### UNIVERSITY OF CALGARY

A Constant Market Share Analysis of OECD Export Performance, 1972-1992

by

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#### FACULTY OF GRADUATE STUDIES

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "A Constant Market Share Analysis of OECD Export Performance, 1972-1992" submitted by Pawel Maurycy Jan Swisterski in partial fulfillment of the requirements for the degree of Master of Arts.

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### Abstract

The rapid growth of world exports caused export revenues to be an increasingly important portion of domestic income for numerous countries. This paper examines factors influencing export performance, and the impact of numerous policy variables on competitiveness. The study is based on a cross-section of 23 OECD countries representing various trade policies, and roughly accounting for two-thirds of the world trade. Using a constant markets share (CMS) analysis over a 20-year period, it is found that competitiveness is the most influential factor a country can control to improve its export performance. It is also fund that trade policy does not meaningfully explain the behavior of the CMS competitiveness residual.

# DEDICATION

To my dearest Karina, whose love was keeping me company during those lonely long thesis-writing nights in my office. For your beautiful warm smile that would welcome me back home, for your patience and understanding, and for all those times I just was not there...I am dedicating this thesis to you mi vida.

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### **CHAPTER ONE: INTRODUCTION**

During the 1950's and 60's, international trade was hindered by the economic development policies held over from the Great Depression. These policies tended to favor protectionism, import substitution, and other measures to promote "balanced" domestic growth. Since the

1970's, however, an increasing number of countries have abandoned those policies as ineffective. This general liberalization of trade policies has contributed to a rapid increase in world trade in recent decades. Many have come to rely



decades. Many have come to rely Figure 1. Source: World Bank and World Trade Data Base increasingly on export revenues as a source of national income, and economic performance has become increasingly dependent upon trade performance. As more countries began to liberalize trade, the level of world trade grew rapidly. For example, the share of U.S. Gross Domestic Product accounted for by merchandise exports grew from 4.4 percent in 1972 to 7.7 percent in 1992.

The purpose of this study is not to explain the increase in world trade, but rather to analyze and explain differences in export growth among OECD countries for the period 1972-1992. In addition, the study analyzes the impact of various policy variables on export competitiveness over this period.

All of the 23 OECD member countries were selected<sup>1</sup> for the sample, for three major reasons: first, these countries account for well over two-thirds of total world exports; reliable economic data is available for each; and third, the OECD member countries constitute a diverse cross-section in terms of both economic composition and wealth. For example, Australia is largely a commodity based economy, whereas Japan is industry based – both are members of the OECD. Differences in relative wealth among member states – such as between United Kingdom and Turkey – are also significant. Finally, differing approaches to income re-distribution and government intervention are also evident in the OECD group (Sweden vs. United States, for example), as are differences in trade policies.

The time period selected for the analysis was guided primarily by the availability of data. The study utilizes the World Trade Database, which tracks world trade flows between 1972 and 1992.

The sample period is significant not only because it witnessed a surge in world exports, but also because it encompassed significant structural change in terms of the relative importance of primary commodities and technology. In 1972, the aggregate value of exported food and crude material commodity groups accounted for approximately 20% of world exports, while high-tech commodities accounted for only 6%. By 1992, however, the share of high-tech exports had more than doubled (to 14%), whereas the share of food and crude materials had declined by more than one-third (to 12%).

The study entails a data manipulation of world exports over a 20-year period. A Constant Market Share (CMS) analysis is used to examine factors responsible for export growth. A key assumption of CMS analysis is that each country maintains its share of world exports over the sample period. The CMS model attributes export variations to one of four factors: a general growth of world trade, a composition of commodities chosen for exports, destination of exports, and competitiveness.

The results of this study indicate that the most important factor behind export growth<sup>2</sup> over the sample period was the general growth of the world trade (i.e. increased world demand, liberalization of global trade, etc.). Among factors that can be influenced through domestic policy measures<sup>3</sup>, export competitiveness is shown to have the most significant effect on export performance. The composition of exports was second most significant factor such factor, followed by the choice of the destination markets. The "competitiveness" variable in the CMS model is a residual term representing all factors

<sup>&</sup>lt;sup>1</sup> Countries that were members of OECD during the 1972-92 period.

 $<sup>^{2}</sup>$  Exports in this paper refer to commodity trade, and do not include services. Over the 20-year period investigated in this paper, growth of trade in commodities has been almost completely liberalized by the WTO, whereas trade in services was, and to some extent still is, hindered by the differences in regulatory systems (Luttik 143).

other than export composition and destination that influence a country's export performance – including it's policies.

It is worthwhile to note that the growth rate of world output over the sample period ranged from a peak of 5.3% in 1972 to a low point of 1.3% in 1992. To determine whether the demand for certain commodity groups was affected by global output growth, the study examined market shares of each commodity group over various stages of the world business cycle. While no strong relationship was found between the stages of the business cycle and the demand for any commodity group, the Constant Market Share analysis revealed that the importance of factors captured by the competitiveness effect was greater during periods of slow global growth.

The thesis is organized as follows: Chapter II specifies the Constant Market Share (CMS) model, briefly reviews selected works pertaining to CMS analysis, and outlines the model used to analyze the competitiveness residual within the CMS framework. Chapter III describes the data employed in the model, while Chapter IV outlines and discusses the study's empirical results. Concluding remarks are presented in Chapter V.

<sup>&</sup>lt;sup>3</sup> Growth of the world demand for exports is assumed to be exogenous to each exporting country.

#### CHAPTER TWO: THE CONSTANT MARKET SHARE MODEL

The chapter begins with a detailed specification/description of the Constant Market Share (CMS) model. This is followed by a brief critical analysis of the model, and a review of selected studies utilizing various approaches to CMS analysis. The chapter concludes with a description of the model used to explain variations in the competitiveness residual in the CMS results.

### The Constant Market Share Analysis Model

The Constant Market Share (CMS) analysis was first outlined by Taszynski (1951), as a tool to monitor export performance. Numerous researchers have subsequently used CMS analysis to analyze export growth (Leamer and Stern 1970). The central assumption underlying CMS analysis is that countries maintain their share of world exports over time. The CMS model specifies four variables which are said to determine changes in national exports: increases (or decreases) in overall world trade, the composition of a country's exports, the destination of those exports, and each country's export competitiveness. CMS analysis attempts to show how each of these factors affects export growth on a national basis.

Consider country X as an example. CMS analysis examines the extent to which country X's exports changed over time due to: a) the general growth of world exports (i.e. growth in global demand for exports), b) the composition of a country X's exports; c) the destination of X's exports; and d) the competitiveness of country X; a term which

measures all other factors not captured by a), b), and c). The competitiveness factor includes elements influenced by X's policy choices, including: the relative price of exports (i.e. the exchange rate), marketing of its exports, relative inflation rates, or the ability to negotiate lower trade barriers with its trading partners. Other factors captured by the competