0.0948 |
| 1964 | 280.9 | 20.00 | 98.50 | 22.50 | 117.10 | 460.4 | 1444. | 0.635 | 0.695 | 0.1057 | 0.1031 |
| 1965 | 304.6 | 21.00 | 115.80 | 22.60 | 132.90 | 477.7 | 1539. | 0.636 | 0.660 | 0.1381 | 0.1011 |
| 1966 | 329.4 | 26.40 | 110.20 | 27.80 | 121.10 | 492.9 | 1629. | 0.630 | 0.648 | 0.1500 | 0.1108 |
| 1967 | 344.5 | 19.10 | 78.80 | 20.40 | 87.10 | 499.0 | 1690. | 0.610 | 0.641 | 0.1512 | 0.1227 |
| 1968 | 353.3 | 23.40 | 64.30 | 25.30 | 71.60 | 498.7 | 1734. | 0.664 | 0.696 | 0.1856 | 0.1678 |
| 1969 | 386.9 | 33.10 | 85.00 | 35.50 | 91.60 | 503.5 | 1789. | 0.691 | 0.707 | 0.2067 | 0.1745 |
| 1970 | 393.0 | 27.40 | 89.40 | 28.40 | 92.60 | 509.2 | 1851. | 0.699 | 0.711 | 0.1921 | 0.1950 |
| 1971 | 422.8 | 30.70 | 81.00 | 30.70 | 81.00 | 499.2 | 1897. | 0.763 | 0.757 | 0.1982 | 0.1842 |
| 1972 | 460.8 | 40.40 | 104.50 | 38.70 | 100.00 | 497.5 | 1925. | 0.819 | 0.844 | 0.1885 | 0.1807 |
| 1973 | 537.4 | 50.90 | 126.20 | 45.50 | 113.30 | 515.8 | 1952. | 0.843 | 0.886 | 0.1856 | 0.1612 |
| 1974 | 589.3 | 41.10 | 156.60 | 32.10 | 123.10 | 529.8 | 1987. | 0.803 | 0.850 | 0.2472 | 0.2122 |
| 1975 | 614.6 | 37.60 | 181.20 | 27.30 | 121.30 | 527.9 | 2022. | 0.798 | 0.801 | 0.2900 | 0.3304 |
| 1976 | 682.7 | 34.70 | 124.50 | 25.30 | 77.40 | 525.7 | 2048. | 0.823 | 0.803 | 0.2866 | 0.4396 |
| 1977 | 741.0 | 36.50 | 83.60 | 24.20 | 46.90 | 528.3 | 2043. | 0.832 | 0.822 | **** | **** |
| 1978 | 808.0 | 39.70 | 99.80 | 24.50 | 53.90 | 529.9 | 2024. | 0.945 | 0.910 | **** | **** |

| | PDC | PDI | PROFITC | PROFIT |
|---|---|---|---|---|
| 1961 | 4.827 | 5.038 | 124.7 | 108.7 |
| 1962 | 5.207 | 5.311 | 136.2 | 130.3 |
| 1963 | 5.523 | 5.596 | 153.0 | 149.1 |
| 1964 | 5.620 | 5.787 | 165.5 | 154.7 |
| 1965 | 5.671 | 5.818 | 127.6 | 162.0 |
| 1966 | 5.810 | 5.823 | 162.5 | 163.0 |
| 1967 | 5.822 | 5.957 | 166.1 | 164.1 |
| 1968 | 6.203 | 6.927 | 165.1 | 151.7 |
| 1969 | 6.322 | 7.649 | 164.3 | 199.7 |
| 1970 | 6.521 | 7.706 | 184.4 | 173.8 |
| 1971 | 7.006 | 8.327 | 185.2 | 181.9 |
| 1972 | 7.029 | 8.971 | 227.6 | 234.7 |
| 1973 | 7.486 | 9.038 | 245.6 | 337.7 |
| 1974 | 7.578 | 9.021 | 327.1 | 421.4 |
| 1975 | 7.625 | 9.201 | 332.4 | 276.0 |
| 1976 | 7.880 | 9.748 | 369.8 | 234.6 |
| 1977 | ********** | ********** | ********** | ********** |
| 1978 | ********** | ********** | ********** | ********** |

Note: Variables whose names (MNEMONICS) end with the letter "K" are constant dollar counterparts of the similar MNEMONICS.

## DATA AND ASSUMPTIONS: EXOGENOUS VARIABLES (1961-90)

| | YD | POP | PGNE | CPI | KFXN | IR | GNLXPK | HAWA | MAET | MAY | KTNDB |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 35029. | 18230. | 0.724 | 74.95 | 1.013 | 2602. | 54741. | 6086. | 0.1435D+04 | 10257. | 5.460 |
| 1962 | 37698. | 18583. | 0.734 | 75.85 | 1.069 | 2704. | 58475. | 6503. | 0.1485D+04 | 11200. | 5.447 |
| 1963 | 39451. | 18931. | 0.748 | 77.17 | 1.078 | 2794. | 61487. | 6939. | 0.1532D+04 | 11954. | 5.374 |
| 1964 | 41292. | 19290. | 0.766 | 78.56 | 1.079 | 3264. | 65610. | 7569. | 0.1629D+04 | 13104. | 5.499 |
| 1965 | 44445. | 19644. | 0.791 | 80.49 | 1.078 | 3413. | 69981. | 8363. | 0.1647D+04 | 14292. | 5.678 |
| 1966 | 47351. | 20015. | 0.826 | 83.50 | 1.077 | 3168. | 74844. | 9388. | 0.1741D+04 | 15367. | 6.498 |
| 1967 | 49478. | 20378. | 0.859 | 86.48 | 1.079 | 3229. | 77344. | 10083. | 0.1747D+04 | 15819. | 7.091 |
| 1968 | 51570. | 20701. | 0.887 | 90.02 | 1.077 | 3702. | 81864. | 10765. | 0.1738D+04 | 16800. | 7.923 |
| 1969 | 53978. | 21001. | 0.926 | 94.07 | 1.077 | 4175. | 86225. | 11754. | 0.1799D+04 | 18065. | 8.751 |
| 1970 | 55296. | 21297. | 0.969 | 97.28 | 1.044 | 3718. | 88390. | 12298. | 0.1768D+04 | 17818. | 9.177 |
| 1971 | 59443. | 21568. | 1.000 | 100.00 | 1.010 | 4816. | 94450. | 13087. | 0.1766D+04 | 18855. | 8.347 |
| 1972 | 65509. | 21802. | 1.050 | 104.77 | 0.990 | 5432. | 100248. | 14478. | 0.1823D+04 | 20203. | 8.301 |
| 1973 | 71444. | 22043. | 1.146 | 112.75 | 1.000 | 5966. | 107812. | 16599. | 0.1927D+04 | 22176. | 8.473 |
| 1974 | 76146. | 22364. | 1.321 | 125.00 | 0.978 | 5935. | 111678. | 19509. | 0.1978D+04 | 23010. | 10.165 |
| 1975 | 80842. | 22697. | 1.463 | 138.52 | 1.017 | 5503. | 113005. | 21524. | 0.1871D+04 | 21551. | 10.762 |
| 1976 | 85209. | 22993. | 1.605 | 148.90 | 0.986 | 6565. | 119116. | 24715. | 0.1921D+04 | 22769. | 10.400 |
| 1977 | 87428. | 23258. | 1.717 | 160.80 | 1.063 | 6228. | 121949. | 26907. | 0.1888D+04 | 23401. | 9.708 |
| 1978 | 90586. | 23483. | 1.827 | 175.10 | 1.140 | 5940. | 126127. | 29695. | 0.1956D+04 | 25219. | 10.017 |
| 1979 | 93262. | 23706. | 2.006 | 191.19 | 1.176 | 5491. | 130171. | 33071. | 0.2040D+04 | 26241. | 11.949 |
| 1980 | 95444. | 23948. | 2.200 | 209.08 | 1.163 | 5268. | 131611. | 36413. | 0.2043D+04 | 26523. | 12.817 |
| 1981 | 98275. | 24171. | 2.390 | 227.99 | 1.149 | 5428. | 136321. | 40881. | 0.2119D+04 | 28361. | 12.634 |
| 1982 | 101476. | 24393. | 2.595 | 247.47 | 1.136 | 5724. | 141640. | 45790. | 0.2165D+04 | 30122. | 12.353 |
| 1983 | 104633. | 24613. | 2.797 | 267.11 | 1.124 | 5762. | 146460. | 50686. | 0.2175D+04 | 31448. | 11.967 |
| 1984 | 108307. | 24851. | 2.982 | 285.28 | 1.111 | 5816. | 152374. | 56046. | 0.2203D+04 | 33092. | 11.508 |
| 1985 | 112043. | 25085. | 3.156 | 302.23 | 1.099 | 5818. | 158200. | 61280. | 0.2220D+04 | 34572. | 11.211 |
| 1986 | 115502. | 25316. | 3.318 | 319.05 | 1.087 | 5786. | 163752. | 66446. | 0.2238D+04 | 36091. | 10.960 |
| 1987 | 119298. | 25562. | 3.495 | 336.64 | 1.087 | 5882. | 170718. | 72293. | 0.2277D+04 | 38172. | 10.761 |
| 1988 | 122970. | 25805. | 3.683 | 355.43 | 1.087 | 5938. | 177182. | 78745. | 0.2306D+04 | 40201. | 10.562 |
| 1989 | 126633. | 26042. | 3.886 | 375.56 | 1.087 | 5913. | 183381. | 85682. | 0.2326D+04 | 41971. | 10.455 |
| 1990 | 130273. | 26274. | 4.112 | 397.93 | 1.087 | 5970. | 189904. | 93602. | 0.2358D+04 | 43919. | 10.399 |

| | WPARTR | TARIF1 | TARIF2 | TARIF3 | TARIF4 | TARIF6 | TARIF7 | XCLOTH | XCARPT | XCURIN | XCUROG |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 0.287 | 0.195 | 0.417 | 0.277 | 0.01226 | 0.220 | 0.117 | 8.049 | 0.289 | 0. | 4.261 |
| 1962 | 0.291 | 0.230 | 0.404 | 0.320 | 0.01127 | 0.262 | 0.153 | 10.245 | 0.338 | 0. | 4.398 |
| 1963 | 0.296 | 0.209 | 0.341 | 0.298 | 0.01256 | 0.168 | 0.153 | 15.166 | 0.461 | 0. | 6.171 |
| 1964 | 0:305 | 0.193 | 0.308 | 0.268 | 0.00457 | 0.160 | 0.141 | 21.240 | 0.578 | 0. | 5.996 |
| 1965 | 0.313 | 0.220 | 0.303 | 0.264 | 0.00672 | 0.194 | 0.152 | 24.163 | 1.423 | 0. | 9.287 |
| 1966 | 0.328 | 0.178 | 0.271 | 0.252 | 0.00464 | 0.155 | 0.153 | 29.313 | 3.281 | 0. | 7.595 |
| 1967 | 0.338 | 0.205 | 0.265 | 0.259 | 0.01919 | 0.187 | 0.167 | 29.472 | 4.028 | 0. | 5.559 |
| 1968 | 0.344 | 0.196 | 0.277 | 0.247 | 0.02172 | 0.179 | 0.161 | 42.493 | 3.748 | 0. | 3.193 |
| 1969 | 0.351 | 0.179 | 0.264 | 0.222 | 0.01777 | 0.156 | 0.159 | 67.708 | 3.350 | 0. | 2.609 |
| 1970 | 0.354 | 0.167 | 0.295 | 0.225 | 0.01423 | 0.143 | 0.171 | 79.916 | 3.739 | 0. | 2.561 |
| 1971 | 0.363 | 0.169 | 0.263 | 0.224 | 0.01303 | 0.134 | 0.172 | 85.464 | 3.506 | 0. | 1.677 |
| 1972 | 0.369 | 0.242 | 0.270 | 0.226 | 0.01303 | 0.151 | 0.177 | 95.655 | 3.347 | 0. | 1.495 |
| 1973 | 0.385 | 0.239 | 0.271 | 0.225 | 0.00553 | 0.147 | 0.181 | 121.508 | 5.181 | 0. | 1.143 |
| 1974 | 0.395 | 0.235 | 0.278 | 0.228 | 0.00713 | 0.143 | 0.167 | 129.744 | 7.397 | 0. | 3.018 |
| 1975 | 0.442 | 0.225 | 0.298 | 0.230 | 0.02077 | 0.143 | 0.174 | 113.111 | 8.180 | 0. | 2.563 |
| 1976 | 0.450 | 0.223 | 0.264 | 0.224 | 0.02434 | 0.185 | 0.175 | 116.819 | 12.196 | 0. | 1.500 |
| 1977 | 0.460 | 0.459 | 0.264 | 0.224 | 0.02434 | 0.185 | 0.175 | 127.907 | 15.237 | 0. | 2.251 |
| 1978 | 0.475 | 0.447 | 0.264 | 0.224 | 0.02434 | 0.185 | 0.175 | 144.602 | 17.523 | 0. | 2.319 |
| 1979 | 0.477 | 0.447 | 0.264 | 0.224 | 0.02434 | 0.185 | 0.175 | 153.362 | 20.151 | 0. | 2.388 |
| 1980 | 0.478 | 0.447 | 0.264 | 0.224 | 0.02434 | 0.185 | 0.175 | 162.121 | 22.166 | 0. | 2.460 |
| 1981 | 0.481 | 0.447 | 0.264 | 0.224 | 0.02434 | 0.185 | 0.175 | 170.881 | 24.382 | 0. | 2.534 |
| 1982 | 0.483 | 0.447 | 0.264 | 0.224 | 0.02434 | 0.185 | 0.175 | 179.641 | 26.821 | 0. | 2.610 |
| 1983 | 0.487 | 0.447 | 0.264 | 0.224 | 0.02434 | 0.185 | 0.175 | 188.400 | 29.503 | 0. | 2.688 |
| 1984 | 0.491 | 0.447 | 0.264 | 0.224 | 0.02434 | 0.185 | 0.175 | 197.160 | 30.978 | 0. | 2.768 |
| 1985 | 0.495 | 0.447 | 0.264 | 0.224 | 0.02434 | 0.185 | 0.175 | 205.919 | 32.527 | 0. | 2.851 |
| 1986 | 0.499 | 0.447 | 0.264 | 0.224 | 0.02434 | 0.185 | 0.175 | 214.679 | 34.153 | 0. | 2.937 |
| 1987 | 0.502 | 0.447 | 0.264 | 0.224 | 0.02434 | 0.185 | 0.175 | 223.439 | 35.861 | 0. | 3.025 |
| 1988 | 0.506 | 0.447 | 0.264 | 0.224 | 0.02434 | 0.185 | 0.175 | 232.198 | 37.654 | 0. | 3.116 |
| 1989 | 0.508 | 0.447 | 0.264 | 0.224 | 0.02434 | 0.185 | 0.175 | 240.958 | 39.536 | 0. | 3.209 |
| 1990 | 0.510 | 0.447 | 0.264 | 0.224 | 0.02434 | 0.165 | 0.175 | 249.717 | 41.514 | 0. | 3.306 |

| | ICLOIP | ITEXIP | ISPCHM | SCRPCK | SCRAPK | XOTHER | XFYACH | INVCLT | INVCRP | INVCRT | INVCOR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 0.778 | 0.735 | 0.975 | 10.500 | 45.30 | 18.694 | 24.87 | 9.719 | 0.0690 | 1.742 | 0.0940 |
| 1962 | 0.829 | 0.780 | 0.971 | 10.700 | 52.50 | 20.808 | 22.26 | 12.041 | 0.7480 | 2.235 | 0.2350 |
| 1963 | 0.852 | 0.812 | 0.969 | 10.400 | 44.50 | 22.121 | 27.45 | 12.923 | 1.0320 | 2.505 | 1.2360 |
| 1964 | 0.897 | 0.841 | 0.963 | 7.500 | 55.50 | 9.113 | 48.71 | 20.158 | 2.2410 | 2.660 | 1.4170 |
| 1965 | 0.929 | 0.871 | 0.961 | 5.300 | 38.30 | 8.761 | 58.82 | 15.112 | 1.9770 | 2.917 | -2.3250 |
| 1966 | 0.950 | 0.910 | 0.958 | 12.600 | 31.60 | 7.821 | 54.42 | 19.270 | 3.6550 | 3.275 | 0.2930 |
| 1967 | 0.936 | 0.905 | 0.976 | 14.300 | 25.40 | 7.106 | 45.81 | 4.240 | 1.5890 | 3.395 | 0.9600 |
| 1968 | 0.925 | 0.898 | 0.985 | 25.600 | 27.50 | 8.007 | 68.13 | 17.034 | 2.9450 | 2.489 | -0.5140 |
| 1969 | 0.932 | 0.928 | 0.986 | 30.700 | 37.30 | 11.454 | 71.88 | 19.477 | 5.3070 | 3.150 | -1.1440 |
| 1970 | 0.965 | 0.965 | 0.990 | 23.700 | 30.40 | 13.996 | 87.04 | 2.768 | 4.0350 | 2.754 | -0.9980 |
| 1971 | 1.000 | 1.000 | 1.000 | 39.700 | 34.50 | 13.387 | 100.79 | 9.118 | -0.5290 | 3.821 | -0.4710 |
| 1972 | 1.044 | 1.045 | 1.014 | 40.400 | 72.00 | 11.897 | 112.89 | 23.915 | 3.8210 | 4.637 | -0.7490 |
| 1973 | 1.119 | 1.114 | 1.065 | 27.200 | 86.20 | 17.574 | 145.27 | 48.490 | 4.5592 | 4.913 | -0.3170 |
| 1974 | 1.280 | 1.272 | 1.371 | 18.100 | 89.00 | 15.058 | 168.40 | 47.421 | 8.2942 | 6.229 | 1.0990 |
| 1975 | 1.367 | 1.494 | 1.603 | 29.400 | 86.00 | 14.216 | 126.02 | 13.521 | 2.3293 | 4.753 | 2.1950 |
| 1976 | 1.372 | 1.609 | 1.672 | 27.500 | 51.60 | 19.679 | 139.05 | 52.778 | 11.7341 | 4.998 | -0.3950 |
| 1977 | 1.508 | 1.710 | 1.759 | 21.600 | 55.70 | 20.466 | 172.50 | 55.153 | 7.0876 | 5.818 | 0.0 |
| 1978 | 1.620 | 1.852 | 1.892 | 22.900 | 72.90 | 21.285 | 182.52 | 57.635 | 7.5258 | 6.209 | 0.0 |
| 1979 | 1.789 | 2.041 | 2.194 | 23.841 | 54.90 | 22.136 | 191.96 | 60.228 | 7.9639 | 6.627 | 0.0 |
| 1980 | 1.954 | 2.231 | 2.350 | 20.286 | 60.19 | 23.022 | 200.81 | 62.939 | 8.4021 | 7.072 | 0.0 |
| 1981 | 2.101 | 2.400 | 2.522 | 21.645 | 68.40 | 23.942 | 209.10 | 65.771 | 8.8403 | 7.547 | 0.0 |
| 1982 | 2.277 | 2.601 | 2.708 | 19.868 | 79.09 | 24.900 | 216.84 | 68.731 | 9.2785 | 8.054 | 0.0 |
| 1983 | 2.445 | 2.797 | 2.871 | 24.259 | 48.04 | 25.896 | 224.06 | 71.823 | 9.7167 | 8.596 | 0.0 |
| 1984 | 2.600 | 2.977 | 3.017 | 22.377 | 39.26 | 26.932 | 230.78 | 75.056 | 10.1549 | 9.173 | 0.0 |
| 1985 | 2.753 | 3.155 | 3.154 | 20.340 | 50.51 | 28.009 | 237.03 | 78.433 | 10.5931 | 9.790 | 0.0 |
| 1986 | 2.892 | 3.324 | 3.287 | 24.468 | 47.14 | 29.130 | 242.86 | 81.962 | 11.0313 | 10.448 | 0.0 |
| 1987 | 3.053 | 3.511 | 3.446 | 19.658 | 52.31 | 30.295 | 248.28 | 85.651 | 11.4695 | 11.150 | 0.0 |
| 1988 | 3.217 | 3.709 | 3.614 | 21.854 | 61.20 | 31.507 | 253.32 | 89.505 | 11.9077 | 11.900 | 0.0 |
| 1989 | 3.393 | 3.924 | 3.796 | 31.579 | 100.80 | 32.767 | 258.01 | 93.533 | 12.3459 | 12.699 | 0.0 |
| 1990 | 3.581 | 4.153 | 3.995 | 29.592 | 106.09 | 34.078 | 262.39 | 97.742 | 12.7841 | 13.553 | 0.0 |

| | INVDTH | INVEYC | HCLTEP | HCRPEP | HCRTEP | HCUREP | HOTHEP | HEYCLP | TAXMEC | TAXMEG | TAXR31 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | -0.0391 | -1.968 | 0.774 | 1.437 | 1.202 | 1.352 | 1.073 | 0.937 | 0.110 | 0.1100 | 0.0219 |
| 1962 | -0.0859 | 8.081 | 0.741 | 1.340 | 1.271 | 1.400 | 1.022 | 0.954 | 0.110 | 0.1100 | 0.0280 |
| 1963 | -0.0360 | 0.781 | 0.752 | 1.058 | 1.364 | 1.592 | 1.007 | 0.954 | 0.110 | 0.1100 | 0.0262 |
| 1964 | 1.2015 | 7.298 | 0.771 | 1.018 | 0.903 | 1.464 | 1.014 | 0.965 | 0.110 | 0.1100 | 0.0296 |
| 1965 | 1.7538 | 5.305 | 0.765 | 1.374 | 0.887 | 1.226 | 0.954 | 0.972 | 0.110 | 0.1100 | 0.0301 |
| 1966 | -0.3912 | 8.971 | 0.815 | 1.105 | 0.760 | 1.120 | 1.017 | 0.988 | 0.110 | 0.1100 | 0.0350 |
| 1967 | -0.4276 | 5.940 | 0.856 | 1.181 | 0.865 | 0.997 | 0.933 | 0.934 | 0.120 | 0.1200 | 0.0396 |
| 1968 | -0.1707 | -12.040 | 0.862 | 1.106 | 0.750 | 1.082 | 0.922 | 0.861 | 0.120 | 0.1200 | 0.0422 |
| 1969 | 2.8776 | 18.142 | 0.907 | 1.113 | 0.846 | 1.096 | 0.924 | 0.943 | 0.120 | 0.1200 | 0.0425 |
| 1970 | -2.9009 | -12.090 | 0.953 | 1.053 | 0.883 | 0.945 | 1.016 | 0.965 | 0.120 | 0.1200 | 0.0409 |
| 1971 | -0.3671 | -8.941 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 0.120 | 0.1200 | 0.0409 |
| 1972 | 4.4969 | 1.630 | 1.078 | 1.083 | 1.098 | 1.371 | 1.080 | 1.022 | 0.120 | 0.1200 | 0.0427 |
| 1973 | 4.9737 | -7.310 | 1.100 | 1.220 | 1.124 | 3.242 | 1.227 | 1.073 | 0.111 | 0.1200 | 0.0487 |
| 1974 | 17.6662 | 29.752 | 1.431 | 1.287 | 1.267 | 4.001 | 1.875 | 1.202 | 0.0 | 0.1200 | 0.0503 |
| 1975 | -5.4309 | 6.774 | 1.457 | 1.264 | 1.345 | 2.160 | 1.574 | 1.268 | 0.0 | 0.1200 | 0.0441 |
| 1976 | 0.7529 | 3.402 | 1.596 | 1.358 | 1.564 | 2.397 | 1.555 | 1.423 | 0.0 | 0.1200 | 0.0519 |
| 1977 | 0.0 | 3.873 | 1.631 | 1.403 | 1.641 | 2.514 | 1.631 | 1.447 | 0.0 | 0.1200 | 0.0518 |
| 1978 | 0.0 | 3.884 | 1.693 | 1.455 | 1.701 | 2.608 | 1.692 | 1.484 | 0.0 | 0.1170 | 0.0350 |
| 1979 | 0.0 | 3.894 | 1.817 | 1.545 | 1.807 | 2.769 | 1.797 | 1.605 | 0.0 | 0.0900 | 0.0474 |
| 1980 | 0.0 | 3.903 | 1.936 | 1.627 | 1.903 | 2.916 | 1.892 | 1.733 | 0.0 | 0.0900 | 0.0516 |
| 1981 | 0.0 | 3.911 | 2.033 | 1.707 | 1.996 | 3.059 | 1.985 | 1.836 | 0.0 | 0.0900 | 0.0516 |
| 1982 | 0.0 | 3.918 | 2.177 | 1.780 | 2.082 | 3.190 | 2.070 | 1.940 | 0.0 | 0.0900 | 0.0516 |
| 1983 | 0.0 | 3.925 | 2.305 | 1.871 | 2.188 | 3.353 | 2.176 | 2.058 | 0.0 | 0.0900 | 0.0516 |
| 1984 | 0.0 | 3.931 | 2.431 | 1.968 | 2.302 | 3.527 | 2.289 | 2.184 | 0.0 | 0.0900 | 0.0515 |
| 1985 | 0.0 | 3.936 | 2.525 | 2.053 | 2.401 | 3.679 | 2.387 | 2.291 | 0.0 | 0.0900 | 0.0515 |
| 1986 | 0.0 | 3.942 | 2.632 | 2.141 | 2.504 | 3.837 | 2.490 | 2.411 | 0.0 | 0.0900 | 0.0515 |
| 1987 | 0.0 | 3.946 | 2.742 | 2.231 | 2.609 | 3.999 | 2.594 | 2.542 | 0.0 | 0.0900 | 0.0515 |
| 1988 | 0.0 | 3.951 | 2.861 | 2.316 | 2.708 | 4.150 | 2.693 | 2.676 | 0.0 | 0.0900 | 0.0515 |
| 1989 | 0.0 | 3.955 | 2.978 | 2.404 | 2.811 | 4.308 | 2.795 | 2.812 | 0.0 | 0.0900 | 0.0514 |
| 1990 | 0.0 | 3.959 | 3.099 | 2.495 | 2.918 | 4.472 | 2.901 | 2.955 | 0.0 | 0.0900 | 0.0514 |

| | TAXRS2 | TAXRS3 | TAXRS4 | ITHF | LCCA | LCCAC | TAXPRF | TXPREC | D61 | D62 | D63 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 0.0261 | 0.0268 | 0.0261 | 1.000 | 0.677 | 0.742 | 0.342 | 0.241 | 1.000 | 0.0 | 0.0 |
| 1962 | 0.0348 | 0.0352 | 0.0337 | 2.000 | 0.679 | 0.689 | 0.351 | 0.240 | 0.0 | 1.000 | 0.0 |
| 1963 | 0.0347 | 0.0351 | 0.0341 | 3.000 | 0.872 | 0.779 | 0.355 | 0.227 | 0.0 | 0.0 | 1.000 |
| 1964 | 0.0369 | 0.0370 | 0.0358 | 4.000 | 0.970 | 0.884 | 0.376 | 0.240 | 0.0 | 0.0 | 0.0 |
| 1965 | 0.0374 | 0.0370 | 0.0370 | 5.000 | 1.224 | 0.976 | 0.341 | 0.453 | 0.0 | 0.0 | 0.0 |
| 1966 | 0.0431 | 0.0431 | 0.0440 | 6.000 | 1.429 | 0.733 | 0.313 | 0.390 | 0.0 | 0.0 | 0.0 |
| 1967 | 0.0514 | 0.0514 | 0.0530 | 7.000 | 1.328 | 0.865 | 0.341 | 0.378 | 0.0 | 0.0 | 0.0 |
| 1968 | 0.0535 | 0.0534 | 0.0547 | 8.000 | 0.940 | 0.690 | 0.476 | 0.455 | 0.0 | 0.0 | 0.0 |
| 1969 | 0.0542 | 0.0542 | 0.0553 | 9.000 | 0.961 | 0.618 | 0.429 | 0.464 | 0.0 | 0.0 | 0.0 |
| 1970 | 0.0516 | 0.0514 | 0.0525 | 10.000 | 0.909 | 0.886 | 0.446 | 0.396 | 0.0 | 0.0 | 0.0 |
| 1971 | 0.0518 | 0.0516 | 0.0525 | 11.000 | 1.010 | 0.992 | 0.446 | 0.458 | 0.0 | 0.0 | 0.0 |
| 1972 | 0.0540 | 0.0507 | 0.0537 | 12.000 | 0.986 | 1.036 | 0.402 | 0.397 | 0.0 | 0.0 | 0.0 |
| 1973 | 0.0603 | 0.0598 | 0.0627 | 13.000 | 1.445 | 1.320 | 0.273 | 0.345 | 0.0 | 0.0 | 0.0 |
| 1974 | 0.0632 | 0.0614 | 0.0643 | 14.000 | 1.611 | 1.307 | 0.279 | 0.350 | 0.0 | 0.0 | 0.0 |
| 1975 | 0.0562 | 0.0545 | 0.0566 | 15.000 | 1.068 | 1.162 | 0.431 | 0.376 | 0.0 | 0.0 | 0.0 |
| 1976 | 0.0654 | 0.0634 | 0.0657 | 16.000 | 0.867 | 1.129 | 0.552 | 0.378 | 0.0 | 0.0 | 0.0 |
| 1977 | 0.0654 | 0.0634 | 0.0657 | 17.000 | 0.867 | 1.129 | 0.552 | 0.378 | 0.0 | 0.0 | 0.0 |
| 1978 | 0.0478 | 0.0515 | 0.0533 | 18.000 | 0.867 | 1.129 | 0.552 | 0.378 | 0.0 | 0.0 | 0.0 |
| 1979 | 0.0622 | 0.0634 | 0.0657 | 19.000 | 0.867 | 1.129 | 0.552 | 0.378 | 0.0 | 0.0 | 0.0 |
| 1980 | 0.0654 | 0.0634 | 0.0657 | 20.000 | 0.867 | 1.129 | 0.552 | 0.378 | 0.0 | 0.0 | 0.0 |
| 1981 | 0.0654 | 0.0634 | 0.0657 | 21.000 | 0.867 | 1.129 | 0.552 | 0.378 | 0.0 | 0.0 | 0.0 |
| 1982 | 0.0654 | 0.0634 | 0.0657 | 22.000 | 0.867 | 1.129 | 0.552 | 0.378 | 0.0 | 0.0 | 0.0 |
| 1983 | 0.0654 | 0.0634 | 0.0657 | 23.000 | 0.867 | 1.129 | 0.552 | 0.378 | 0.0 | 0.0 | 0.0 |
| 1984 | 0.0654 | 0.0634 | 0.0657 | 24.000 | 0.867 | 1.129 | 0.552 | 0.378 | 0.0 | 0.0 | 0.0 |
| 1985 | 0.0654 | 0.0634 | 0.0657 | 25.000 | 0.867 | 1.129 | 0.552 | 0.378 | 0.0 | 0.0 | 0.0 |
| 1986 | 0.0654 | 0.0634 | 0.0657 | 26.000 | 0.867 | 1.129 | 0.552 | 0.378 | 0.0 | 0.0 | 0.0 |
| 1987 | 0.0654 | 0.0634 | 0.0657 | 27.000 | 0.867 | 1.129 | 0.552 | 0.378 | 0.0 | 0.0 | 0.0 |
| 1988 | 0.0654 | 0.0634 | 0.0657 | 28.000 | 0.867 | 1.129 | 0.552 | 0.378 | 0.0 | 0.0 | 0.0 |
| 1989 | 0.0654 | 0.0634 | 0.0657 | 29.000 | 0.867 | 1.129 | 0.552 | 0.378 | 0.0 | 0.0 | 0.0 |
| 1990 | 0.0654 | 0.0634 | 0.0657 | 30.000 | 0.867 | 1.129 | 0.552 | 0.378 | 0.0 | 0.0 | 0.0 |

| | D64 | D65 | D66 | D67 | D68 | D69 | D70 | D71 | D72 | D73 | D74 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1962 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1963 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1964 | 1.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1965 | 0.0 | 1.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1966 | 0.0 | 0.0 | 1.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1967 | 0.0 | 0.0 | 0.0 | 1.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1968 | 0.0 | 0.0 | 0.0 | 0.0 | 1.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1969 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1970 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.000 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1971 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.000 | 0.0 | 0.0 | 0.0 |
| 1972 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.000 | 0.0 | 0.0 |
| 1973 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.000 | 0.0 |
| 1974 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.000 |
| 1975 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1976 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1977 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1978 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1979 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1980 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1981 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1982 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1983 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1984 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1985 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1986 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1987 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1988 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1989 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1990 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

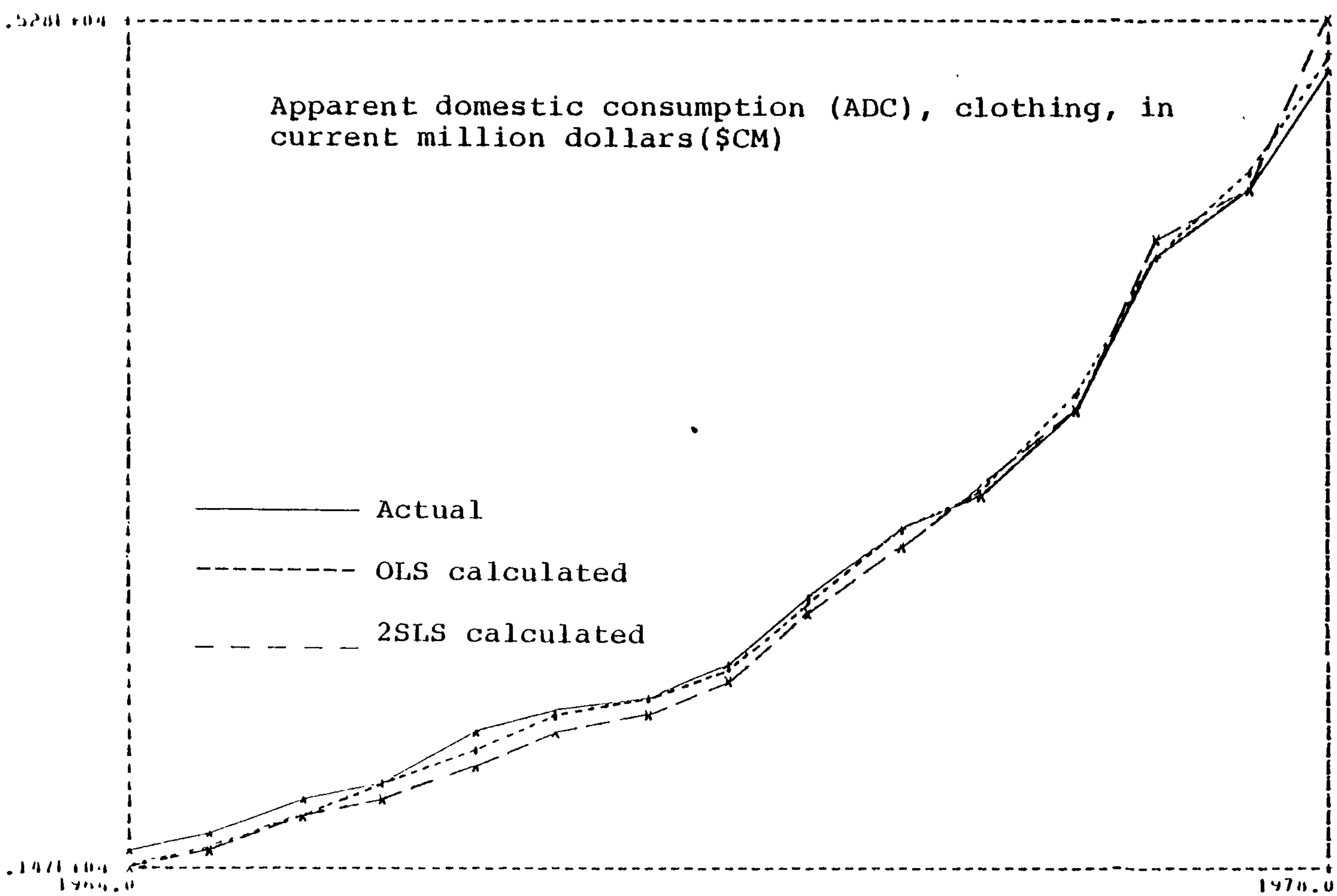
| | D75 | D76 | RLDGCK |
|---|---|---|---|
| 1961 | 0.0 | 0.0 | 2043.9 |
| 1962 | 0.0 | 0.0 | 2441.5 |
| 1963 | 0.0 | 0.0 | 2489.0 |
| 1964 | 0.0 | 0.0 | 2579.0 |
| 1965 | 0.0 | 0.0 | 3251.8 |
| 1966 | 0.0 | 0.0 | 3655.1 |
| 1967 | 0.0 | 0.0 | 3393.0 |
| 1968 | 0.0 | 0.0 | 3370.8 |
| 1969 | 0.0 | 0.0 | 3236.3 |
| 1970 | 0.0 | 0.0 | 3370.7 |
| 1971 | 0.0 | 0.0 | 3566.7 |
| 1972 | 0.0 | 0.0 | 3457.9 |
| 1973 | 0.0 | 0.0 | 3604.3 |
| 1974 | 0.0 | 0.0 | 4219.2 |
| 1975 | 1.000 | 0.0 | 4575.3 |
| 1976 | 0.0 | 1.000 | 4180.6 |
| 1977 | 0.0 | 0.0 | 4007.0 |
| 1978 | 0.0 | 0.0 | 3975.1 |
| 1979 | 0.0 | 0.0 | 4093.0 |
| 1980 | 0.0 | 0.0 | 4008.9 |
| 1981 | 0.0 | 0.0 | 3993.0 |
| 1982 | 0.0 | 0.0 | 4265.1 |
| 1983 | 0.0 | 0.0 | 4703.5 |
| 1984 | 0.0 | 0.0 | 5097.4 |
| 1985 | 0.0 | 0.0 | 5456.1 |
| 1986 | 0.0 | 0.0 | 5823.0 |
| 1987 | 0.0 | 0.0 | 6200.9 |
| 1988 | 0.0 | 0.0 | 6624.8 |
| 1989 | 0.0 | 0.0 | 7041.7 |
| 1990 | 0.0 | 0.0 | 7464.9 |

Note: 1961-78, actuals; 1979-90, assumptions.

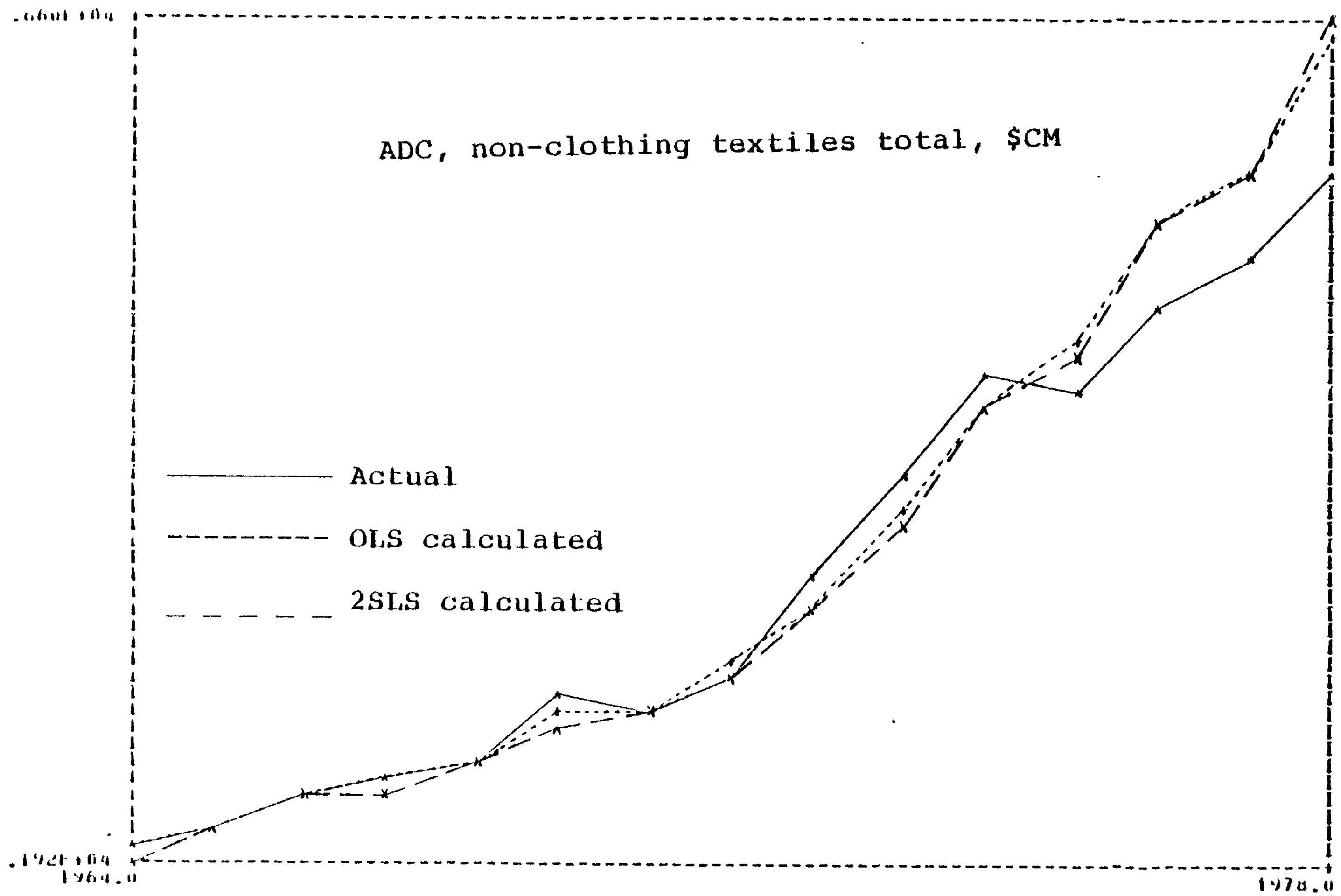
# APPENDIX C

EX-POST SIMULATIONS: 1964-78

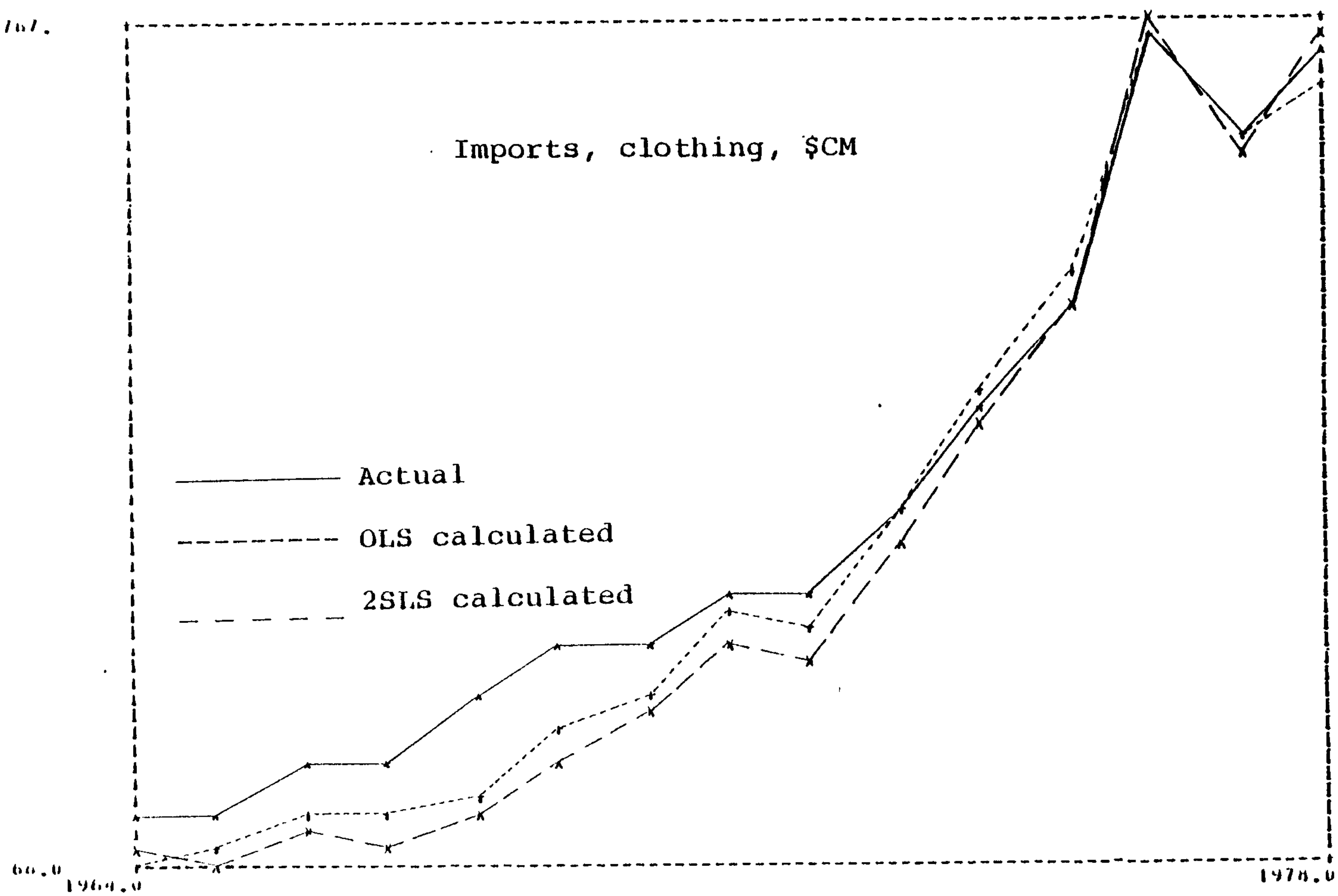
Graph A-1



<u>Graph A-2</u>

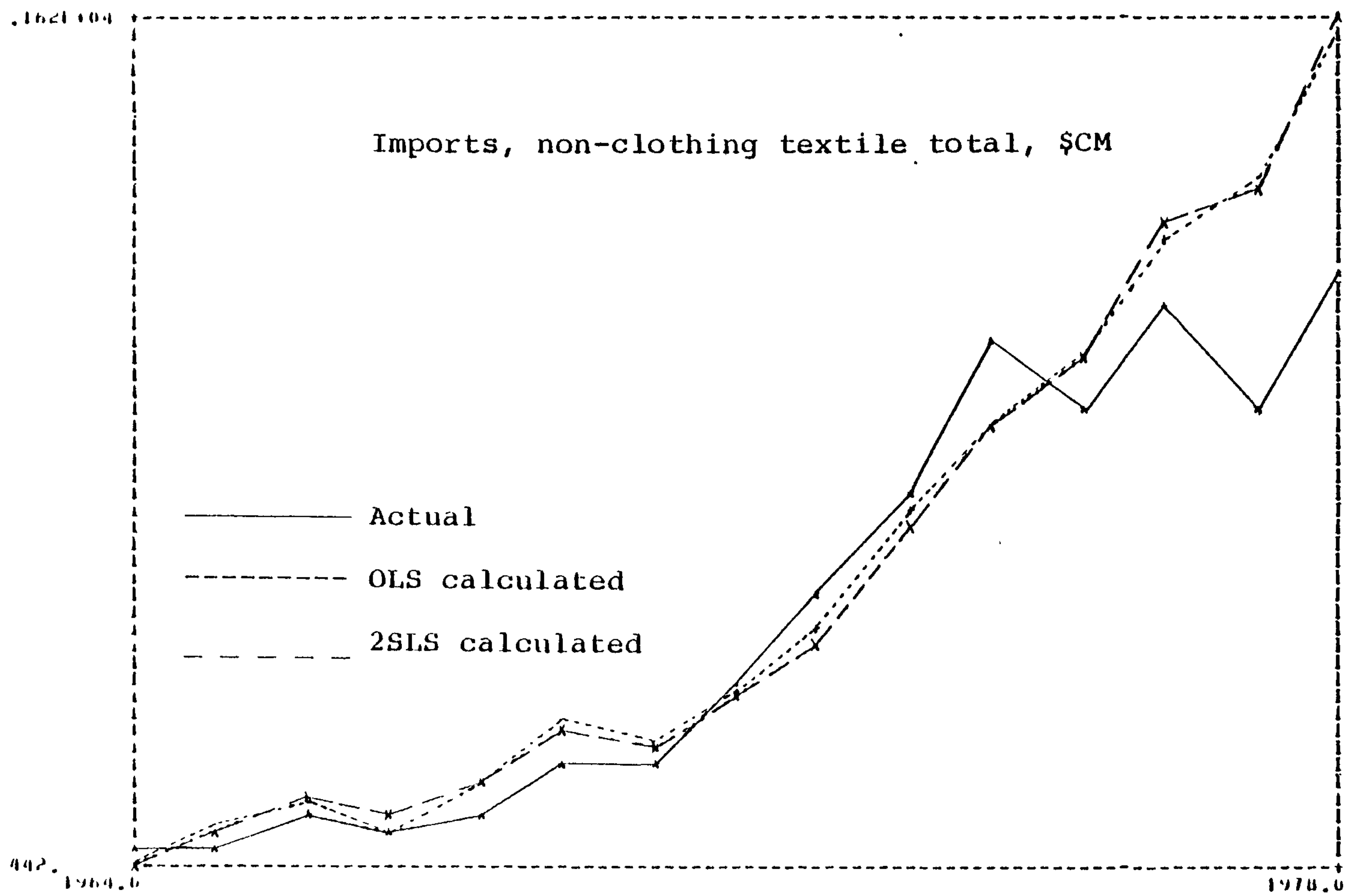

.660E+04
ADC, non-clothing textiles total, $CM
Actual
OLS calculated
2SLS calculated
.192E+04
1964.0
1978.0

Graph A-3

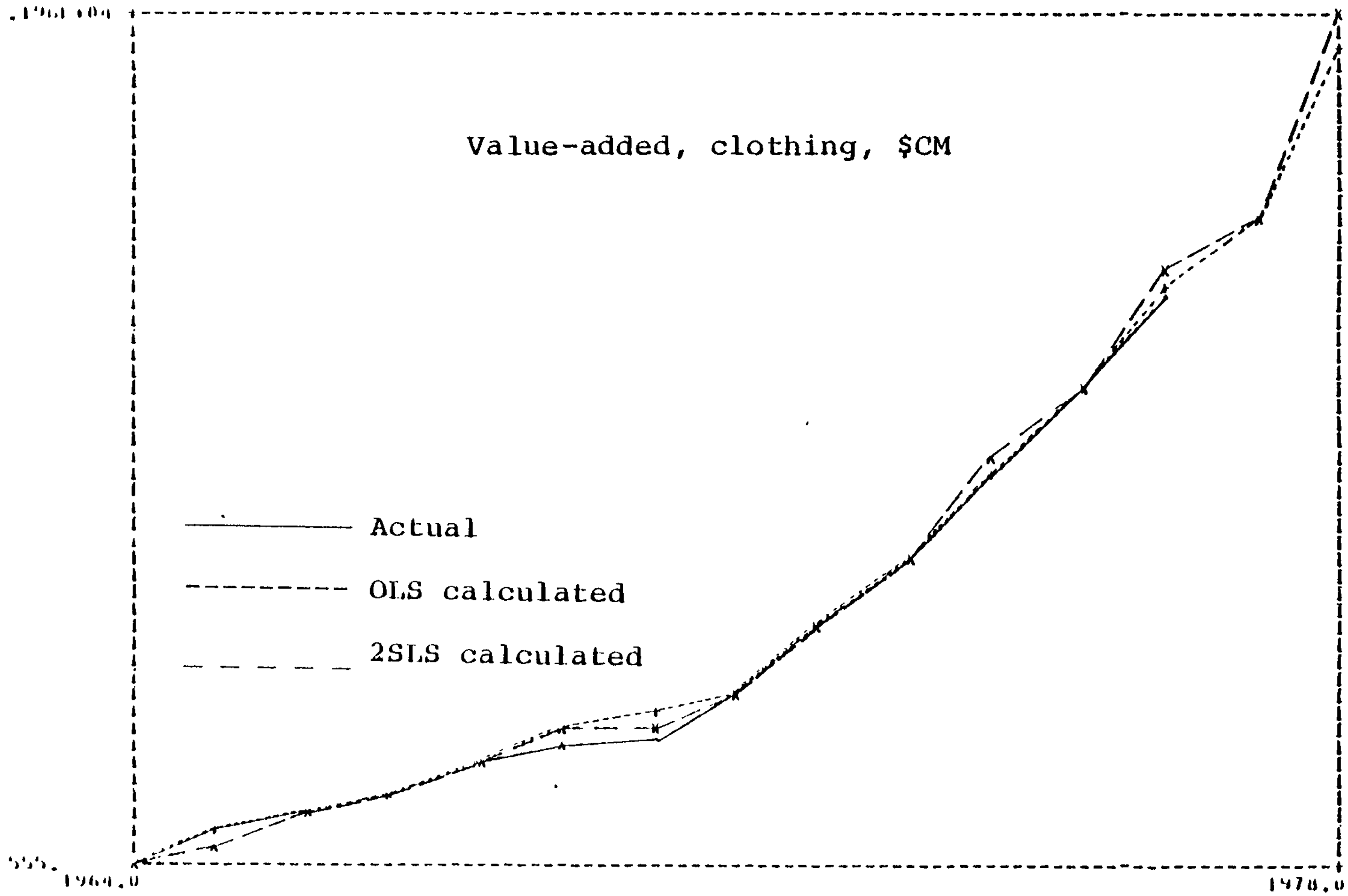


Imports, clothing, $CM
Actual
OLS calculated
2SLS calculated

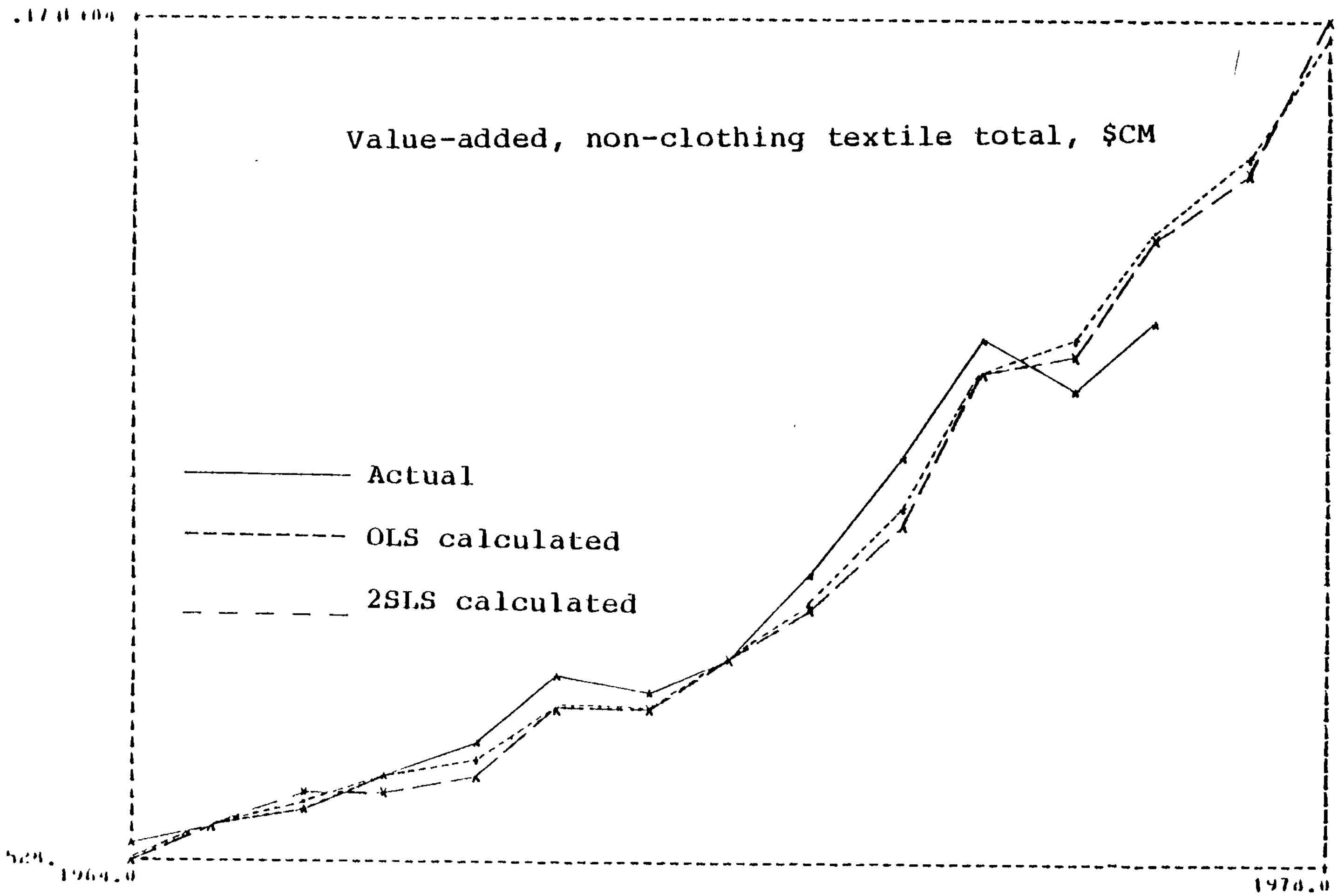
Graph A-4


.1621+04
442.
1964.0
1978.0
Imports, non-clothing textile total, $CM
Actual
OLS calculated
2SLS calculated

Graph A-5

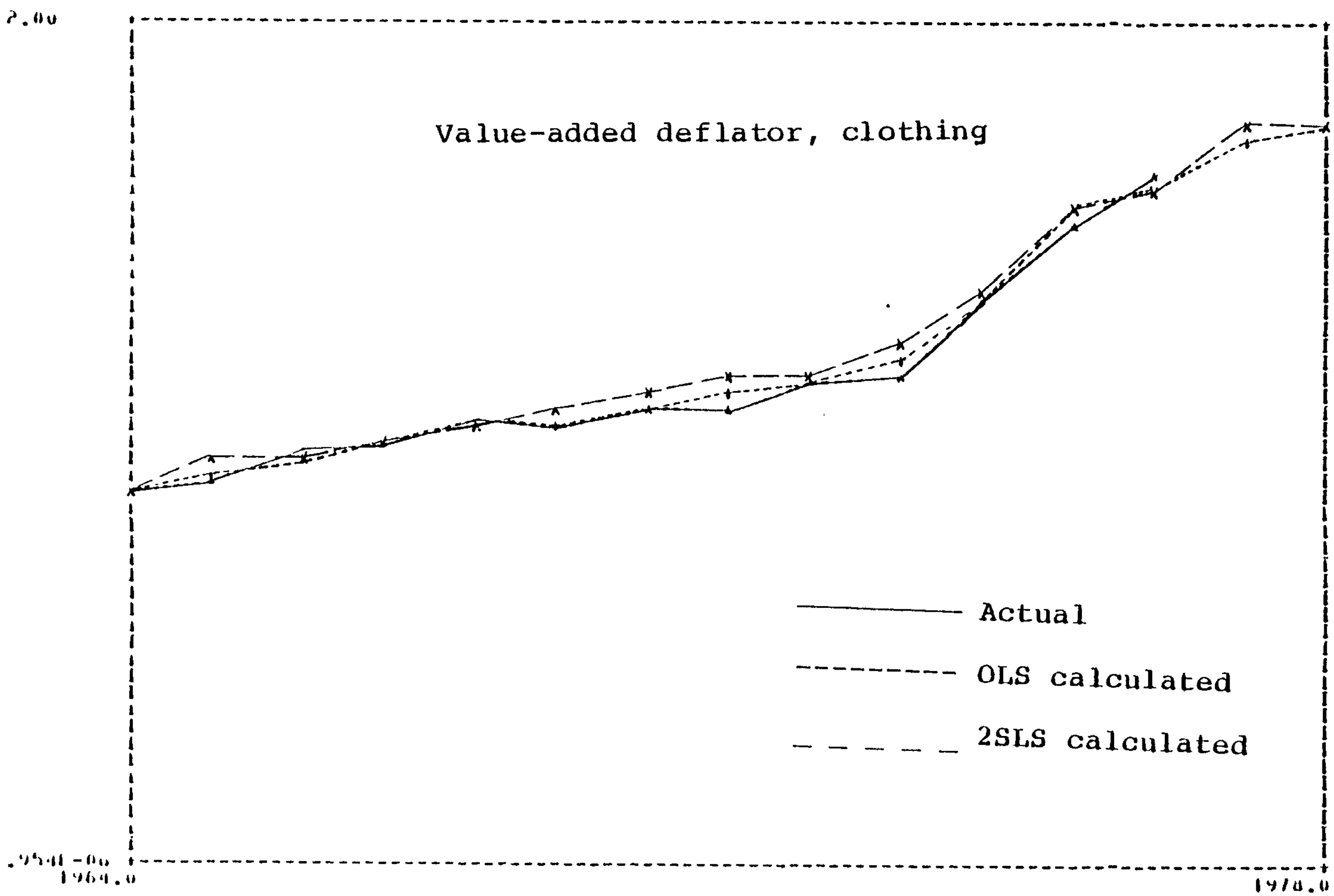

Value-added, clothing, $CM
Actual
OLS calculated
2SLS calculated

Graph A-6



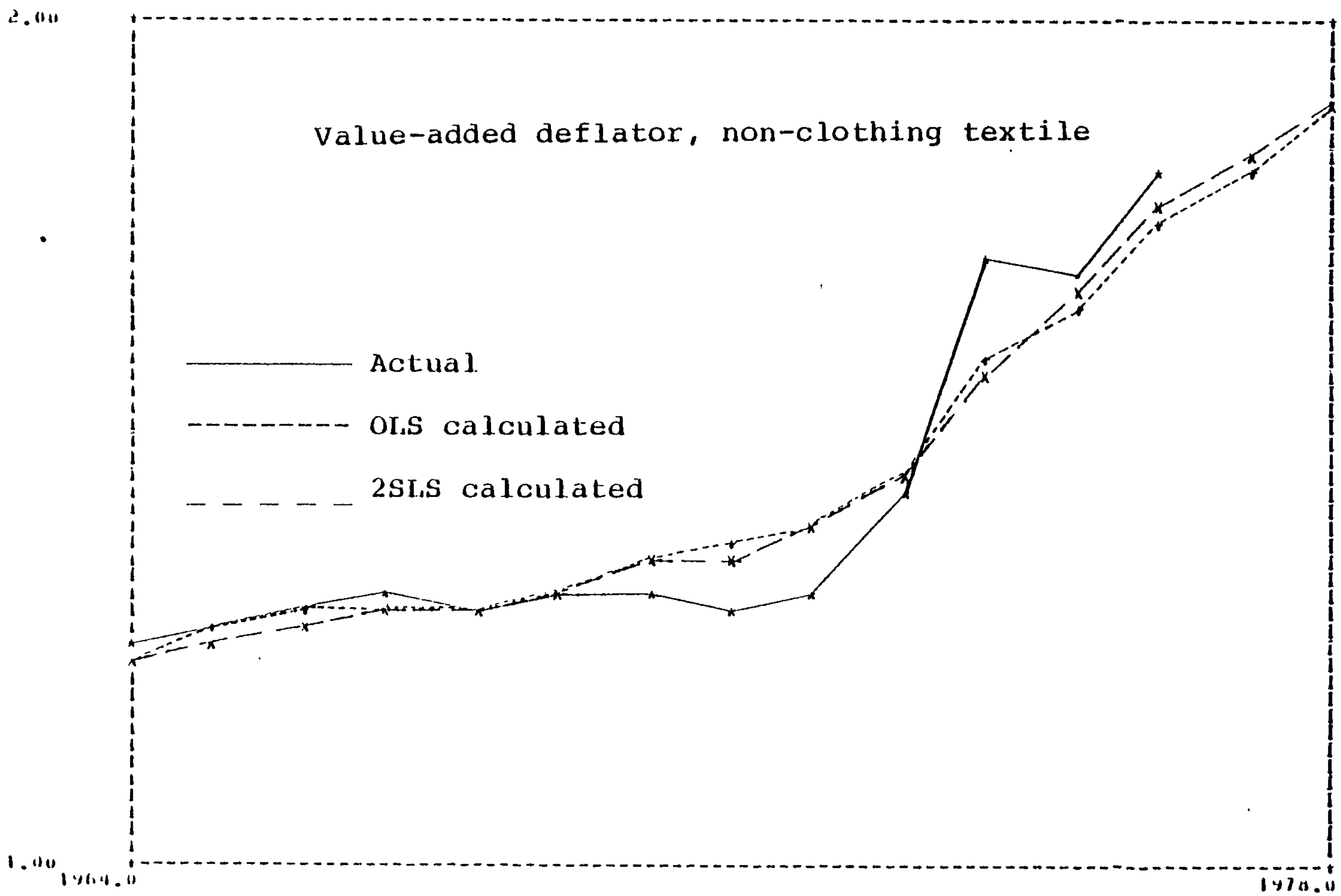
Value-added, non-clothing textile total, $CM
Actual
OLS calculated
2SLS calculated

Graph A-7

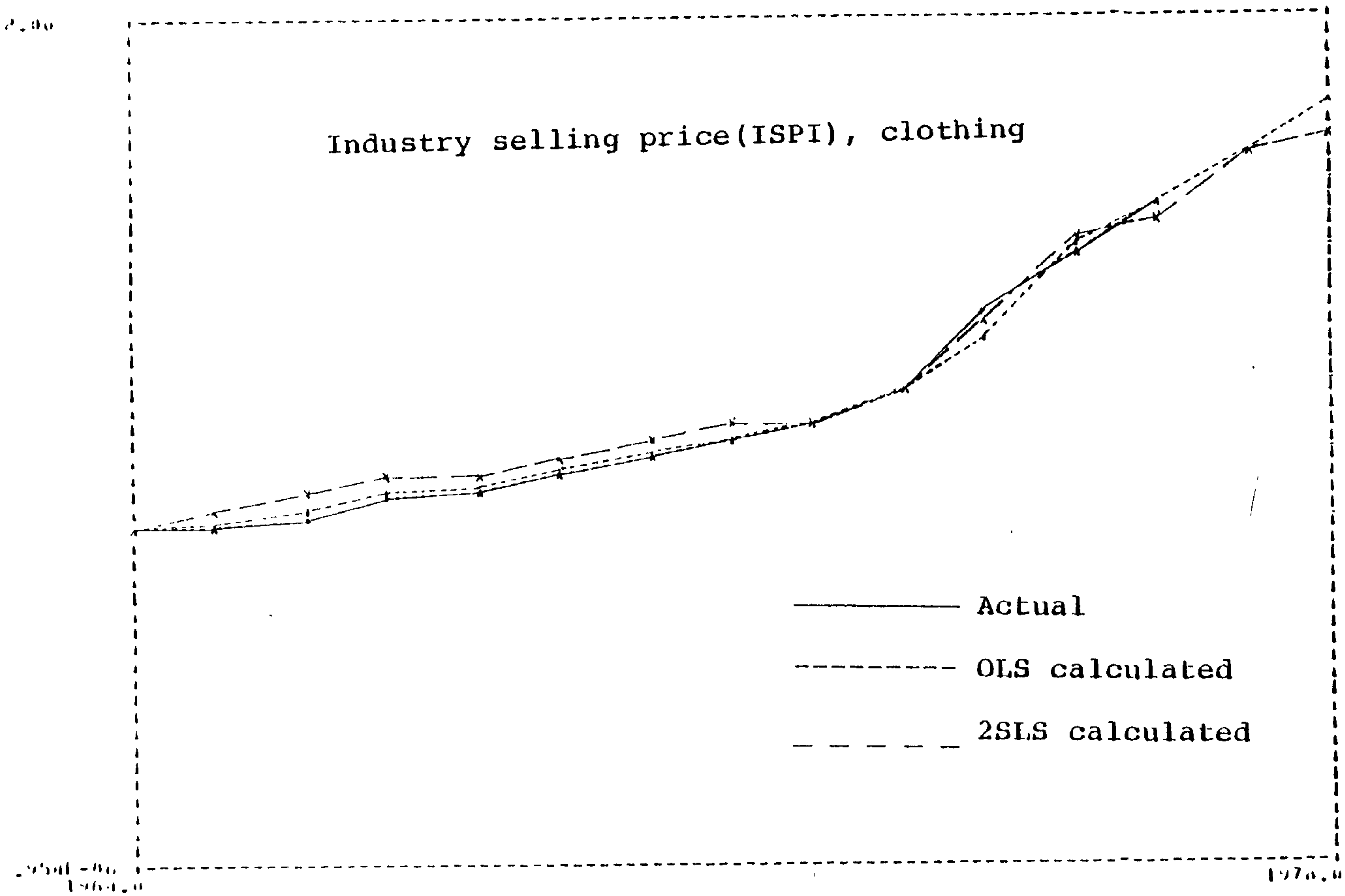


Value-added deflator, clothing
1964.0
Actual
OLS calculated
2SLS calculated

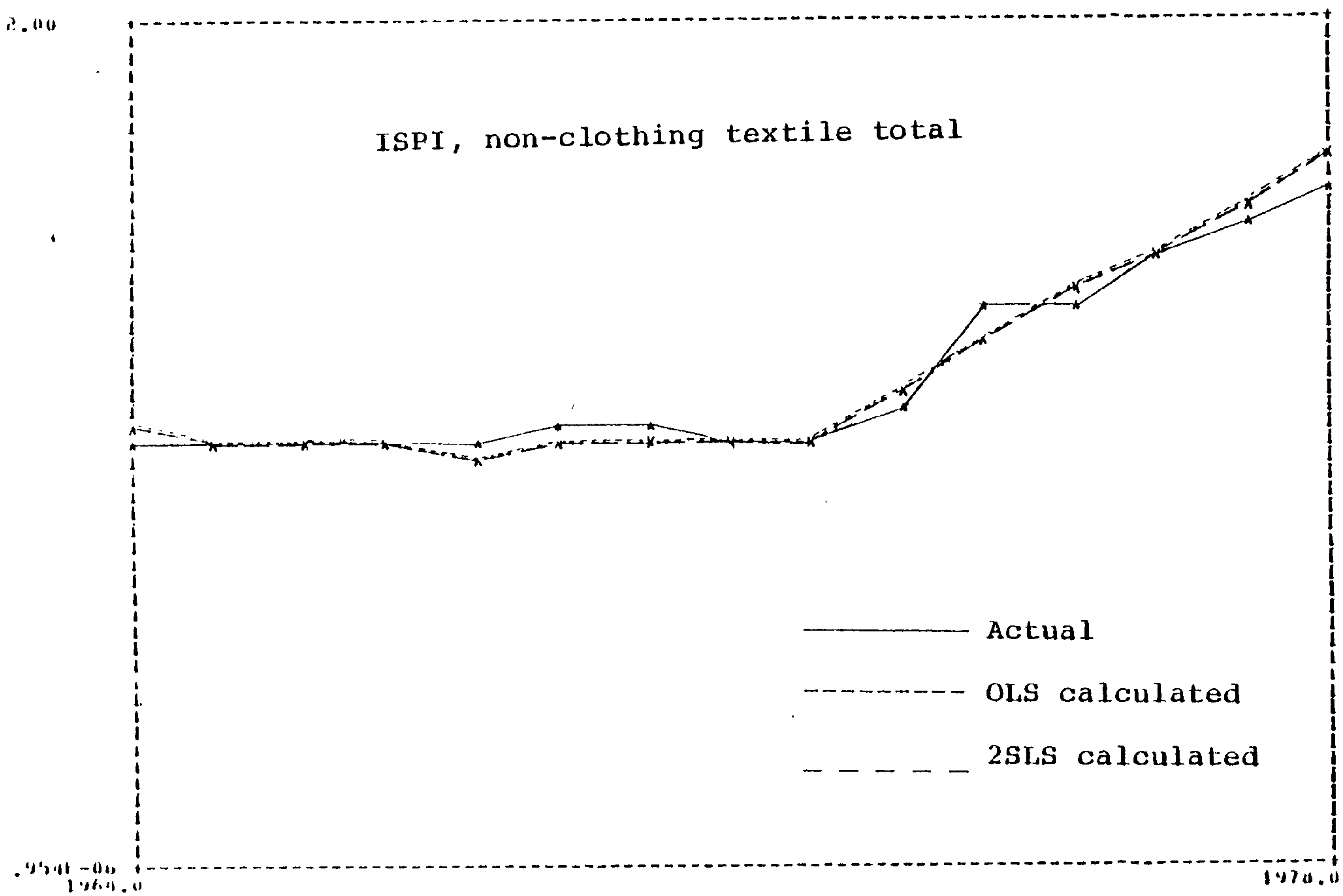
Graph A-8


2.00
Value-added deflator, non-clothing textile
Actual
OLS calculated
2SLS calculated
1.00
1964.0
1978.0

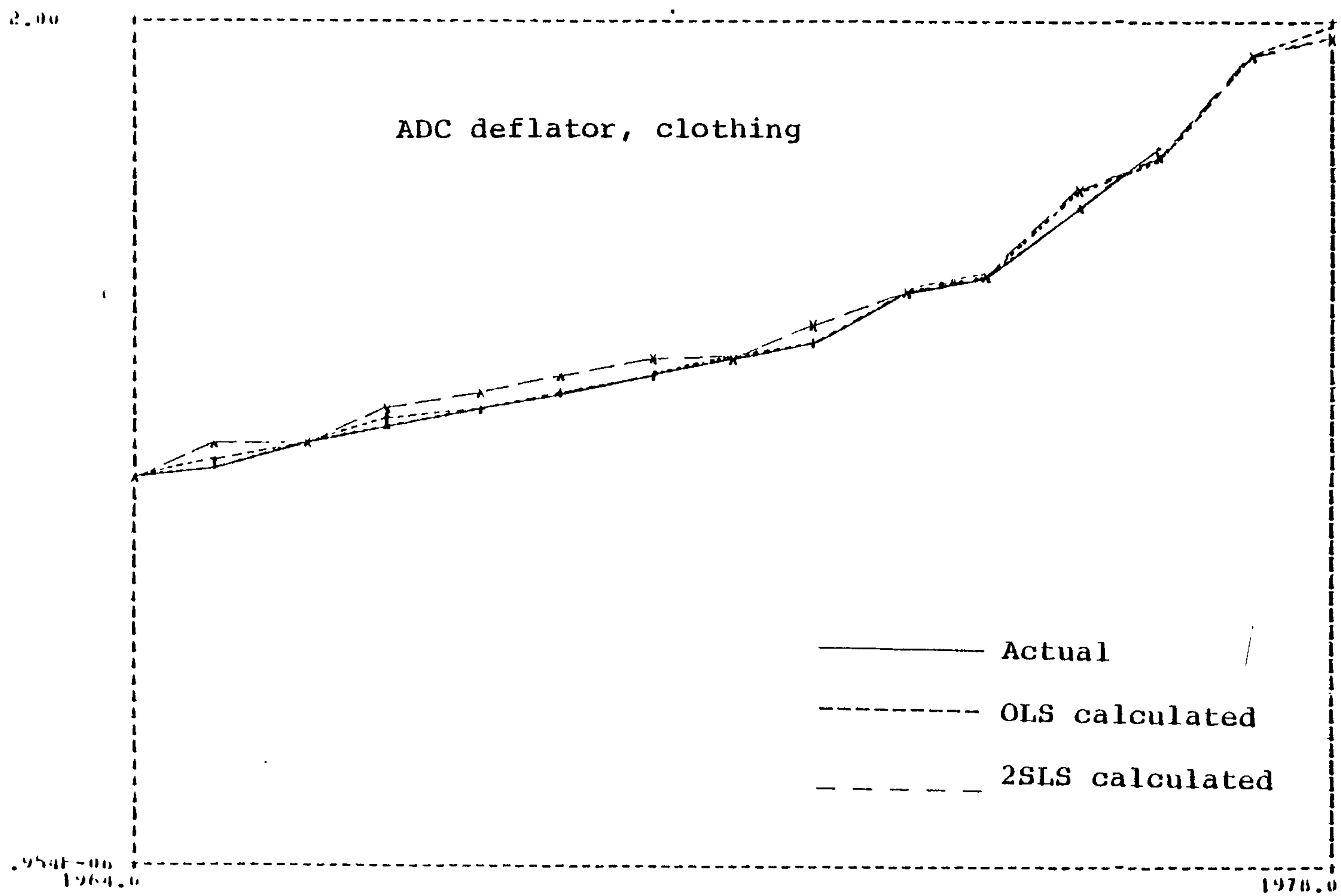
## Graph A-9


Industry selling price(ISPI), clothing
Actual
OLS calculated
2SLS calculated

Graph A-10

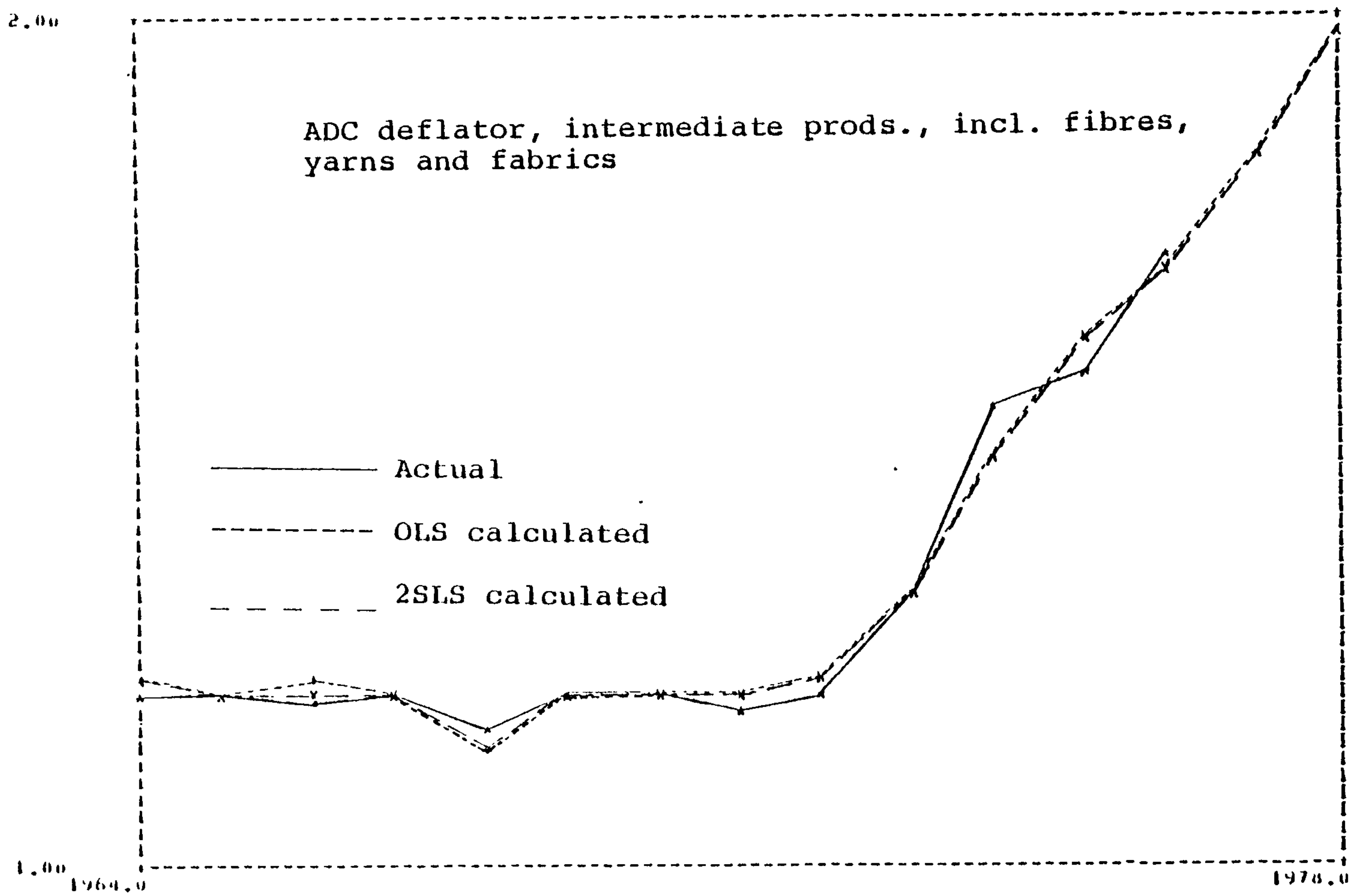

2.00
ISPI, non-clothing textile total
Actual
OLS calculated
2SLS calculated

Graph A-11



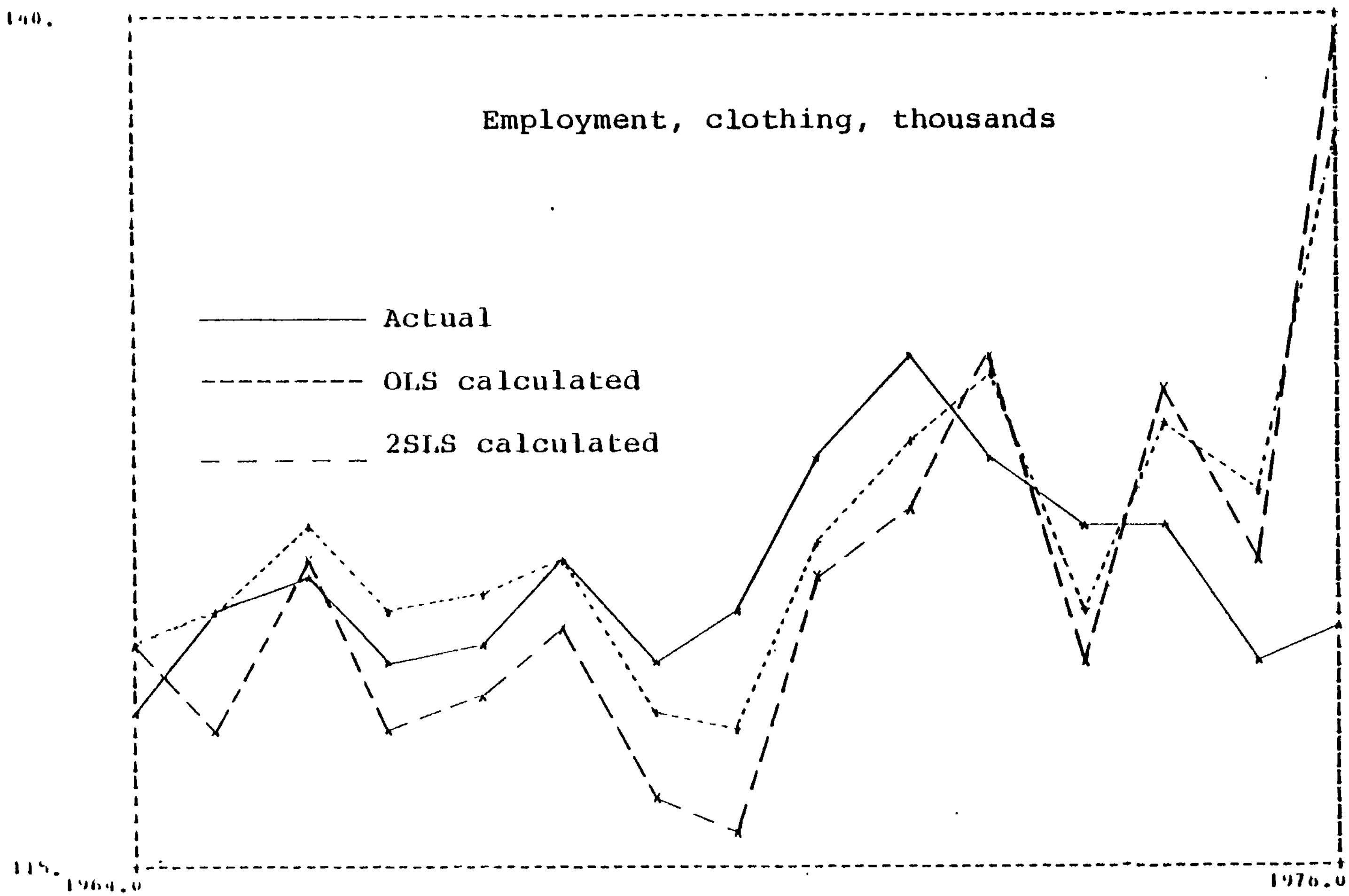
2.00
ADC deflator, clothing
Actual
OLS calculated
2SLS calculated
1964.0
1978.0

Graph A-12



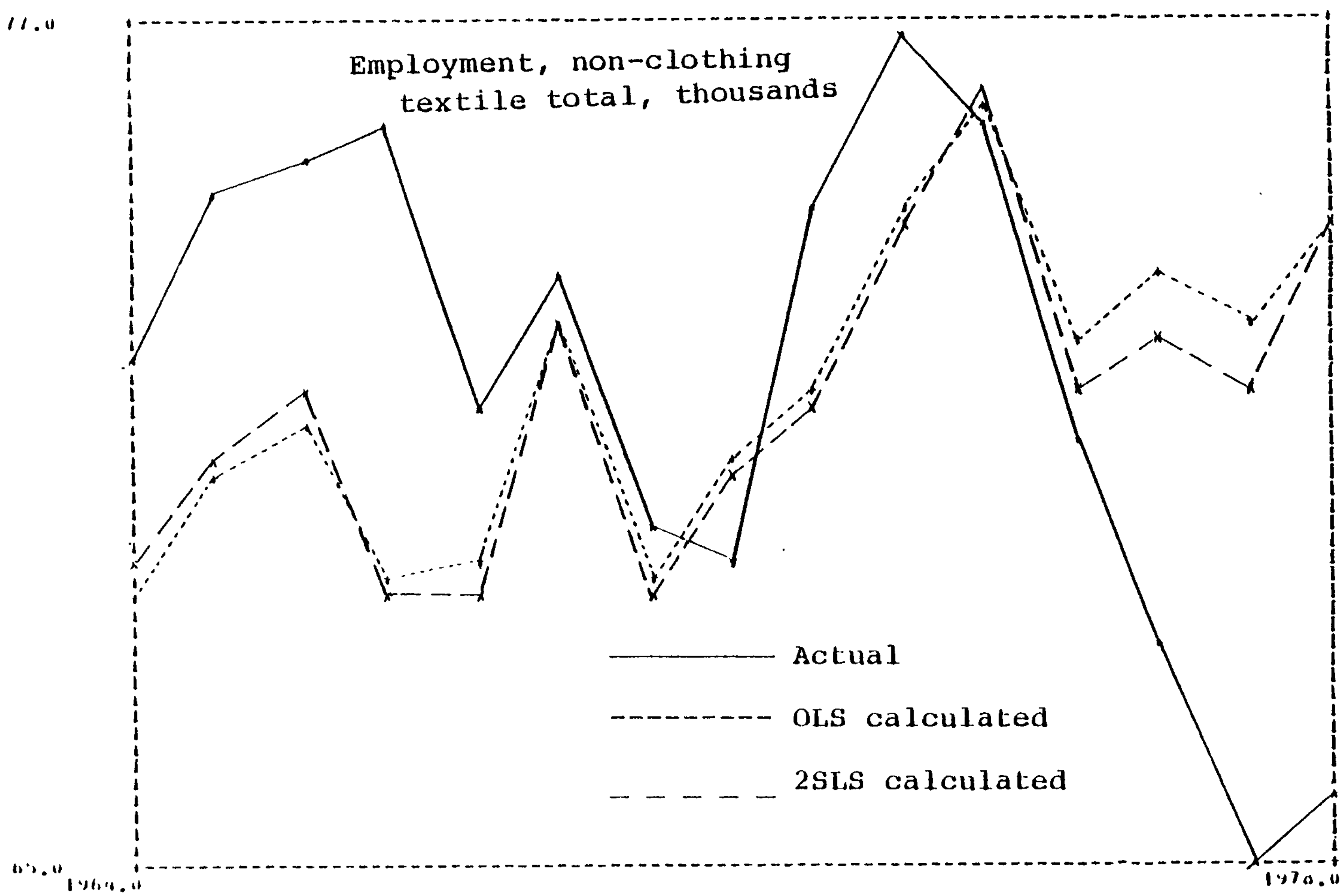
2.00
ADC deflator, intermediate prods., incl. fibres, yarns and fabrics
Actual
OLS calculated
2SLS calculated
1.00
1964.0
1978.0

## Graph A-13



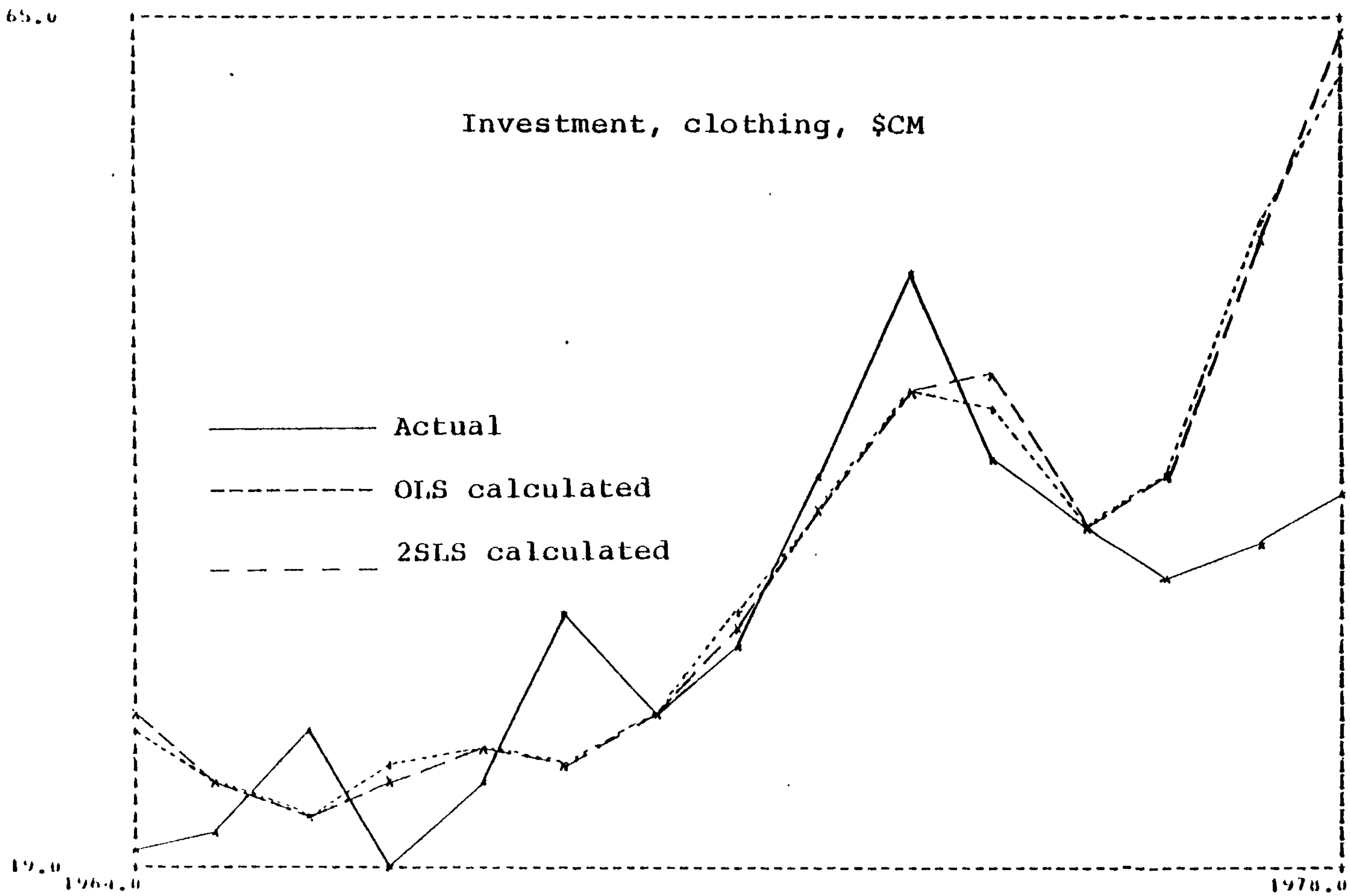
140.
Employment, clothing, thousands
Actual
OLS calculated
2SLS calculated
115.
1964.0
1976.0

Graph A-14

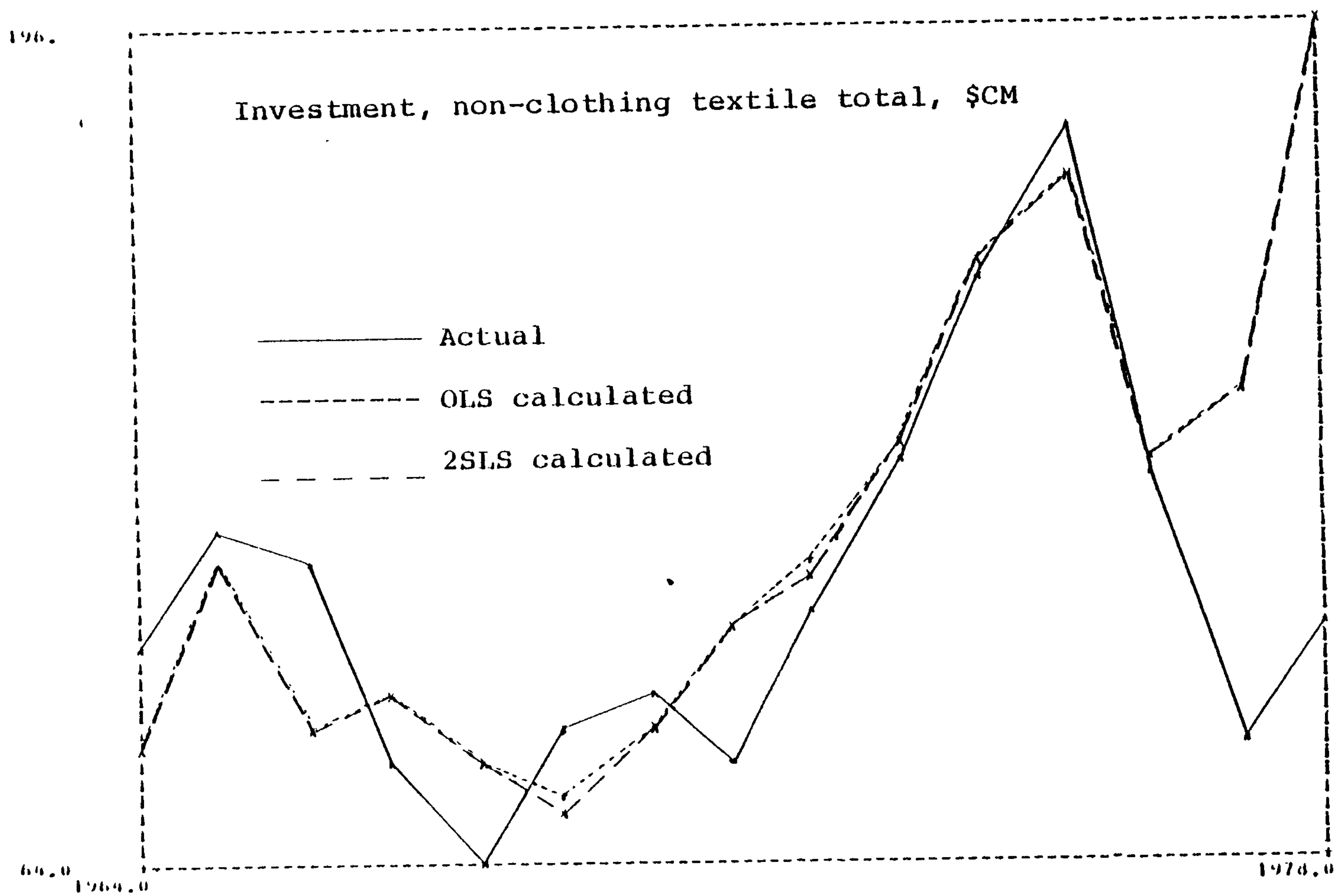


Employment, non-clothing textile total, thousands
Actual
OLS calculated
2SLS calculated

## Graph A-15

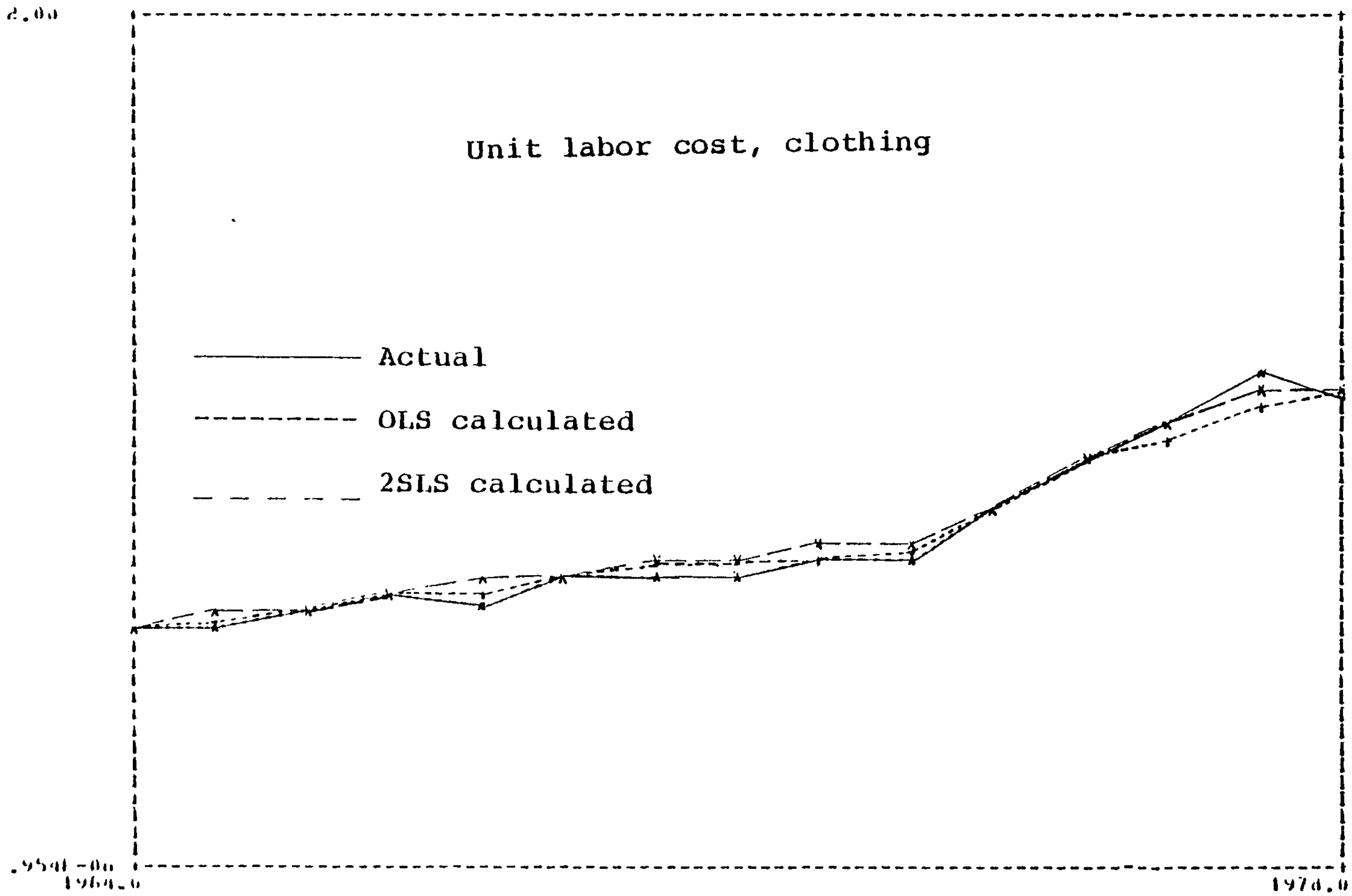

65.0
Investment, clothing, $CM
Actual
OLS calculated
2SLS calculated
19.0
1964.0
1978.0

Graph A-16



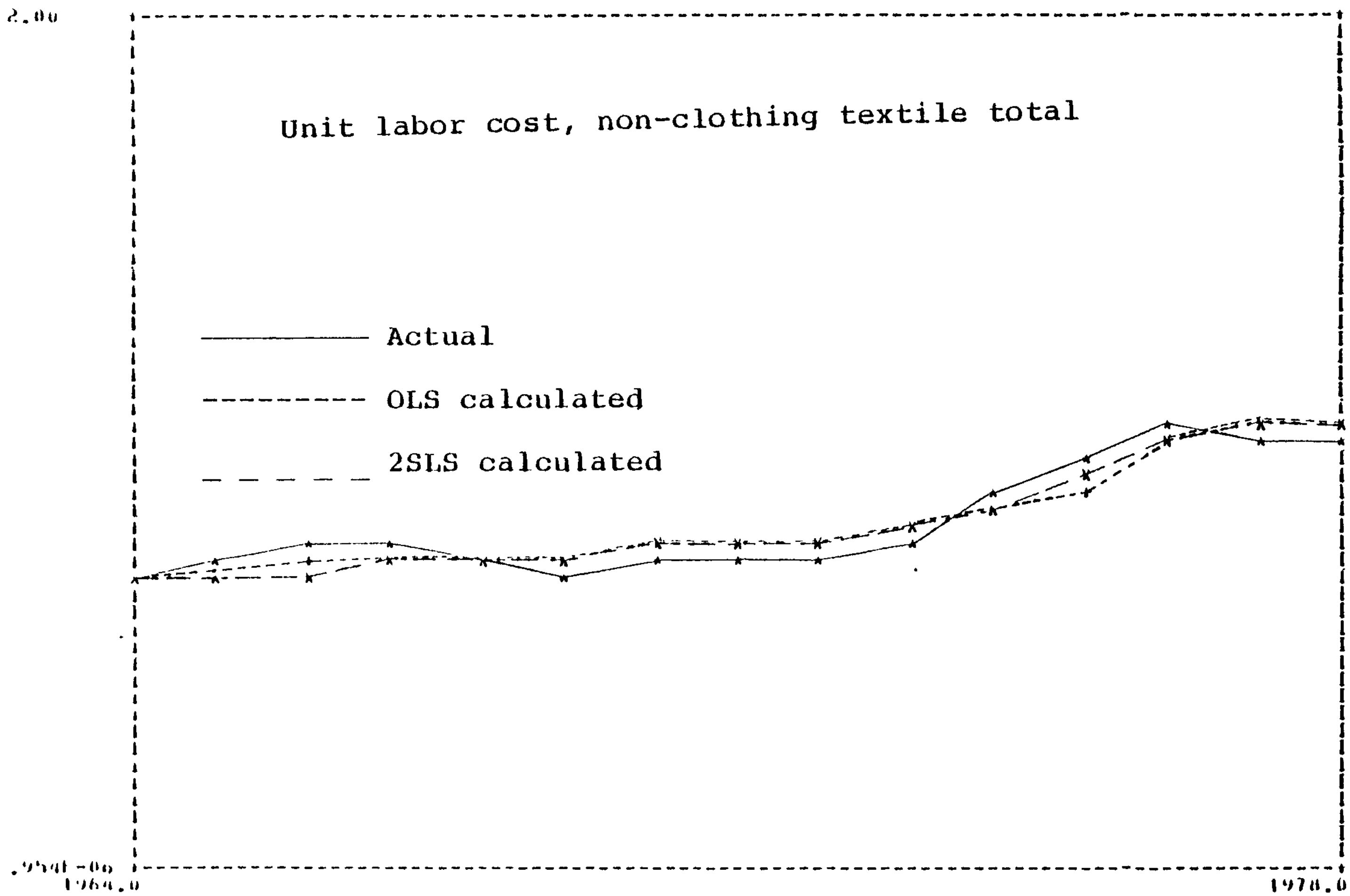
Investment, non-clothing textile total, $CM
Actual
OLS calculated
2SLS calculated

<u>Graph A-17</u>

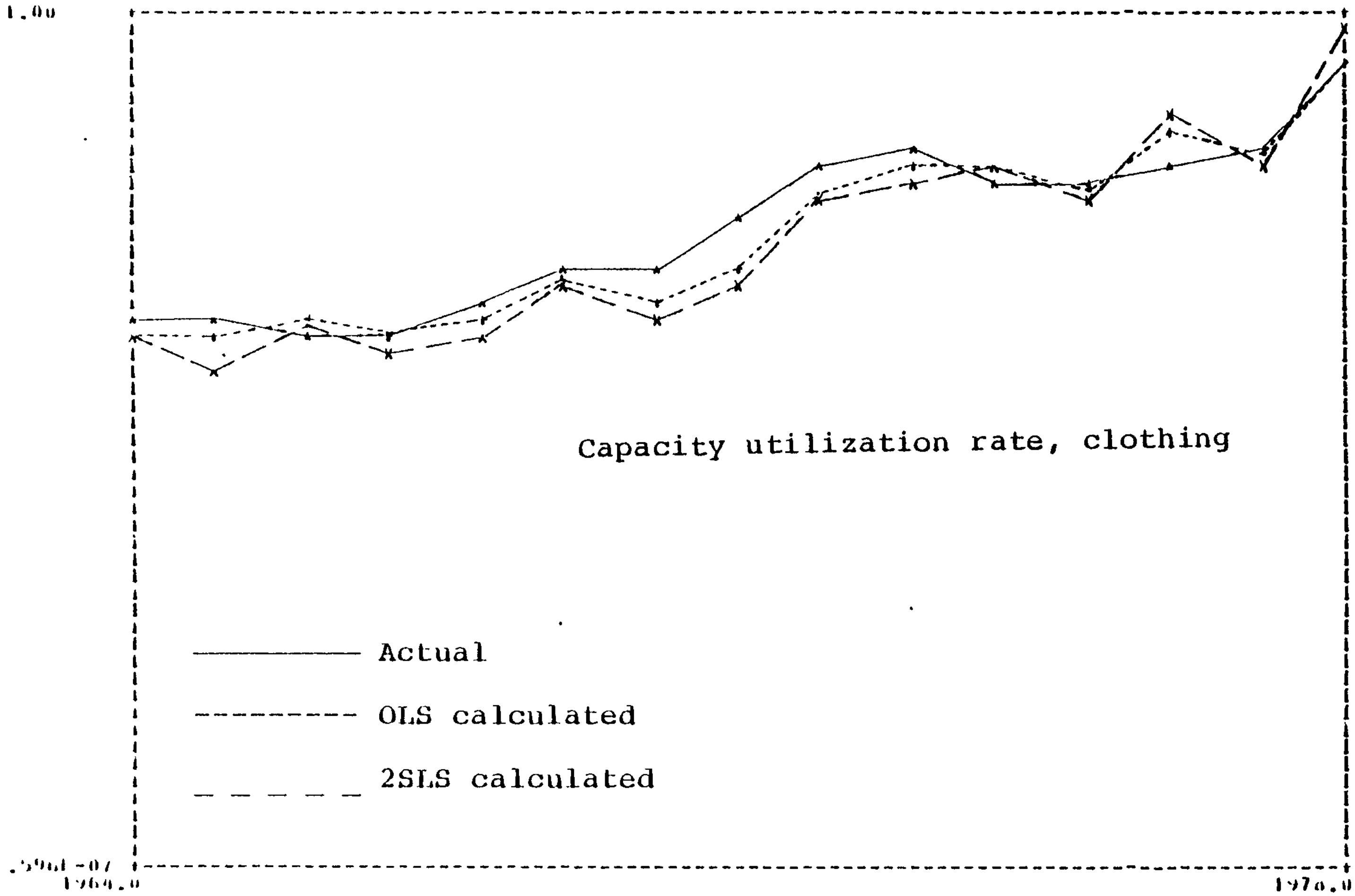


2.00
Unit labor cost, clothing
Actual
OLS calculated
2SLS calculated
1964.0
1978.0

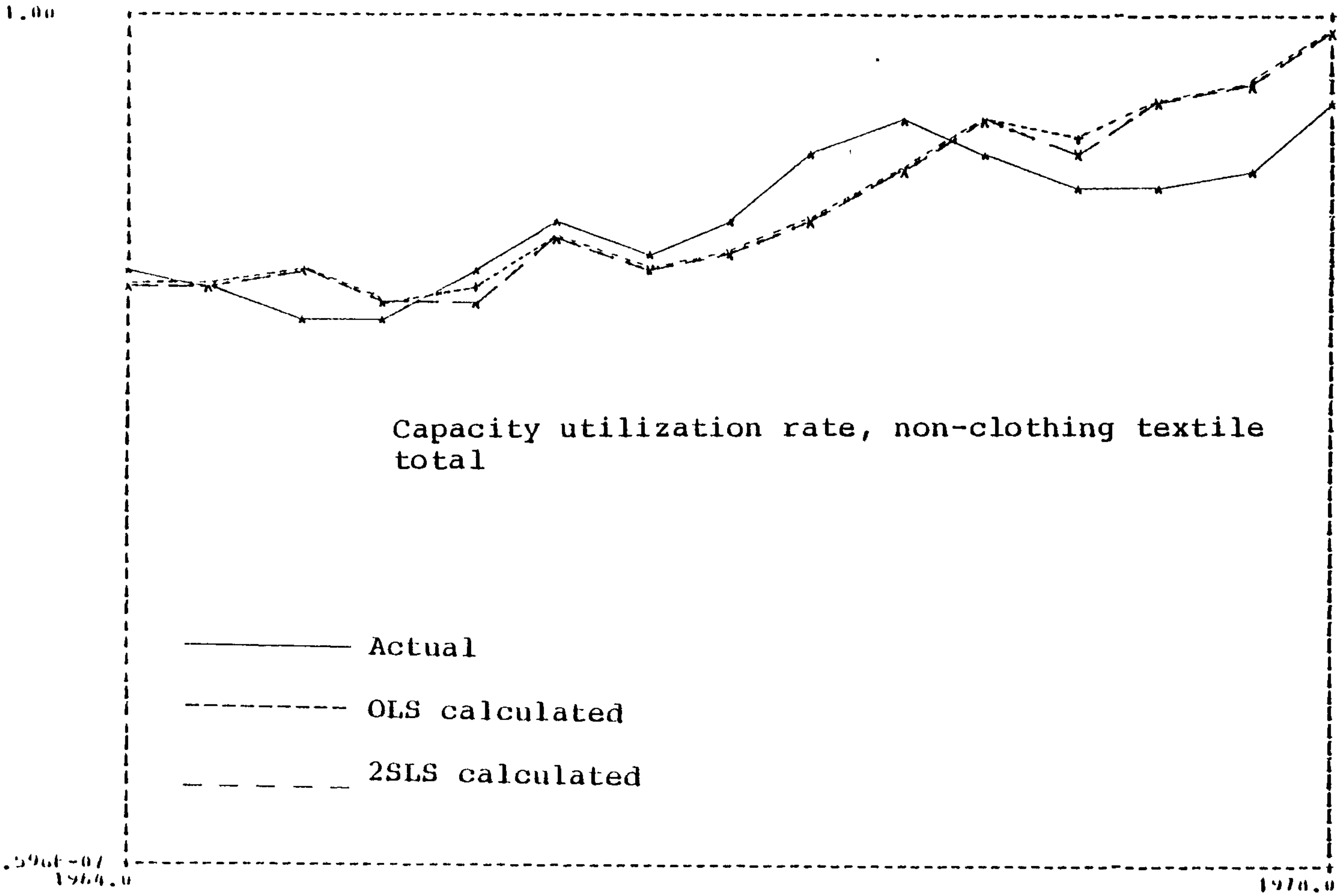
Graph A-18


2.00
Unit labor cost, non-clothing textile total
Actual
OLS calculated
2SLS calculated
1964.0
1978.0

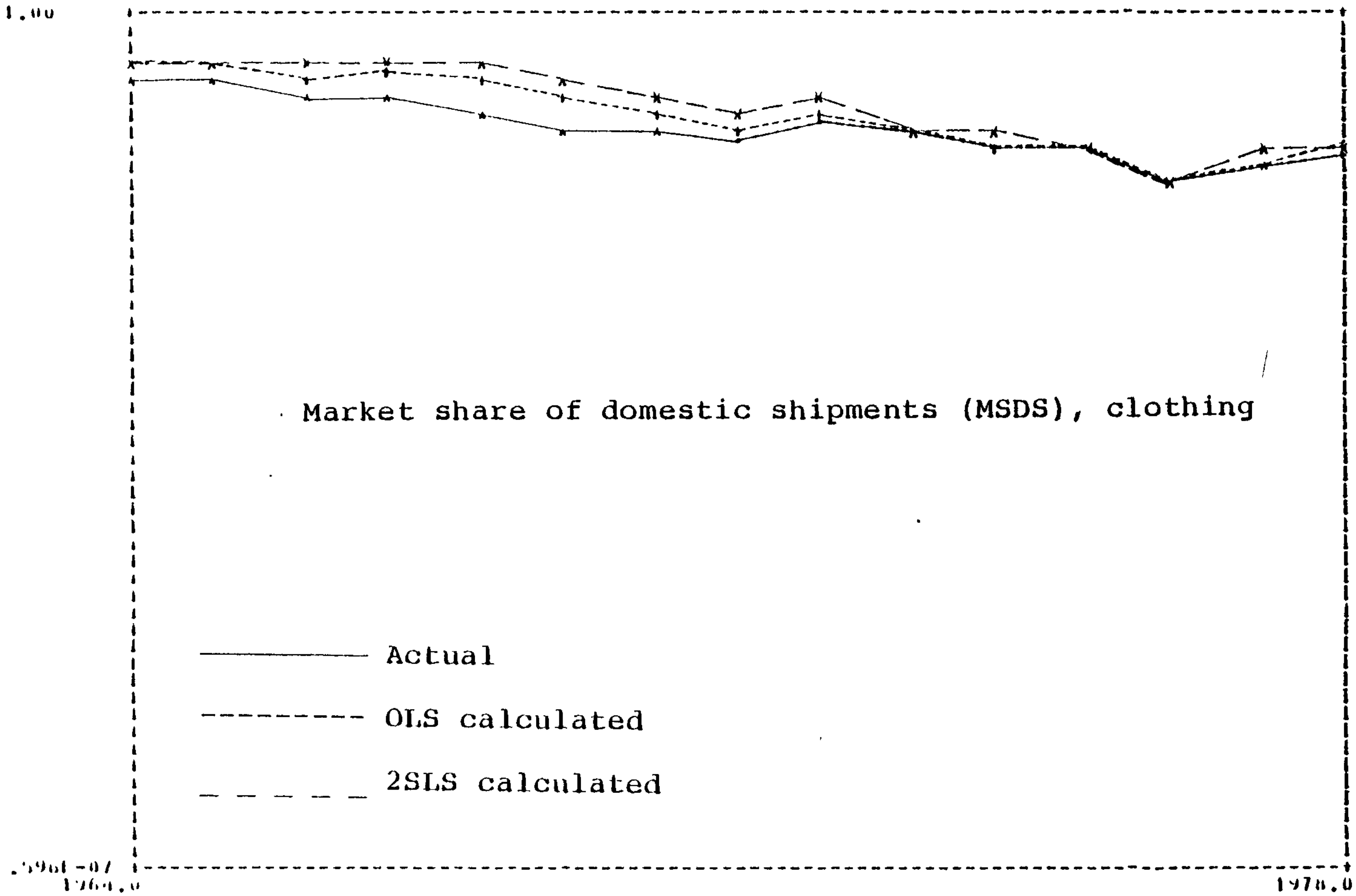
Graph A-19


1.00
Capacity utilization rate, clothing
Actual
OLS calculated
2SLS calculated

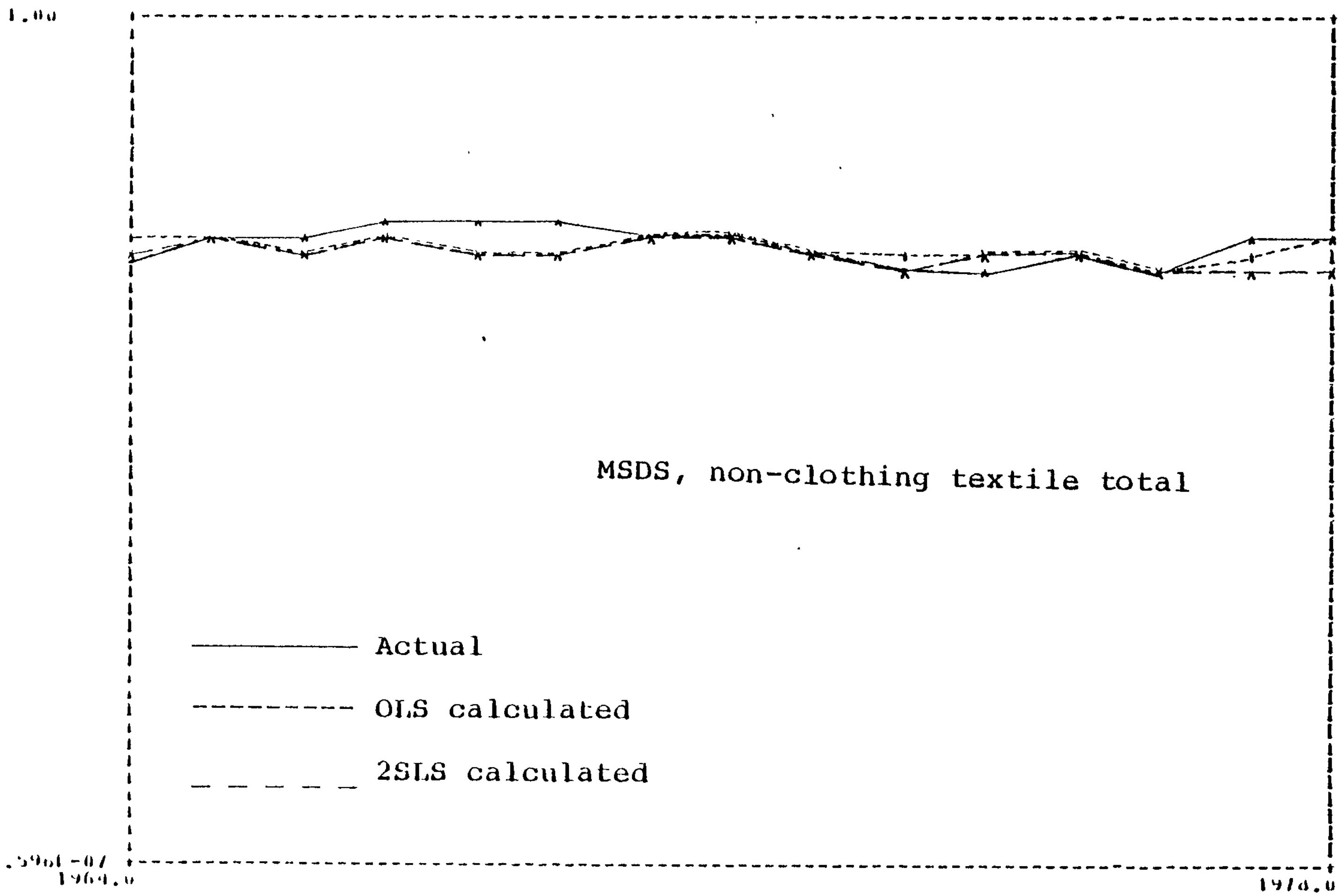
Graph A-20


1.00
Capacity utilization rate, non-clothing textile total
Actual
OLS calculated
2SLS calculated

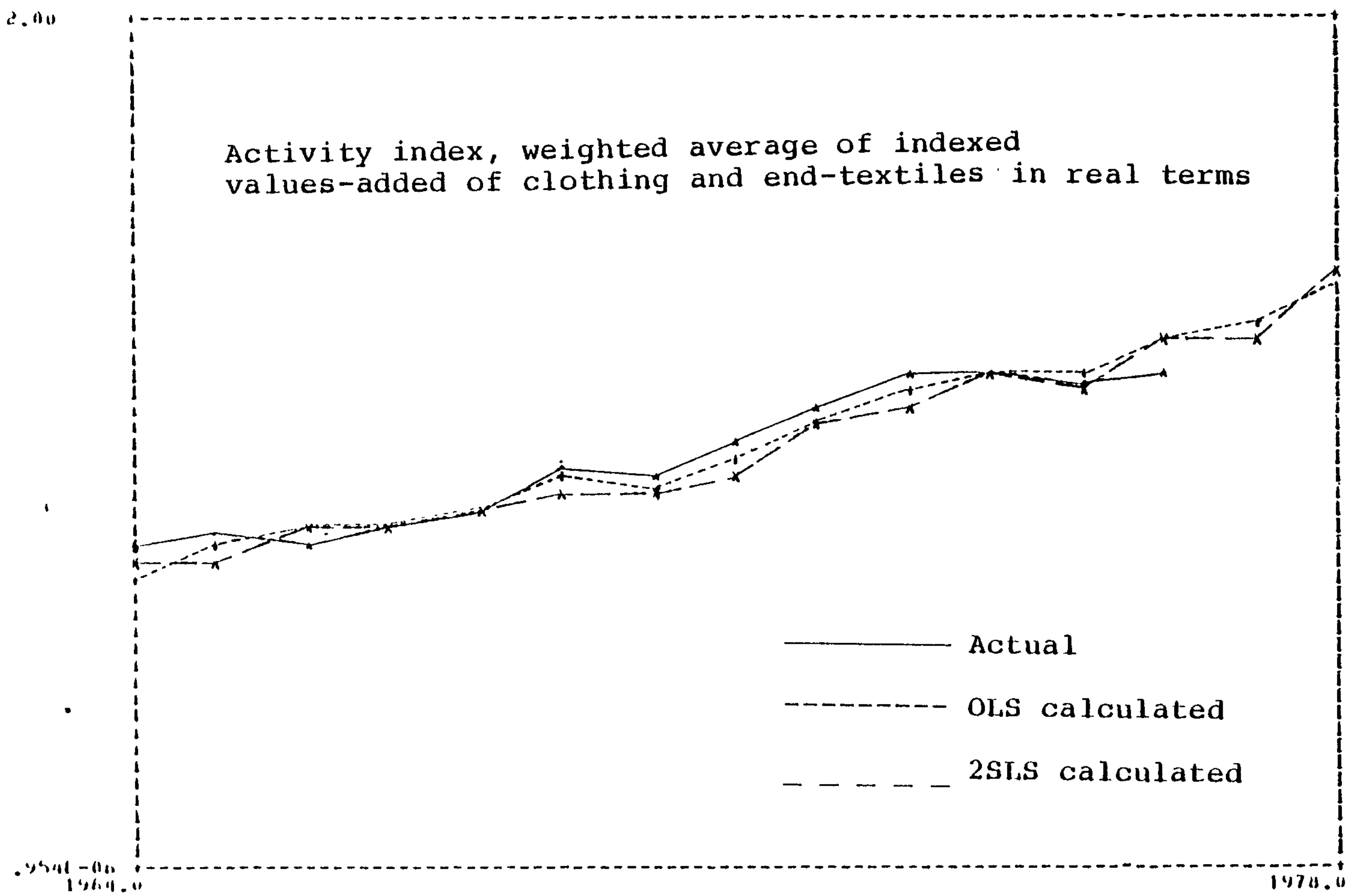
## Graph A-21


1.00
Market share of domestic shipments (MSDS), clothing
Actual
OLS calculated
2SLS calculated
1964.0
1978.0

Graph A-22

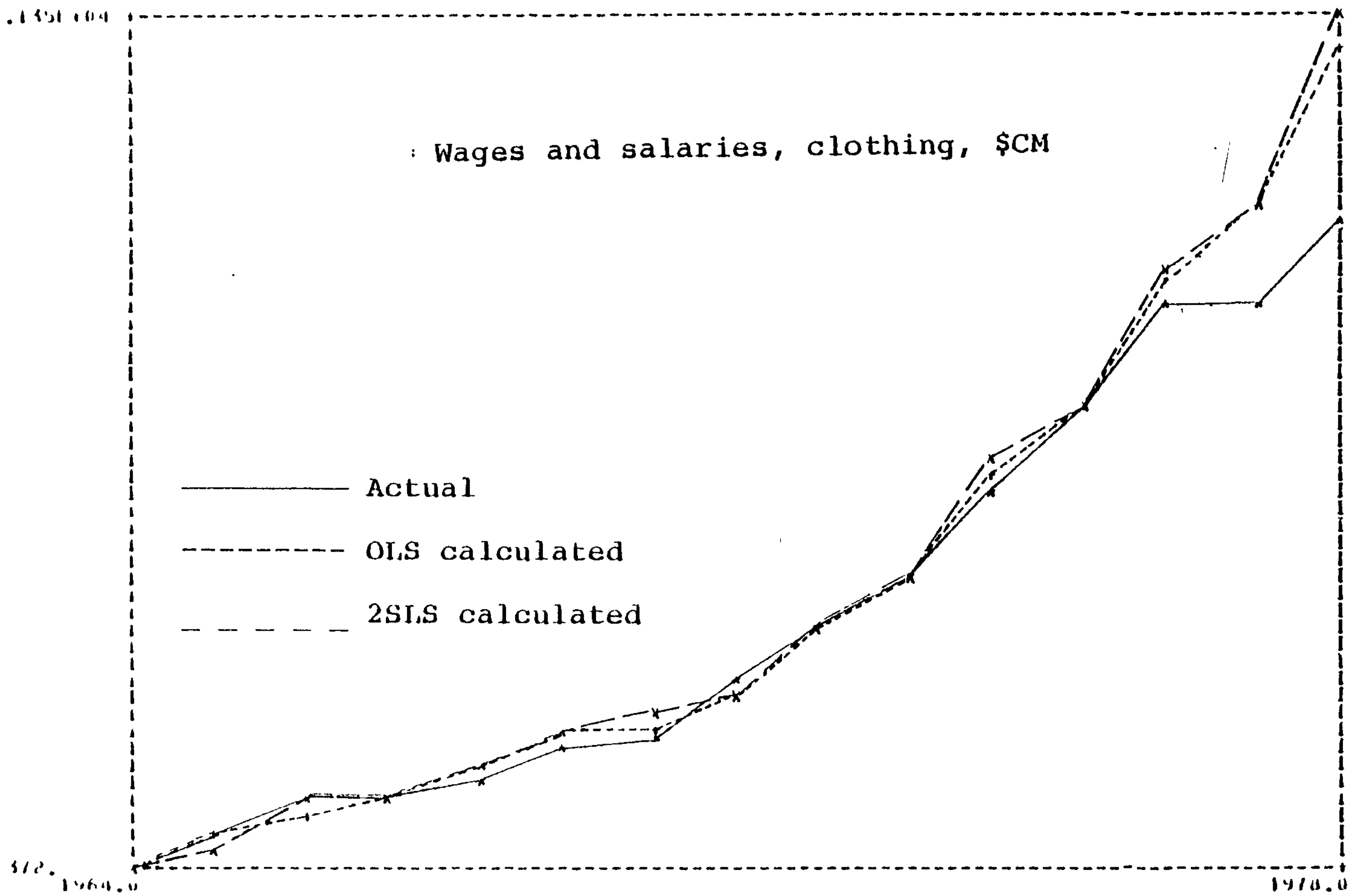

1.00
1964.0
MSDS, non-clothing textile total
Actual
OLS calculated
2SLS calculated

Graph A-23



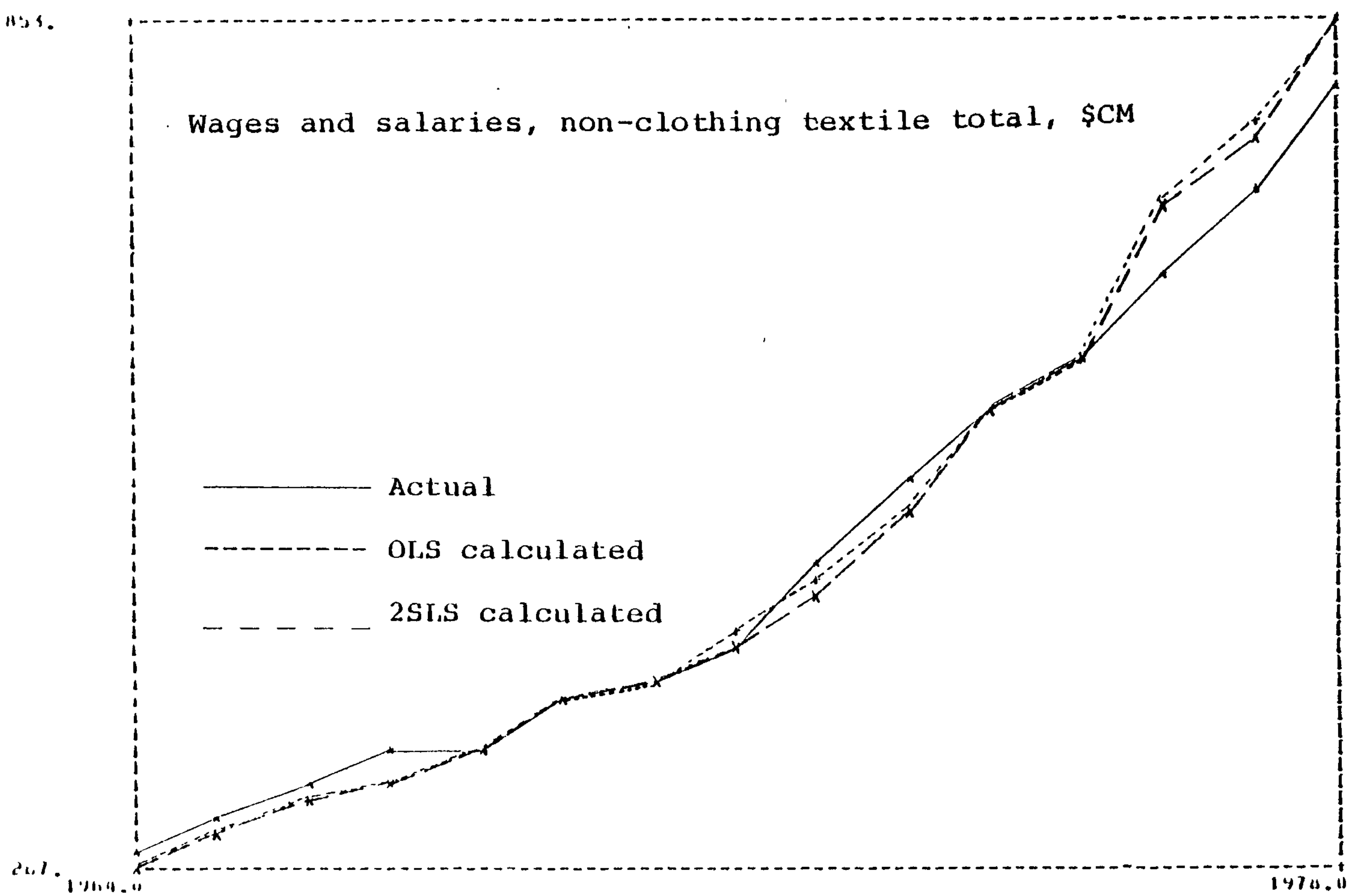
2.00
Activity index, weighted average of indexed values-added of clothing and end-textiles in real terms
Actual
OLS calculated
2SLS calculated
1978.0

Graph A-24



Wages and salaries, clothing, $CM
Actual
OLS calculated
2SLS calculated

Graph A-25



Wages and salaries, non-clothing textile total, $CM
Actual
OLS calculated
2SLS calculated

## SAMPLE PERIOD DYNAMIC SIMULATIONS: 1964-76

## RESIDUAL ANALYSIS (OLS)

| TAG | BL-EQN | U | UM | US | UC | RXMSE | AVABS | AVABSP | R | SUMR |
|---|---|---|---|---|---|---|---|---|---|---|
| CMCLTH*S | 01 0001 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.000 | 0.0 |
| CMCLTH*S | 01 0002 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.000 | 0.0 |
| CCLOTH*S | 01 0003 | 0.8695E-02 | 0.2596 | 0.5446 | 0.1958 | 45.07 | 30.63 | 1.794 | 0.9997 | 298.5 |
| CCARPI*S | 01 0004 | 0.3292E-01 | 0.6246E-02 | 0.2975 | 0.6963 | 21.51 | 17.06 | 7.229 | 0.9933 | -22.10 |
| CCURTN*S | 01 0005 | 0.3432E-01 | 0.5766E-04 | 0.5434E-01 | 0.9456 | 3.004 | 2.928 | 6.041 | 0.9879 | -0.3762 |
| CCORDG*S | 01 0006 | 0.1428 | 0.1229 | 0.1358 | 0.7413 | 13.97 | 7.389 | 15.46 | 0.8182 | -63.67 |
| COTHER*S | 01 0008 | 0.3142E-01 | 0.1072E-02 | 0.1835 | 0.8154 | 53.28 | 44.26 | 5.336 | 0.9878 | 22.68 |
| CFYACM*S | 01 0009 | 0.2472E-01 | 0.3254E-01 | 0.2318 | 0.7356 | 103.4 | 82.42 | 3.695 | 0.9863 | 242.5 |
| CIEXTL*S | 01 0012 | 0.2492E-01 | 0.6775E-02 | 0.1670 | 0.8262 | 167.3 | 123.4 | 3.299 | 0.9892 | 179.0 |
| MCLOTH*S | 02 0001 | 0.5802E-01 | 0.4136 | 0.2283 | 0.3582 | 39.91 | 33.20 | 16.37 | 0.9920 | 333.7 |
| MCARPI*S | 02 0002 | 0.3253E-01 | 0.2542 | 0.1967E-02 | 0.7438 | 2.507 | 2.110 | 8.569 | 0.9939 | -16.43 |
| MCURTN*S | 02 0003 | 0.6643E-01 | 0.4252E-03 | 0.1524 | 0.8471 | 0.7080 | 0.5399 | 9.762 | 0.9580 | 0.1898 |
| MCORDG*S | 02 0004 | 0.1626 | 0.8136E-02 | 0.1557 | 0.8362 | 7.927 | 5.294 | 27.19 | 0.8738 | 9.295 |
| MOTHER*S | 02 0006 | 0.5207E-01 | 0.3838E-02 | 0.1262 | 0.8700 | 7.791 | 6.215 | 9.127 | 0.9794 | 6.275 |
| MFYACM*S | 02 0007 | 0.3168E-01 | 0.3327E-01 | 0.3562E-02 | 0.9632 | 41.09 | 34.34 | 5.432 | 0.9801 | -97.44 |
| MIEXTL*S | 02 0010 | 0.3463E-01 | 0.1918E-01 | 0.1687E-02 | 0.9791 | 54.49 | 45.10 | 5.757 | 0.9798 | -98.11 |
| SCLOTH*S | 03 0001 | 0.7047E-02 | 0.1721 | 0.5524E-01 | 0.7727 | 27.35 | 21.86 | 1.271 | 0.9991 | -147.5 |
| SCARPI*S | 03 0002 | 0.3628E-01 | 0.1645E-04 | 0.3715 | 0.6285 | 16.45 | 12.80 | 7.675 | 0.9923 | 0.8672 |
| SCURTN*S | 03 0003 | 0.3396E-01 | 0.3183E-03 | 0.1457E-01 | 0.9851 | 2.740 | 2.242 | 7.017 | 0.9875 | -0.6356 |
| SCORDG*S | 03 0004 | 0.2894 | 0.1616 | 0.5709 | 0.2675 | 12.62 | 7.732 | 41.95 | 0.4196 | -65.94 |
| SOTHER*S | 03 0006 | 0.2928E-01 | 0.7989E-03 | 0.2023 | 0.7969 | 36.94 | 31.15 | 5.052 | 0.9882 | 13.57 |
| SFYACM*S | 03 0007 | 0.3108E-01 | 0.1351 | 0.3535 | 0.5114 | 69.21 | 57.37 | 5.119 | 0.9781 | 330.7 |
| SHRCLT*S | 03 0008 | 0.1240E-01 | 0.4843 | 0.1842 | 0.3315 | 0.2181F-01 | 0.1744E-01 | 1.980 | 0.9443 | -0.1973 |
| SHRCRP*S | 03 0009 | 0.6014E-02 | 0.4173E-01 | 0.4784E-01 | 0.9104 | 0.1034F-01 | 0.9127E-02 | 1.067 | 0.7871 | 0.2745E-01 |
| SHRCRT*S | 03 0010 | 0.1035E-01 | 0.5012E-01 | 0.2510 | 0.6989 | 0.1820F-01 | 0.1305E-01 | 1.609 | 0.7284 | -0.5298F-01 |
| SHRCOR*S | 03 0011 | 0.1298 | 0.3559E-01 | 0.7413E-01 | 0.8903 | 0.1455 | 0.1112 | 26.99 | 0.5199 | -0.3569 |
| SHROTH*S | 03 0012 | 0.3117E-02 | 0.3026E-01 | 0.7351E-02 | 0.9624 | 0.5646E-02 | 0.4258E-02 | 0.4710 | 0.9449 | -0.1277F-01 |
| SHRFYC*S | 03 0013 | 0.1653E-01 | 0.2162 | 0.1472 | 0.6367 | 0.2131F-01 | 0.1475E-01 | 2.208 | 0.7847 | 0.1288 |
| VCLOTH*S | 03 0014 | 0.5343E-02 | 0.3226 | 0.4222E-01 | 0.6351 | 10.07 | 8.300 | 0.9696 | 0.9996 | -74.37 |
| VCARPI*S | 03 0015 | 0.3974E-01 | 0.9562E-05 | 0.2904 | 0.7096 | 6.980 | 5.084 | 7.818 | 0.9895 | 0.2806 |
| VCURTN*S | 03 0016 | 0.2803E-01 | 0.1353E-01 | 0.2157E-03 | 0.9863 | 1.099 | 0.9361 | 6.897 | 0.9921 | -1.662 |
| VCORDG*S | 03 0017 | 0.8098E-01 | 0.8782E-01 | 0.4257 | 0.4865 | 1.566 | 1.131 | 11.55 | 0.9037 | -6.032 |
| VOTHER*S | 03 0019 | 0.2686E-01 | 0.5687E-02 | 0.1061 | 0.8882 | 15.29 | 12.06 | 4.408 | 0.9912 | -14.99 |
| VFYACM*S | 03 0020 | 0.3500E-01 | 0.7413E-01 | 0.1533 | 0.7726 | 35.72 | 29.13 | 5.497 | 0.9608 | 126.4 |
| VIEXTL*S | 03 0021 | 0.2706E-01 | 0.2661E-01 | 0.1191 | 0.8543 | 49.05 | 38.04 | 3.939 | 0.9858 | 104.0 |
| AINDEX*S | 03 0022 | 0.1610E-01 | 0.2220E-02 | 0.1604 | 0.8373 | 0.3551F-01 | 0.2686E-01 | 2.267 | 0.9955 | 0.2175F-01 |
| VKNIFB*S | 03 0023 | 0.7060E-01 | 0.4851E-01 | 0.3550E-01 | 0.9160 | 10.08 | 7.860 | 12.08 | 0.9404 | 28.85 |
| AINDXK*S | 03 0026 | 0.2172E-01 | 0.4679E-01 | 0.2373E-01 | 0.9295 | 0.4197F-01 | 0.3390E-01 | 3.345 | 0.9710 | 0.1180 |
| SIEXTL*S | 03 0027 | 0.2511E-01 | 0.4452E-01 | 0.2993 | 0.6562 | 101.5 | 80.45 | 3.817 | 0.9898 | 278.5 |
| SHRTXT*S | 03 0028 | 0.9339E-02 | 0.1785 | 0.3880 | 0.4335 | 0.1359F-01 | 0.9940E-02 | 1.342 | 0.7742 | 0.7463F-01 |
| RAWCLT*S | 03 0029 | 0.8934E-02 | 0.8149E-01 | 0.3665E-01 | 0.8819 | 19.70 | 17.54 | 1.766 | 0.9983 | -73.11 |
| RAWCRP*S | 03 0030 | 0.3410E-01 | 0.1989E-04 | 0.3888 | 0.6112 | 10.13 | 9.010 | 7.388 | 0.9934 | 0.5874 |
| RAWCRT*S | 03 0031 | 0.3498E-01 | 0.2096E-02 | 0.3583E-01 | 0.9621 | 1.725 | 1.388 | 6.462 | 0.9841 | 1.027 |
| RAWCOR*S | 03 0032 | 0.3479 | 0.1689 | 0.2333 | 0.5978 | 11.21 | 6.875 | 64.18 | 0.1290 | -59.91 |
| RAWOTH*S | 03 0033 | 0.3137E-01 | 0.9385E-02 | 0.2271 | 0.7635 | 22.68 | 19.53 | 5.437 | 0.9842 | 28.57 |
| RAWFYC*S | 03 0034 | 0.2699E-01 | 0.1692 | 0.3856 | 0.4452 | 38.20 | 31.54 | 4.593 | 0.9860 | 204.2 |
| VIEXTP*S | 04 0001 | 0.1848E-01 | 0.6732E-03 | 0.2669 | 0.7324 | 0.5259F-01 | 0.3737E-01 | 2.580 | 0.9656 | -0.1774F-01 |
| ISPCLI*S | 04 0002 | 0.9971E-02 | 0.2337 | 0.7513E-01 | 0.6912 | 0.2127F-01 | 0.1759E-01 | 1.719 | 0.9969 | -0.1337 |
| ISPCRP*S | 04 0003 | 0.2601E-01 | 0.7377 | 0.1507 | 0.1116 | 0.5381E-01 | 0.4877E-01 | 4.529 | 0.9205 | 0.6008 |
| ISPCRI*S | 04 0004 | 0.1415E-01 | 0.1449E-02 | 0.1122 | 0.8864 | 0.2386F-01 | 0.2000E-01 | 2.416 | 0.9744 | -0.1181F-01 |

| TAG | BL-EQN | U | UM | US | UC | RXMSE | AVABS | AVABSP | R | SUMR |
|---|---|---|---|---|---|---|---|---|---|---|
| ISPCOR*S | 04 0005 | 0.4354E-01 | 0.2458E-04 | 0.2125E-02 | 0.9979 | 0.1464 | 0.1023 | 6.774 | 0.9821 | -0.9432F-02 |
| ISPOTH*S | 04 0007 | 0.1847E-01 | 0.4278E-02 | 0.2102E-01 | 0.9747 | 0.4140F-01 | 0.2967E-01 | 2.611 | 0.9732 | 0.3520E-01 |
| ISPFYC*S | 04 0008 | 0.1252E-01 | 0.3252E-01 | 0.1825E-02 | 0.9657 | 0.2809E-01 | 0.1975E-01 | 1.666 | 0.9838 | 0.6586F-01 |
| MCLUTP*S | 04 0009 | 0.5015E-06 | 0.5161 | 0.2728 | 0.2111 | 0.1104E-05 | 0.7932E-06 | 0.6591E-04 | 1.000 | 0.1031F-04 |
| MCARPP*S | 04 0010 | 0.6570E-06 | 0.8700 | 0.2817E-01 | 0.1019 | 0.1588F-05 | 0.1481E-05 | 0.1221F-03 | 1.000 | 0.1925F-04 |
| MCURTP*S | 04 0011 | 0.4204E-06 | 0.5228 | 0.2364 | 0.2408 | 0.8941E-06 | 0.6465E-06 | 0.5631E-04 | 1.000 | 0.8404F-05 |
| MCORDP*S | 04 0012 | 0.3850E-06 | 0.8147 | 0.3257E-01 | 0.1527 | 0.1499E-05 | 0.1353E-05 | 0.8739E-04 | 1.000 | 0.1758F-04 |
| MOTHEP*S | 04 0014 | 0.6591E-06 | 0.7494 | 0.7583E-01 | 0.1748 | 0.1600F-05 | 0.1385E-05 | 0.1144F-03 | 1.000 | 0.1800F-04 |
| MFYCMP*S | 04 0015 | 0.6480E-06 | 0.7595 | 0.1002 | 0.1403 | 0.1410F-05 | 0.1229E-05 | 0.1105F-03 | 1.000 | 0.1597F-04 |
| CCLUTP*S | 04 0016 | 0.7196E-02 | 0.1720 | 0.5045E-01 | 0.7775 | 0.1773E-01 | 0.1441E-01 | 1.200 | 0.9976 | -0.9558F-01 |
| CCARPP*S | 04 0017 | 0.2044E-01 | 0.7158 | 0.1058 | 0.1783 | 0.5322F-01 | 0.4876E-01 | 3.627 | 0.9510 | 0.5853 |
| CCURTP*S | 04 0018 | 0.9596E-02 | 0.2180E-02 | 0.2806E-01 | 0.9698 | 0.2007F-01 | 0.1605E-01 | 1.544 | 0.9892 | 0.1218F-01 |
| CCORDP*S | 04 0019 | 0.5760E-01 | 0.4924E-02 | 0.1256 | 0.8695 | 0.2400 | 0.1279 | 5.557 | 0.9724 | 0.2190 |
| COTHEP*S | 04 0021 | 0.1585E-01 | 0.5294E-02 | 0.3202E-01 | 0.9627 | 0.4303F-01 | 0.3108E-01 | 2.246 | 0.9841 | 0.4070E-01 |
| CFYCMP*S | 04 0022 | 0.7363E-02 | 0.1520E-01 | 0.3449E-02 | 0.9813 | 0.1934F-01 | 0.1308E-01 | 0.8417 | 0.9941 | 0.3100E-01 |
| VCLUTP*S | 04 0023 | 0.1152E-01 | 0.1593 | 0.9298E-02 | 0.8314 | 0.2682E-01 | 0.1966E-01 | 1.669 | 0.9937 | -0.1391 |
| ISPTXI*S | 04 0024 | 0.1227E-01 | 0.7187E-04 | 0.7596E-01 | 0.9240 | 0.2719E-01 | 0.2135E-01 | 1.871 | 0.9843 | 0.2997F-02 |
| MIEXTP*S | 04 0025 | 0.6036E-02 | 0.4296E-01 | 0.1372 | 0.8198 | 0.1363F-01 | 0.5989E-02 | 0.4619 | 0.9969 | 0.3672F-01 |
| MIPIRF*S | 04 0026 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.000 | 0.0 |
| TARIFI*S | 04 0027 | 0.4001E-02 | 0.7305E-02 | 0.6851E-01 | 0.9242 | 0.1329F-02 | 0.1097E-02 | 0.6596 | 0.9902 | -0.1477E-02 |
| ULCTXI*S | 04 0028 | 0.2339E-01 | 0.3580E-02 | 0.1782 | 0.8182 | 0.3654E-01 | 0.3245E-01 | 4.170 | 0.9368 | 0.2842F-01 |
| ULCCLT*S | 04 0029 | 0.1291E-01 | 0.4405 | 0.5887E-01 | 0.5007 | 0.1887F-01 | 0.1517E-01 | 2.169 | 0.9952 | -0.1628 |
| EIEXTL*S | 05 0001 | 0.2219E-01 | 0.1857 | 0.2885E-01 | 0.7855 | 3.205 | 2.659 | 3.642 | 0.2659 | 17.95 |
| WIEXTL*S | 05 0002 | 0.1952E-01 | 0.4954E-01 | 0.3624 | 0.5881 | 17.84 | 13.33 | 2.993 | 0.9944 | 51.62 |
| PROFIT*S | 05 0003 | 0.4249E-01 | 0.1290E-01 | 0.1245 | 0.8626 | 19.64 | 16.22 | 7.013 | 0.9706 | 29.00 |
| IIEXTL*S | 05 0004 | 0.5445E-01 | 0.2410E-02 | 0.1534E-01 | 0.9823 | 12.29 | 10.27 | 10.96 | 0.9211 | 7.845 |
| KIEXTK*S | 05 0005 | 0.7442E-02 | 0.7620 | 0.8074E-01 | 0.1572 | 26.88 | 23.47 | 1.352 | 0.9984 | 305.1 |
| UCCTXT*S | 05 0006 | 0.5329E-06 | 0.7606 | 0.1782 | 0.6122E-01 | 0.2261F-06 | 0.1972E-06 | 0.1024F-03 | 1.000 | 0.2563F-05 |
| UTLZCE*S | 05 0007 | 0.2128E-01 | 0.1790 | 0.1884E-01 | 0.8022 | 0.3075F-01 | 0.2486E-01 | 3.335 | 0.9473 | 0.1691 |
| UTILZE*S | 05 0008 | 0.3154E-01 | 0.1907E-02 | 0.6855E-02 | 0.9912 | 0.4765F-01 | 0.3916E-01 | 5.042 | 0.8208 | 0.2705F-01 |
| WCLOTH*S | 05 0009 | 0.9968E-02 | 0.2848 | 0.1631E-01 | 0.6989 | 12.68 | 9.962 | 1.686 | 0.9965 | -87.96 |
| ELLOTH*S | 05 0010 | 0.8533E-02 | 0.1043E-02 | 0.3728E-02 | 0.9952 | 2.114 | 1.902 | 1.532 | 0.7448 | 0.8873 |
| ICLOTH*S | 05 0011 | 0.6863E-01 | 0.5687E-02 | 0.7624E-01 | 0.9181 | 4.467 | 3.676 | 13.01 | 0.8752 | -4.379 |
| KCLOTK*S | 05 0012 | 0.6486E-02 | 0.5731 | 0.1351 | 0.2918 | 6.558 | 5.299 | 1.074 | 0.9800 | -64.54 |
| UCCCLT*S | 05 0013 | 0.8094E-04 | 0.9888 | 0.5876E-02 | 0.5338E-02 | 0.3257E-04 | 0.3239E-04 | 0.1760F-01 | 1.000 | 0.4210F-03 |
| PUC *S | 05 0014 | 0.9002E-02 | 0.1028 | 0.2607E-01 | 0.8711 | 0.1204 | 0.9126E-01 | 1.353 | 0.9900 | 0.5020 |
| PUT *S | 05 0015 | 0.2390E-01 | 0.4162E-03 | 0.5354E-01 | 0.9460 | 0.3736 | 0.3198 | 4.260 | 0.9653 | -0.9910F-01 |
| PROFTC*S | 05 0016 | 0.1363E-01 | 0.8468E-01 | 0.1105 | 0.8049 | 6.349 | 5.138 | 2.503 | 0.9973 | 24.02 |

Note: BL=Block number; EQN=Equation number; U=Coefficient of inequality; UM=Partial coefficient for unequal central tendency; US=Partial coefficient for unequal variation; UC=Partial coefficient for imperfect covariation; RXMSE=Root mean square error; AVABS=Average absolute error; AVABSP=Average absolute percent error; R=Correlation coefficient; SUMR=Sum of residuals.

## SAMPLE PERIOD DYNAMIC SIMULATIONS: 1964-76

## RESIDUAL ANALYSIS (2SLS)

| TAG | BL-FNN | U | UM | US | UC | RXMSE | AVABS | AVABSP | R | SHHR |
|---|---|---|---|---|---|---|---|---|---|---|
| CNCLTH*S | 01 0001 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.000 | 0.0 |
| CWCLTH*S | 01 0002 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.000 | 0.0 |
| CCLOTH*S | 01 0003 | 0.1519E-01 | 0.3732 | 0.4203 | 0.2065 | 78.43 | 70.15 | 3.165 | 0.9990 | 672.9 |
| CCARPT*S | 01 0004 | 0.3504E-01 | 0.1114E-02 | 0.3525 | 0.6464 | 27.84 | 18.20 | 7.680 | 0.9929 | -9.908 |
| CCURTN*S | 01 0005 | 0.3438E-01 | 0.4192E-04 | 0.4676E-01 | 0.9532 | 3.811 | 2.964 | 6.283 | 0.9877 | -0.3207 |
| CCORDG*S | 01 0006 | 0.1420 | 0.1178 | 0.1348 | 0.7474 | 13.88 | 7.317 | 15.37 | 0.8187 | -61.91 |
| COTHER*S | 01 0008 | 0.3167E-01 | 0.1104E-02 | 0.1905 | 0.8084 | 53.72 | 43.04 | 5.086 | 0.9877 | 23.21 |
| CFYACM*S | 01 0009 | 0.2632E-01 | 0.1091 | 0.2251 | 0.6658 | 109.7 | 94.20 | 4.391 | 0.9861 | 470.6 |
| CIEXTL*S | 01 0012 | 0.2571E-01 | 0.3554E-01 | 0.1612 | 0.8032 | 172.1 | 133.4 | 3.674 | 0.9889 | 421.9 |
| MCLOTH*S | 02 0001 | 0.7996E-01 | 0.6131 | 0.1725 | 0.2144 | 54.11 | 43.80 | 21.95 | 0.9913 | 550.8 |
| MCARPT*S | 02 0002 | 0.3428E-01 | 0.3383 | 0.7357E-02 | 0.6543 | 2.653 | 2.172 | 8.840 | 0.9941 | -20.06 |
| MCURTN*S | 02 0003 | 0.6723E-01 | 0.1349E-01 | 0.1409 | 0.8456 | 0.7121 | 0.5520 | 10.17 | 0.9574 | 1.075 |
| MCORDG*S | 02 0004 | 0.1703 | 0.9851E-02 | 0.1301 | 0.8601 | 8.301 | 5.383 | 26.91 | 0.8591 | 10.71 |
| MOTHER*S | 02 0006 | 0.5124E-01 | 0.1130E-02 | 0.2037 | 0.7951 | 7.696 | 5.863 | 8.446 | 0.9820 | 3.363 |
| MFYACM*S | 02 0007 | 0.3338E-01 | 0.1444E-01 | 0.1447E-01 | 0.9711 | 43.25 | 34.67 | 5.271 | 0.9780 | -67.58 |
| MIEXTL*S | 02 0010 | 0.3574E-01 | 0.9837E-02 | 0.1026E-01 | 0.9799 | 56.22 | 45.02 | 5.546 | 0.9788 | -72.49 |
| SCLOTH*S | 03 0001 | 0.9380E-02 | 0.8024E-01 | 0.3176 | 0.6021 | 36.43 | 27.13 | 1.438 | 0.9988 | -134.1 |
| SCARPT*S | 03 0002 | 0.3964E-01 | 0.4546E-02 | 0.4304 | 0.5651 | 17.90 | 13.89 | 8.230 | 0.9917 | 15.69 |
| SCURTN*S | 03 0003 | 0.3398E-01 | 0.2251E-02 | 0.1166E-01 | 0.9861 | 2.744 | 2.261 | 7.309 | 0.9875 | -1.692 |
| SCORDG*S | 03 0004 | 0.2897 | 0.1605 | 0.5709 | 0.2686 | 12.63 | 7.710 | 42.25 | 0.4165 | -65.74 |
| SOTHER*S | 03 0006 | 0.2982E-01 | 0.1229E-02 | 0.1892 | 0.8095 | 37.61 | 31.12 | 4.867 | 0.9876 | 17.14 |
| SFYACM*S | 03 0007 | 0.3369E-01 | 0.2656 | 0.2934 | 0.4410 | 74.59 | 63.09 | 5.801 | 0.9780 | 499.7 |
| SHRCLI*S | 03 0008 | 0.1652E-01 | 0.6176 | 0.1375 | 0.2448 | 0.2919E-01 | 0.2294E-01 | 2.602 | 0.9288 | -0.2982 |
| SHRCRP*S | 03 0009 | 0.6634E-02 | 0.8651E-01 | 0.3876E-01 | 0.8747 | 0.1140E-01 | 0.1024E-01 | 1.195 | 0.7518 | 0.4357E-01 |
| SHRCRI*S | 03 0010 | 0.1081E-01 | 0.9962E-01 | 0.2187 | 0.6817 | 0.1904E-01 | 0.1421E-01 | 1.653 | 0.7137 | -0.7814E-01 |
| SHRCOR*S | 03 0011 | 0.1320 | 0.5975E-01 | 0.6227E-01 | 0.8980 | 0.1483 | 0.1107 | 27.27 | 0.5080 | -0.3843 |
| SHRUTH*S | 03 0012 | 0.3230E-02 | 0.2441E-01 | 0.5600E-01 | 0.9196 | 0.5850E-02 | 0.4579E-02 | 0.5072 | 0.9463 | -0.1188E-01 |
| SHRFYC*S | 03 0013 | 0.1772E-01 | 0.2648 | 0.1126 | 0.6226 | 0.2281E-01 | 0.1567E-01 | 2.353 | 0.7643 | 0.1526 |
| VCLOTH*S | 03 0014 | 0.8224E-02 | 0.1108 | 0.3022 | 0.5869 | 15.52 | 10.56 | 1.060 | 0.9992 | -67.15 |
| VCARPT*S | 03 0015 | 0.4267E-01 | 0.3540E-02 | 0.3462 | 0.6502 | 7.466 | 5.473 | 8.320 | 0.9888 | 5.775 |
| VCURTN*S | 03 0016 | 0.2814E-01 | 0.2188E-01 | 0.1454E-02 | 0.9767 | 1.104 | 0.9222 | 6.869 | 0.9921 | -2.124 |
| VCORDG*S | 03 0017 | 0.5789E-01 | 0.4322E-01 | 0.2388 | 0.7180 | 1.098 | 0.8324 | 8.781 | 0.9169 | -2.968 |
| VOTHER*S | 03 0019 | 0.2716E-01 | 0.4130E-02 | 0.9446E-01 | 0.9014 | 15.46 | 11.98 | 4.204 | 0.9908 | -12.91 |
| VFYACM*S | 03 0020 | 0.3601E-01 | 0.1682 | 0.1397 | 0.6921 | 36.56 | 31.26 | 6.061 | 0.9631 | 194.9 |
| VIEXTL*S | 03 0021 | 0.2739E-01 | 0.8071E-01 | 0.9403E-01 | 0.8253 | 49.47 | 40.84 | 4.359 | 0.9859 | 182.7 |
| AINDEX*S | 03 0022 | 0.1671E-01 | 0.2343E-01 | 0.1866 | 0.7900 | 0.3680E-01 | 0.2842E-01 | 2.447 | 0.9955 | 0.7323E-01 |
| VKNIFB*S | 03 0023 | 0.7474E-01 | 0.1071 | 0.3589E-01 | 0.6570 | 10.59 | 7.763 | 11.69 | 0.9387 | 45.05 |
| AINDXK*S | 03 0026 | 0.2466E-01 | 0.1383 | 0.2161E-01 | 0.8401 | 0.4745E-01 | 0.3835E-01 | 3.806 | 0.9666 | 0.2294 |
| SIEXTL*S | 03 0027 | 0.2601E-01 | 0.1165 | 0.2514 | 0.6321 | 104.8 | 87.54 | 4.284 | 0.9894 | 465.1 |
| SHRIXT*S | 03 0028 | 0.9622E-02 | 0.2153 | 0.2797 | 0.5050 | 0.1399E-01 | 0.1020E-01 | 1.379 | 0.7484 | 0.8440E-01 |
| RAWCLI*S | 03 0029 | 0.1052E-01 | 0.4926E-01 | 0.2472 | 0.7035 | 23.22 | 17.60 | 1.708 | 0.9982 | -66.99 |
| RAWCRP*S | 03 0030 | 0.3732E-01 | 0.4764E-02 | 0.4469 | 0.5483 | 11.05 | 8.704 | 7.939 | 0.9929 | 9.914 |
| RAWCRI*S | 03 0031 | 0.3498E-01 | 0.3694E-03 | 0.3434E-01 | 0.9653 | 1.726 | 1.396 | 6.031 | 0.9840 | 0.4313 |
| RAWCOR*S | 03 0032 | 0.3600 | 0.1684 | 0.2577 | 0.5738 | 11.78 | 7.138 | 67.11 | 0.1278 | -62.82 |
| RAWOTH*S | 03 0033 | 0.3200E-01 | 0.9979E-02 | 0.2165 | 0.7735 | 23.14 | 19.54 | 5.304 | 0.9833 | 30.05 |
| RAWFYC*S | 03 0034 | 0.3040E-01 | 0.3002 | 0.3052 | 0.3945 | 42.79 | 35.93 | 5.380 | 0.9806 | 304.8 |
| VTEXTP*S | 04 0001 | 0.1805E-01 | 0.3252E-02 | 0.2094 | 0.7874 | 0.5131E-01 | 0.3478E-01 | 2.401 | 0.9656 | 0.3804E-01 |
| ISPCLI*S | 04 0002 | 0.1560E-01 | 0.5608 | 0.4894E-01 | 0.3902 | 0.3350E-01 | 0.3050E-01 | 3.071 | 0.9957 | -0.3261 |
| ISPCRP*S | 04 0003 | 0.3257E-01 | 0.8576 | 0.7010E-01 | 0.7226E-01 | 0.6686E-01 | 0.6192E-01 | 5.774 | 0.9270 | 0.8049 |
| ISPCRI*S | 04 0004 | 0.1460E-01 | 0.2157E-01 | 0.9009E-01 | 0.8883 | 0.2499E-01 | 0.2103E-01 | 2.552 | 0.9720 | -0.4771E-01 |

| TAG | UL-EQN | U | UM | US | UC | RXMSE | AVAUS | AVABSP | R | SUMR |
|---|---|---|---|---|---|---|---|---|---|---|
| ISPCOR*S | 04 0005 | 0.4482E-01 | 0.1857E-02 | 0.3488E-02 | 0.9947 | 0.1503 | 0.1046 | 6.915 | 0.9811 | 0.8422E-01 |
| ISPOTH*S | 04 0007 | 0.1861E-01 | 0.3215E-02 | 0.9917E-02 | 0.9869 | 0.4174E-01 | 0.2995E-01 | 2.614 | 0.9727 | 0.3076E-01 |
| ISPFYC*S | 04 0008 | 0.1253E-01 | 0.5533E-01 | 0.4342E-03 | 0.9442 | 0.2811E-01 | 0.1888E-01 | 1.588 | 0.9842 | 0.8596E-01 |
| MCLUTP*S | 04 0009 | 0.5015E-06 | 0.5161 | 0.2728 | 0.2111 | 0.1104E-05 | 0.7932E-06 | 0.6591E-04 | 1.000 | 0.1031E-04 |
| MCARPP*S | 04 0010 | 0.6570E-06 | 0.8700 | 0.2817E-01 | 0.1019 | 0.1588E-05 | 0.1481E-05 | 0.1221E-03 | 1.000 | 0.1925E-04 |
| MCURTP*S | 04 0011 | 0.4204E-06 | 0.5228 | 0.2364 | 0.2408 | 0.8941E-06 | 0.6465E-06 | 0.5631E-04 | 1.000 | 0.8404E-05 |
| MCORDP*S | 04 0012 | 0.3850E-06 | 0.8147 | 0.3257E-01 | 0.1527 | 0.1499E-05 | 0.1353E-05 | 0.8739E-04 | 1.000 | 0.1758E-04 |
| MOTHEP*S | 04 0014 | 0.6591E-06 | 0.7494 | 0.7583E-01 | 0.1748 | 0.1600E-05 | 0.1365E-05 | 0.1144E-03 | 1.000 | 0.1600E-04 |
| MFYCMP*S | 04 0015 | 0.6480E-06 | 0.7595 | 0.1002 | 0.1403 | 0.1410E-05 | 0.1229E-05 | 0.1105E-03 | 1.000 | 0.1597E-04 |
| CCLUTP*S | 04 0016 | 0.1146E-01 | 0.5210 | 0.3608E-01 | 0.4429 | 0.2837E-01 | 0.2615E-01 | 2.229 | 0.9965 | -0.2662 |
| CCARPP*S | 04 0017 | 0.2529E-01 | 0.8488 | 0.5209E-01 | 0.9908E-01 | 0.6546E-01 | 0.6031E-01 | 4.497 | 0.9603 | 0.7840 |
| CCURTP*S | 04 0018 | 0.1006E-01 | 0.2453E-02 | 0.2013E-01 | 0.9774 | 0.2107E-01 | 0.1672E-01 | 1.611 | 0.9880 | -0.1356E-01 |
| CCORDP*S | 04 0019 | 0.6049E-01 | 0.1018E-01 | 0.1281 | 0.8617 | 0.2515 | 0.1293 | 5.507 | 0.9698 | 0.3299 |
| COTHEP*S | 04 0021 | 0.1569E-01 | 0.3420E-02 | 0.1563E-01 | 0.9810 | 0.4260E-01 | 0.3113E-01 | 2.235 | 0.9842 | 0.3239E-01 |
| CFYCMP*S | 04 0022 | 0.7363E-02 | 0.2804E-01 | 0.5784E-03 | 0.9714 | 0.1933E-01 | 0.1253E-01 | 0.9011 | 0.9942 | 0.4208E-01 |
| VCLUTP*S | 04 0023 | 0.1616E-01 | 0.4446 | 0.8825E-02 | 0.5466 | 0.3783E-01 | 0.3132E-01 | 2.751 | 0.9917 | -0.3279 |
| ISPIXI*S | 04 0024 | 0.1243E-01 | 0.1028E-01 | 0.9124E-01 | 0.8985 | 0.2750E-01 | 0.2137E-01 | 1.870 | 0.9845 | 0.3626E-01 |
| MIEXTP*S | 04 0025 | 0.6175E-02 | 0.3955E-01 | 0.1326 | 0.8279 | 0.1394E-01 | 0.5962E-02 | 0.4588 | 0.9968 | 0.3604E-01 |
| MIPIRF*S | 04 0026 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.000 | 0.0 |
| TARIFI*S | 04 0027 | 0.4102E-02 | 0.1492E-01 | 0.5632E-01 | 0.9288 | 0.1363E-02 | 0.1100E-02 | 0.6595 | 0.9896 | -0.2165E-02 |
| ULCIXI*S | 04 0028 | 0.2220E-01 | 0.2380E-01 | 0.1375 | 0.8387 | 0.3462E-01 | 0.3032E-01 | 3.896 | 0.9436 | 0.6944E-01 |
| ULCCLI*S | 04 0029 | 0.2227E-01 | 0.7009 | 0.2536E-01 | 0.2737 | 0.3286E-01 | 0.2916E-01 | 4.255 | 0.9920 | -0.3577 |
| EIEXTL*S | 05 0001 | 0.2128E-01 | 0.2574 | 0.3519E-01 | 0.7075 | 3.070 | 2.540 | 3.469 | 0.3841 | 20.25 |
| WIEXTL*S | 05 0002 | 0.1975E-01 | 0.1520 | 0.2994 | 0.5486 | 17.99 | 14.04 | 3.234 | 0.9947 | 91.17 |
| PROFIT*S | 05 0003 | 0.4281E-01 | 0.2770E-01 | 0.1481 | 0.8242 | 19.74 | 16.28 | 7.014 | 0.9714 | 42.71 |
| ITEXTL*S | 05 0004 | 0.5481E-01 | 0.2602E-02 | 0.1290E-01 | 0.9845 | 12.37 | 10.29 | 11.01 | 0.9202 | 8.205 |
| KIEXTK*S | 05 0005 | 0.7566E-02 | 0.7761 | 0.7076E-01 | 0.1531 | 27.33 | 24.07 | 1.384 | 0.9984 | 313.0 |
| UCCIXI*S | 05 0006 | 0.5329E-06 | 0.7606 | 0.1782 | 0.6122E-01 | 0.2261E-06 | 0.1972E-06 | 0.1024E-03 | 1.000 | 0.2563E-05 |
| UILZCE*S | 05 0007 | 0.3007E-01 | 0.3239 | 0.5401E-01 | 0.6221 | 0.4313E-01 | 0.3658E-01 | 4.952 | 0.9246 | 0.3191 |
| UITLZE*S | 05 0008 | 0.3080E-01 | 0.6406E-02 | 0.4507E-02 | 0.9891 | 0.4648E-01 | 0.3908E-01 | 5.039 | 0.8281 | 0.4036E-01 |
| WCLUTH*S | 05 0009 | 0.1446E-01 | 0.3159 | 0.1155 | 0.5685 | 18.46 | 13.25 | 2.095 | 0.9976 | -134.9 |
| ECLUTH*S | 05 0010 | 0.1434E-01 | 0.2447 | 0.1189 | 0.6364 | 3.529 | 3.178 | 2.559 | 0.6656 | 22.70 |
| ICLUTH*S | 05 0011 | 0.6952E-01 | 0.7620E-02 | 0.5003E-01 | 0.9424 | 4.533 | 3.746 | 13.08 | 0.3717 | -5.144 |
| KCLUTK*S | 05 0012 | 0.6166E-02 | 0.5431 | 0.1407 | 0.3163 | 6.232 | 5.042 | 1.022 | 0.9905 | -59.71 |
| UCCCLI*S | 05 0013 | 0.8094E-04 | 0.9888 | 0.5876E-02 | 0.5338E-02 | 0.3257E-04 | 0.3239E-04 | 0.1760E-01 | 1.000 | 0.4210E-03 |
| PDC *S | 05 0014 | 0.1003E-01 | 0.1820 | 0.3466E-01 | 0.7833 | 0.1340 | 0.9951E-01 | 1.479 | 0.9890 | 0.7430 |
| PDT *S | 05 0015 | 0.2394E-01 | 0.5189E-03 | 0.4642E-01 | 0.9531 | 0.3743 | 0.3227 | 4.291 | 0.9651 | -0.1108 |
| PROFTC*S | 05 0016 | 0.1858E-01 | 0.3403 | 0.1457 | 0.5140 | 8.604 | 6.987 | 3.471 | 0.9969 | 65.25 |

## CONSTANT ADJUSTMENTS FOR REFERENCE FORECAST

| | CCLOTH | CCARPT | COTHER | CCORDG | CFYACM | MCLOTH | ICLOTH |
|---|---|---|---|---|---|---|---|
| 1977 | -5 | 10 | -100 | -40 | -100 | -15 | -20 |
| 1978 | 15 | 20 | -100 | -40 | -100 | 0 | -20 |
| 1979 | 5 | 30 | -100 | -45 | -100 | 0 | -10 |
| 1980 | 0 | 35 | -100 | -50 | -100 | 0 | 0 |
| 1981 | 0 | 35 | -100 | -55 | -100 | 0 | 0 |
| 1982 | 0 | 35 | -100 | -60 | -100 | 0 | 0 |
| 1983 | 0 | 35 | -100 | -65 | -100 | 0 | 0 |
| 1984 | 0 | 35 | -100 | -70 | -100 | 0 | 0 |
| 1985 | 0 | 35 | -100 | -75 | -100 | 0 | 0 |
| 1986 | 0 | 35 | -100 | -80 | -100 | 0 | 0 |
| 1987 | 0 | 35 | -100 | -85 | -100 | 0 | 0 |
| 1988 | 0 | 35 | -100 | -90 | -100 | 0 | 0 |
| 1989 | 0 | 35 | -100 | -95 | -100 | 0 | 0 |
| 1990 | 0 | 35 | -100 | -100 | -100 | 0 | 0 |

| | ECLOTH | ETEXTL | VCLOTP | VTEXTP | ISPCLT | ISPFYC | ITEXTL |
|---|---|---|---|---|---|---|---|
| 1977 | 0 | -1 | 0.03 | 0.1 | -0.02 | 0 | -50 |
| 1978 | -5 | 0 | 0.1 | 0.1 | 0.04 | -0.06 | -100 |
| 1979 | -6 | 0 | 0.08 | 0.1 | 0.05 | -0.07 | -70 |
| 1980 | 0 | 0 | 0.05 | 0.1 | 0.02 | 0 | -30 |
| 1981 | 0 | 0 | 0.02 | 0.1 | 0 | 0 | 0 |
| 1982 | 0 | 0 | 0 | 0.1 | 0 | 0 | 0 |
| 1983 | 0 | 0 | 0 | 0.1 | 0 | 0 | 0 |
| 1984 | 0 | 0 | 0 | 0.1 | 0 | 0 | 0 |
| 1985 | 0 | 0 | 0 | 0.1 | 0 | 0 | 0 |
| 1986 | 0 | 0 | 0 | 0.1 | 0 | 0 | 0 |
| 1987 | 0 | 0 | 0 | 0.1 | 0 | 0 | 0 |
| 1988 | 0 | 0 | 0 | 0.1 | 0 | 0 | 0 |
| 1989 | 0 | 0 | 0 | 0.1 | 0 | 0 | 0 |
| 1990 | 0 | 0 | 0 | 0.1 | 0 | 0 | 0 |

# REFERENCE FORECAST: 1977-90

| | LCLOTH | LCARPT | LCURTN | LCURUG | LOTHER | LFYALM | CTLXTL | HCLOTH | HCARPT | HCURTN | HCURUG |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1977 | 4525. | 599.6 | 101.84 | 55.97 | 1472. | 3043. | 5272. | 680.5 | 78.81 | 9.866 | 26.55 |
| 1978 | 5050. | 612.9 | 104.90 | 69.16 | 1596. | 3488. | 5872. | 735.2 | 89.25 | 11.479 | 31.42 |
| 1979 | 5619. | 636.1 | 110.71 | 78.72 | 1789. | 4076. | 6691. | 800.3 | 100.38 | 13.658 | 35.97 |
| 1980 | 6200. | 652.7 | 116.65 | 88.81 | 1995. | 4621. | 7473. | 905.2 | 106.90 | 15.243 | 39.28 |
| 1981 | 6625. | 691.8 | 126.02 | 98.28 | 2206. | 5094. | 8216. | 1064.8 | 115.25 | 17.037 | 41.91 |
| 1982 | 7492. | 763.5 | 140.19 | 109.17 | 2434. | 5510. | 8957. | 1240.8 | 127.52 | 19.279 | 44.53 |
| 1983 | 8137. | 830.5 | 153.41 | 120.57 | 2658. | 5893. | 9645. | 1408.2 | 141.98 | 21.237 | 47.36 |
| 1984 | 8796. | 895.2 | 165.85 | 133.11 | 2873. | 6320. | 10387. | 1572.1 | 157.09 | 23.154 | 50.33 |
| 1985 | 9424. | 950.3 | 176.71 | 144.70 | 3077. | 6681. | 11030. | 1719.1 | 170.74 | 24.801 | 52.90 |
| 1986 | 10040. | 1002.7 | 187.03 | 156.82 | 3272. | 7132. | 11750. | 1874.9 | 184.52 | 26.485 | 55.51 |
| 1987 | 10697. | 1072.3 | 200.43 | 174.20 | 3494. | 7708. | 12649. | 2021.7 | 201.59 | 28.722 | 59.15 |
| 1988 | 11370. | 1144.5 | 214.60 | 192.67 | 3728. | 8241. | 13520. | 2152.8 | 219.70 | 30.990 | 62.73 |
| 1989 | 12090. | 1212.8 | 228.71 | 212.90 | 3980. | 8734. | 14368. | 2308.7 | 238.38 | 33.324 | 66.49 |
| 1990 | 12869. | 1292.4 | 245.14 | 236.14 | 4255. | 9274. | 15303. | 2484.4 | 259.05 | 36.055 | 70.57 |

| | MOTHER | MFYALM | MTLXTL | SCLOTH | SCARPT | SCURTN | SCURUG | SOTHER | SFYALM | STLXTL | SHRCLT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1977 | 123.4 | 986.2 | 1225. | 3270. | 402.9 | 73.44 | 22.78 | 1087.1 | 1559. | 3145. | 0.828 |
| 1978 | 148.4 | 1168.8 | 1449. | 3776. | 410.9 | 75.26 | 29.74 | 1180.8 | 1750. | 3447. | 0.837 |
| 1979 | 179.9 | 1380.0 | 1710. | 4164. | 422.5 | 76.80 | 35.38 | 1326.7 | 2119. | 3982. | 0.839 |
| 1980 | 205.2 | 1535.7 | 1902. | 4537. | 427.0 | 81.98 | 41.24 | 1472.8 | 2436. | 4459. | 0.834 |
| 1981 | 236.9 | 1699.9 | 2111. | 4892. | 450.1 | 87.88 | 47.23 | 1618.4 | 2676. | 4880. | 0.821 |
| 1982 | 268.0 | 1858.4 | 2314. | 5263. | 496.3 | 97.36 | 54.55 | 1777.9 | 2872. | 5298. | 0.809 |
| 1983 | 297.1 | 1962.3 | 2470. | 5624. | 535.7 | 106.36 | 62.10 | 1935.9 | 3092. | 5732. | 0.800 |
| 1984 | 325.3 | 2069.4 | 2625. | 6005. | 572.3 | 114.75 | 70.57 | 2088.0 | 3368. | 6215. | 0.793 |
| 1985 | 350.8 | 2151.0 | 2750. | 6382. | 602.5 | 122.10 | 78.57 | 2233.6 | 3603. | 6639. | 0.788 |
| 1986 | 377.3 | 2247.0 | 2891. | 6734. | 630.4 | 128.95 | 87.00 | 2370.0 | 3904. | 7120. | 0.782 |
| 1987 | 411.3 | 2383.5 | 3084. | 7139. | 668.6 | 137.77 | 94.23 | 2520.4 | 4272. | 7698. | 0.779 |
| 1988 | 444.6 | 2507.3 | 3265. | 7582. | 707.8 | 147.22 | 112.51 | 2682.5 | 4615. | 8265. | 0.779 |
| 1989 | 482.5 | 2659.9 | 3481. | 8035. | 743.0 | 156.54 | 127.21 | 2854.2 | 4889. | 8770. | 0.777 |
| 1990 | 526.2 | 2837.2 | 3729. | 8510. | 785.5 | 167.37 | 144.36 | 3039.8 | 5176. | 9315. | 0.774 |

| | SHRCRP | SHRCRT | SHRCUR | SHROTH | SHRFYC | SHRTXT | RAWCLT | RAWCRP | RAWCRT | RAWCUR | RAWOTH |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1977 | 0.836 | 0.882 | 0.462 | 0.898 | 0.612 | 0.720 | 1647. | 267.5 | 43.19 | 16.351 | 599.9 |
| 1978 | 0.822 | 0.868 | 0.486 | 0.888 | 0.600 | 0.704 | 2124. | 274.3 | 44.36 | 22.510 | 648.4 |
| 1979 | 0.808 | 0.852 | 0.496 | 0.881 | 0.606 | 0.700 | 2335. | 283.5 | 46.44 | 27.513 | 723.7 |
| 1980 | 0.800 | 0.843 | 0.512 | 0.878 | 0.613 | 0.701 | 2538. | 287.8 | 48.35 | 32.714 | 799.2 |
| 1981 | 0.796 | 0.838 | 0.530 | 0.872 | 0.612 | 0.698 | 2732. | 304.1 | 51.70 | 38.028 | 874.4 |
| 1982 | 0.796 | 0.835 | 0.551 | 0.869 | 0.607 | 0.696 | 2934. | 335.0 | 56.96 | 44.509 | 956.7 |
| 1983 | 0.790 | 0.834 | 0.567 | 0.867 | 0.612 | 0.699 | 3131. | 361.8 | 61.98 | 51.195 | 1038.3 |
| 1984 | 0.785 | 0.832 | 0.584 | 0.865 | 0.619 | 0.703 | 3338. | 386.0 | 66.70 | 58.684 | 1116.9 |
| 1985 | 0.779 | 0.831 | 0.598 | 0.864 | 0.626 | 0.707 | 3544. | 406.3 | 70.90 | 65.766 | 1192.2 |
| 1986 | 0.774 | 0.830 | 0.610 | 0.863 | 0.635 | 0.711 | 3736. | 425.2 | 74.85 | 73.232 | 1262.7 |
| 1987 | 0.768 | 0.827 | 0.627 | 0.860 | 0.642 | 0.714 | 3957. | 450.6 | 79.86 | 84.027 | 1340.6 |
| 1988 | 0.763 | 0.826 | 0.642 | 0.858 | 0.648 | 0.717 | 4197. | 476.7 | 85.23 | 95.737 | 1424.3 |
| 1989 | 0.757 | 0.824 | 0.657 | 0.855 | 0.648 | 0.716 | 4442. | 500.4 | 90.56 | 108.705 | 1513.1 |
| 1990 | 0.752 | 0.823 | 0.672 | 0.852 | 0.646 | 0.714 | 4701. | 528.6 | 96.71 | 123.914 | 1609.9 |

| | RAWFYC | VCLOTH | VCARPT | VCURIN | VCURDG | VOTHER | VFYALM | VKNTER | VTEXTI | AINDEX | CCLOTK |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1977 | 1015.5 | 1606. | 157.7 | 36.06 | 8.675 | 507.6 | 719.3 | 119.4 | 1429. | 1.824 | 2363. |
| 1978 | 1135.9 | 1854. | 161.7 | 37.11 | 9.545 | 553.6 | 800.6 | 139.1 | 1563. | 2.036 | 2467. |
| 1979 | 1361.7 | 2042. | 167.1 | 38.99 | 10.252 | 625.1 | 953.2 | 176.1 | 1795. | 2.290 | 2493. |
| 1980 | 1556.1 | 2224. | 169.7 | 40.71 | 10.986 | 696.7 | 1084.5 | 207.9 | 2003. | 2.527 | 2634. |
| 1981 | 1704.6 | 2397. | 179.2 | 43.72 | 11.737 | 768.0 | 1184.8 | 232.2 | 2187. | 2.747 | 2772. |
| 1982 | 1826.2 | 2577. | 197.4 | 48.45 | 12.652 | 846.1 | 1267.0 | 252.1 | 2372. | 2.975 | 2881. |
| 1983 | 1961.7 | 2753. | 213.1 | 52.97 | 13.596 | 923.5 | 1358.5 | 274.3 | 2562. | 3.204 | 2931. |
| 1984 | 2130.1 | 2939. | 227.4 | 57.22 | 14.654 | 998.0 | 1472.3 | 301.9 | 2770. | 3.447 | 3005. |
| 1985 | 2274.1 | 3122. | 239.3 | 60.99 | 15.654 | 1069.4 | 1569.6 | 325.4 | 2955. | 3.673 | 3075. |
| 1986 | 2457.1 | 3295. | 250.4 | 64.55 | 16.708 | 1136.4 | 1693.2 | 355.4 | 3161. | 3.904 | 3152. |
| 1987 | 2680.4 | 3491. | 265.3 | 69.06 | 18.233 | 1210.2 | 1844.1 | 391.9 | 3407. | 4.179 | 3217. |
| 1988 | 2868.1 | 3707. | 280.6 | 73.89 | 19.886 | 1289.6 | 1984.3 | 425.9 | 3608. | 4.452 | 3263. |
| 1989 | 3054.2 | 3925. | 294.5 | 78.68 | 21.718 | 1373.9 | 2096.6 | 453.1 | 3865. | 4.719 | 3315. |
| 1990 | 3228.1 | 4157. | 311.1 | 84.21 | 23.851 | 1464.8 | 2214.0 | 481.6 | 4098. | 5.005 | 3370. |

| | LCARPK | LCURIK | LCURDK | LOTHEK | LFYCMK | LTEXIK | MCLOTK | MCARPK | MCURIK | MCURDK | MOTHEK |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1977 | 378.2 | 71.49 | 16.19 | 750.5 | 1696. | 2913. | 396.3 | 53.53 | 5.710 | 10.03 | 71.84 |
| 1978 | 374.2 | 71.14 | 17.46 | 761.5 | 1808. | 3032. | 384.7 | 54.53 | 5.977 | 10.67 | 77.72 |
| 1979 | 371.8 | 71.83 | 17.68 | 786.9 | 1931. | 3179. | 378.2 | 55.78 | 6.491 | 11.15 | 86.00 |
| 1980 | 367.6 | 72.63 | 17.72 | 807.7 | 2005. | 3271. | 405.9 | 57.04 | 6.956 | 11.70 | 94.19 |
| 1981 | 381.0 | 75.93 | 18.11 | 848.5 | 2097. | 3421. | 455.9 | 59.34 | 7.502 | 12.04 | 104.89 |
| 1982 | 413.3 | 81.37 | 18.64 | 891.4 | 2160. | 3565. | 506.6 | 63.67 | 8.233 | 12.41 | 115.07 |
| 1983 | 439.7 | 85.97 | 19.12 | 928.3 | 2201. | 3674. | 549.0 | 68.17 | 8.721 | 12.69 | 122.69 |
| 1984 | 463.4 | 89.97 | 19.67 | 960.1 | 2262. | 3796. | 587.8 | 72.53 | 9.144 | 12.97 | 129.19 |
| 1985 | 482.7 | 93.34 | 20.18 | 991.4 | 2306. | 3894. | 625.5 | 76.41 | 9.493 | 13.21 | 135.05 |
| 1986 | 500.4 | 96.34 | 20.65 | 1016.9 | 2373. | 4007. | 661.7 | 79.96 | 9.927 | 13.44 | 140.77 |
| 1987 | 523.7 | 99.88 | 21.34 | 1037.7 | 2448. | 4131. | 684.8 | 83.93 | 10.227 | 13.74 | 147.29 |
| 1988 | 547.4 | 103.49 | 22.01 | 1059.2 | 2501. | 4233. | 699.1 | 88.12 | 10.631 | 14.04 | 153.37 |
| 1989 | 567.1 | 106.52 | 22.68 | 1080.6 | 2533. | 4310. | 720.3 | 92.11 | 11.013 | 14.34 | 160.37 |
| 1990 | 590.8 | 110.12 | 23.45 | 1103.4 | 2566. | 4394. | 744.6 | 96.43 | 11.479 | 14.66 | 168.48 |

| | HFYCMK | HTEXIK | SCLOTK | SCARPK | SCURIK | SCURDK | SOTHEK | SFYCMK | STEXIK | VCLOTK | VTEXIK |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1977 | 673.6 | 814.5 | 1967. | 324.9 | 65.78 | 6.166 | 678.6 | 1023. | 2098. | 915.5 | 752.5 |
| 1978 | 706.0 | 854.7 | 2082. | 319.8 | 65.16 | 6.790 | 683.9 | 1102. | 2170. | 1017.3 | 801.1 |
| 1979 | 746.4 | 905.8 | 2115. | 316.0 | 65.34 | 6.527 | 701.0 | 1184. | 2273. | 1091.9 | 870.9 |
| 1980 | 773.4 | 943.3 | 2220. | 310.5 | 65.67 | 6.019 | 713.5 | 1232. | 2320. | 1132.3 | 954.5 |
| 1981 | 813.5 | 997.3 | 2316. | 321.7 | 68.43 | 6.069 | 743.6 | 1284. | 2423. | 1168.9 | 1003.2 |
| 1982 | 851.7 | 1051.1 | 2375. | 349.6 | 73.14 | 6.239 | 776.4 | 1308. | 2514. | 1193.0 | 1056.5 |
| 1983 | 856.8 | 1069.0 | 2382. | 371.6 | 77.25 | 6.433 | 805.6 | 1344. | 2605. | 1196.3 | 1112.7 |
| 1984 | 861.3 | 1085.1 | 2417. | 390.9 | 80.83 | 6.706 | 830.9 | 1401. | 2710. | 1216.9 | 1172.6 |
| 1985 | 862.6 | 1096.8 | 2450. | 406.3 | 83.85 | 6.973 | 856.4 | 1444. | 2797. | 1251.1 | 1222.3 |
| 1986 | 865.8 | 1109.8 | 2490. | 420.4 | 86.52 | 7.212 | 876.0 | 1507. | 2897. | 1254.5 | 1283.0 |
| 1987 | 871.0 | 1126.2 | 2532. | 439.8 | 89.65 | 7.596 | 890.4 | 1570. | 3005. | 1282.3 | 1336.0 |
| 1988 | 870.5 | 1136.6 | 2560. | 459.3 | 92.86 | 7.965 | 905.8 | 1631. | 3097. | 1302.6 | 1419.3 |
| 1989 | 878.8 | 1156.7 | 2595. | 475.0 | 95.51 | 8.345 | 920.2 | 1654. | 3155. | 1320.6 | 1467.8 |
| 1990 | 892.0 | 1183.0 | 2625. | 494.4 | 98.64 | 8.786 | 935.0 | 1675. | 3211. | 1339.7 | 1520.1 |

| | SHRCLK | SHRCPK | SHRCIK | SHRCUK | SHROIK | SHRFYK | ISPCLT | ISPCRP | ISPCOR | ISPOTH | ISPFYC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1977 | 0.852 | 0.859 | 0.920 | 0.381 | 0.904 | 0.603 | 1.657 | 1.223 | 3.522 | 1.599 | 1.527 |
| 1978 | 0.844 | 0.855 | 0.916 | 0.369 | 0.898 | 0.610 | 1.805 | 1.253 | 4.106 | 1.721 | 1.582 |
| 1979 | 0.848 | 0.850 | 0.910 | 0.369 | 0.891 | 0.613 | 1.955 | 1.289 | 4.880 | 1.866 | 1.784 |
| 1980 | 0.846 | 0.845 | 0.904 | 0.340 | 0.883 | 0.614 | 2.017 | 1.319 | 5.703 | 2.061 | 1.977 |
| 1981 | 0.836 | 0.844 | 0.901 | 0.335 | 0.876 | 0.612 | 2.088 | 1.335 | 6.232 | 2.174 | 2.085 |
| 1982 | 0.824 | 0.846 | 0.899 | 0.335 | 0.871 | 0.606 | 2.189 | 1.349 | 6.756 | 2.269 | 2.196 |
| 1983 | 0.813 | 0.845 | 0.899 | 0.336 | 0.868 | 0.611 | 2.337 | 1.360 | 7.281 | 2.403 | 2.301 |
| 1984 | 0.804 | 0.843 | 0.898 | 0.341 | 0.865 | 0.619 | 2.461 | 1.369 | 7.799 | 2.513 | 2.408 |
| 1985 | 0.797 | 0.842 | 0.898 | 0.345 | 0.864 | 0.626 | 2.588 | 1.375 | 8.244 | 2.608 | 2.495 |
| 1986 | 0.790 | 0.840 | 0.898 | 0.349 | 0.862 | 0.635 | 2.689 | 1.378 | 8.712 | 2.706 | 2.590 |
| 1987 | 0.787 | 0.840 | 0.898 | 0.356 | 0.858 | 0.644 | 2.803 | 1.379 | 9.327 | 2.851 | 2.706 |
| 1988 | 0.786 | 0.839 | 0.897 | 0.362 | 0.855 | 0.652 | 2.940 | 1.381 | 9.960 | 2.963 | 2.827 |
| 1989 | 0.783 | 0.838 | 0.897 | 0.368 | 0.852 | 0.653 | 3.083 | 1.383 | 10.629 | 3.104 | 2.951 |
| 1990 | 0.779 | 0.837 | 0.896 | 0.375 | 0.847 | 0.652 | 3.231 | 1.385 | 11.347 | 3.254 | 3.088 |

| | ISPTXT | MCLOIP | MCARPP | HCURTP | HCURDP | HOTHEP | HFYCMP | HTEXTP | LCLOIP | CCARPP | LCURTP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1977 | 1.517 | 1.717 | 1.478 | 1.728 | 2.648 | 1.718 | 1.464 | 1.519 | 1.915 | 1.586 | 1.425 |
| 1978 | 1.602 | 1.911 | 1.643 | 1.921 | 2.944 | 1.910 | 1.656 | 1.711 | 2.047 | 1.659 | 1.475 |
| 1979 | 1.780 | 2.116 | 1.800 | 2.104 | 3.225 | 2.092 | 1.849 | 1.903 | 2.254 | 1.711 | 1.541 |
| 1980 | 1.901 | 2.230 | 1.874 | 2.191 | 3.358 | 2.179 | 1.985 | 2.030 | 2.354 | 1.776 | 1.606 |
| 1981 | 2.069 | 2.336 | 1.942 | 2.271 | 3.461 | 2.258 | 2.040 | 2.150 | 2.462 | 1.816 | 1.660 |
| 1982 | 2.177 | 2.449 | 2.003 | 2.342 | 3.589 | 2.329 | 2.182 | 2.217 | 2.600 | 1.847 | 1.723 |
| 1983 | 2.282 | 2.565 | 2.085 | 2.435 | 3.732 | 2.422 | 2.290 | 2.323 | 2.776 | 1.889 | 1.784 |
| 1984 | 2.386 | 2.675 | 2.166 | 2.532 | 3.881 | 2.518 | 2.403 | 2.432 | 2.927 | 1.932 | 1.843 |
| 1985 | 2.479 | 2.748 | 2.234 | 2.613 | 4.004 | 2.598 | 2.494 | 2.521 | 3.064 | 1.969 | 1.893 |
| 1986 | 2.574 | 2.833 | 2.305 | 2.695 | 4.131 | 2.680 | 2.595 | 2.618 | 3.186 | 2.004 | 1.941 |
| 1987 | 2.694 | 2.952 | 2.402 | 2.808 | 4.304 | 2.793 | 2.737 | 2.753 | 3.325 | 2.048 | 2.007 |
| 1988 | 2.819 | 3.079 | 2.493 | 2.915 | 4.468 | 2.899 | 2.880 | 2.888 | 3.483 | 2.091 | 2.074 |
| 1989 | 2.953 | 3.205 | 2.589 | 3.026 | 4.638 | 3.009 | 3.027 | 3.025 | 3.647 | 2.139 | 2.147 |
| 1990 | 3.036 | 3.336 | 2.686 | 3.141 | 4.814 | 3.123 | 3.181 | 3.169 | 3.819 | 2.168 | 2.226 |

| | CCURDP | COTHEP | CFYCMP | VCLOIP | VTEXIP | TARIFF | ULCCLT | ULCTXT | ECLOTH | ETEXTI | WCLOTH |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1977 | 3.457 | 1.962 | 1.794 | 1.755 | 1.900 | 0.179 | 1.101 | 1.029 | 121.1 | 65.09 | 1083. |
| 1978 | 3.961 | 2.096 | 1.929 | 1.822 | 1.951 | 0.178 | 1.081 | 1.041 | 122.3 | 65.53 | 1182. |
| 1979 | 4.453 | 2.273 | 2.111 | 1.871 | 2.061 | 0.178 | 1.108 | 1.062 | 125.4 | 67.17 | 1314. |
| 1980 | 5.013 | 2.468 | 2.305 | 1.964 | 2.143 | 0.178 | 1.180 | 1.098 | 126.7 | 68.30 | 1461. |
| 1981 | 5.426 | 2.600 | 2.429 | 2.051 | 2.180 | 0.178 | 1.236 | 1.124 | 127.2 | 69.73 | 1584. |
| 1982 | 5.856 | 2.730 | 2.551 | 2.160 | 2.245 | 0.178 | 1.314 | 1.158 | 127.0 | 70.09 | 1721. |
| 1983 | 6.306 | 2.803 | 2.673 | 2.302 | 2.302 | 0.178 | 1.406 | 1.197 | 125.0 | 70.47 | 1850. |
| 1984 | 6.766 | 2.993 | 2.794 | 2.415 | 2.362 | 0.179 | 1.490 | 1.233 | 124.7 | 70.83 | 1909. |
| 1985 | 7.169 | 3.104 | 2.897 | 2.536 | 2.417 | 0.179 | 1.576 | 1.266 | 124.0 | 70.50 | 2142. |
| 1986 | 7.594 | 3.218 | 3.006 | 2.626 | 2.464 | 0.179 | 1.649 | 1.294 | 123.8 | 70.56 | 2292. |
| 1987 | 8.104 | 3.367 | 3.148 | 2.723 | 2.512 | 0.179 | 1.718 | 1.318 | 124.3 | 71.04 | 2150. |
| 1988 | 8.756 | 3.519 | 3.295 | 2.846 | 2.570 | 0.180 | 1.799 | 1.346 | 123.9 | 70.93 | 2613. |
| 1989 | 9.306 | 3.683 | 3.449 | 2.972 | 2.633 | 0.180 | 1.886 | 1.377 | 122.6 | 70.05 | 2778. |
| 1990 | 10.072 | 3.856 | 3.614 | 3.103 | 2.696 | 0.180 | 1.977 | 1.409 | 121.5 | 69.27 | 2955. |

| | NTEXTL | ICLOTH | ITEXTL | ICLOTK | ITEXTK | KCLOTK | KTEXTK |
|---|---|---|---|---|---|---|---|
| 1977 | 709.3 | 32.30 | 78.58 | 21.41 | 45.85 | 525.5 | 2040. |
| 1978 | 760.0 | 39.26 | 93.58 | 24.23 | 50.54 | 526.8 | 2017. |
| 1979 | 833.8 | 41.91 | 155.23 | 23.43 | 76.06 | 526.4 | 2039. |
| 1980 | 919.5 | 49.54 | 202.18 | 25.36 | 90.63 | 531.5 | 2069. |
| 1981 | 1007.8 | 54.63 | 250.48 | 26.01 | 104.35 | 535.9 | 2105. |
| 1982 | 1093.5 | 69.90 | 287.01 | 30.69 | 110.32 | 546.7 | 2136. |
| 1983 | 1189.6 | 80.79 | 317.40 | 33.05 | 113.49 | 555.5 | 2202. |
| 1984 | 1287.9 | 88.45 | 345.17 | 34.01 | 115.93 | 567.1 | 2278. |
| 1985 | 1376.6 | 96.86 | 376.51 | 35.18 | 119.26 | 581.9 | 2347. |
| 1986 | 1473.4 | 103.79 | 404.73 | 35.89 | 121.76 | 593.3 | 2422. |
| 1987 | 1581.2 | 110.40 | 435.35 | 36.16 | 124.01 | 609.8 | 2493. |
| 1988 | 1687.4 | 118.28 | 469.30 | 36.77 | 126.52 | 624.7 | 2559. |
| 1989 | 1784.7 | 125.77 | 504.96 | 37.06 | 128.69 | 630.2 | 2587. |
| 1990 | 1889.7 | 131.46 | 534.71 | 36.71 | 128.76 | 637.3 | 2609. |

| | UTLZCF | UTLIZF | UCCCLT | UCCTXT |
|---|---|---|---|---|
| 1977 | 0.855 | 0.856 | 0.296 | 0.458 |
| 1978 | 0.952 | 0.900 | 0.327 | 0.487 |
| 1979 | 1.017 | 0.965 | 0.416 | 0.625 |
| 1980 | 1.053 | 1.018 | 0.482 | 0.726 |
| 1981 | 1.083 | 1.076 | 0.512 | 0.771 |
| 1982 | 1.085 | 1.120 | 0.544 | 0.820 |
| 1983 | 1.072 | 1.145 | 0.569 | 0.857 |
| 1984 | 1.071 | 1.165 | 0.590 | 0.887 |
| 1985 | 1.056 | 1.178 | 0.608 | 0.914 |
| 1986 | 1.060 | 1.197 | 0.628 | 0.945 |
| 1987 | 1.058 | 1.227 | 0.652 | 0.981 |
| 1988 | 1.051 | 1.251 | 0.676 | 1.020 |
| 1989 | 1.057 | 1.281 | 0.708 | 1.070 |
| 1990 | 1.061 | 1.317 | 0.744 | 1.127 |

| | PDC | PDT | PROFTC | PROFTT |
|---|---|---|---|---|
| 1977 | 8.119 | 10.595 | 399.8 | 269.1 |
| 1978 | 8.944 | 11.136 | 504.5 | 297.3 |
| 1979 | 9.456 | 11.693 | 562.6 | 351.5 |
| 1980 | 9.772 | 12.263 | 603.6 | 392.1 |
| 1981 | 10.060 | 12.859 | 649.8 | 424.5 |
| 1982 | 10.316 | 13.472 | 689.6 | 459.6 |
| 1983 | 10.521 | 14.099 | 732.8 | 491.8 |
| 1984 | 10.760 | 14.751 | 772.2 | 528.5 |
| 1985 | 10.965 | 15.428 | 812.1 | 561.3 |
| 1986 | 11.227 | 16.139 | 844.8 | 596.9 |
| 1987 | 11.476 | 16.891 | 891.7 | 642.3 |
| 1988 | 11.718 | 17.673 | 945.3 | 687.7 |
| 1989 | 12.013 | 18.499 | 995.5 | 729.1 |
| 1990 | 12.308 | 19.367 | 1047.0 | 773.6 |

Note: Variables whose names (MNEMONICS) end with the letter "K" are notmodel variables, but their values are calculated outside the model (in the Epilogue Block) mainly for the purpose of interpreting results and checking consistencies. They are constant dollar counterparts of the variables with similar MNEMONICS.

BIBLIOGRAPHY


Bodkin, R.G. and S.M. Tanny, eds., CANDIDE Model 1.1, Economic Council of Canada, 1975.

Bramson, M.J. and Miles, C., "An Input-Output Model of the U.K. Textile Industry", The Medium-Term Model of the British Economy, (Worswick and Blackby, eds.), London: Heinemann Educational Books, 1972. pp.201-211.

Informetrica Limited, Post-Workshop II-79 Forecast: Key Assumptions and Summary, December 1979.

Isard, P., "Employment Impacts of Textile Imports and Investment: a vintage-capital model", American Economic Review. LXIII, No. 3 (June 1973). pp.279-289.

Johnston, J., Econometric Methods, New York: McGraw-Hill Book Company (1972). pp.408-420.

Jorgenson, D.W., "Anticipations and Investment Behavior", The Brookings Quarterly Econometric Model of the United States, eds., Dusenberry, J.S., Fromm, G., Klein, L.R. and Kuh E., Chicago: Rand McNally & Co., (1965). pp.36-92.

Klein, L.R., "Estimation of Interdependent Systems in Macro Econometrics", Econometrica, Vol. 37(2) (April 1969). pp.171-192.

Koutsoyiannis, A., Theory of Econometrics, London: The MacMillan Press Ltd. (1973).

Lewis, K.A., "An Econometric Analysis of the Demand for Textile Fabrics", American Journal of Agricultural Economics, Vol. 54(2) (May 1972). pp.238-244.

McCracken, M.C. and Sonnen, C.A., Simulation System for Econometric Models, Ottawa: Informetrica Limited, 1975.

McFetridge, D.G., The Determinants of Pricing Behavior: A Study of the Canadian Cotton Textile Industry", Journal of Industrial Economics, Vol. XXII, No. 12 (December 1973). pp.141-152.

Miller, R.L., "A Short-Term Model of Textile Industries", American Economic Review, LXI, No 3 (June 1971). pp.279-289.

Newall, J.G., Chairman, The Canadian Textile and Clothing Industries: A Report by the Sector Task Force, Ottawa, 1978.

Pestieau, C., The Quebec Textile Industry in Canada, C.D. Howe Research Institute, June 1978.

Wallace, R.L., Naylor, T.H. and Sassar, W.E., "An Econometric Model of the Textile Industry in the United States", Review of Economics and Statistics, Vol. 50(1) (February 1968). pp.13-22.

White, D.A., CANDIDE Model 1.0: Business Fixed Investment (CANDIDE Project Paper No. 5), Economic Council of Canada, 1974.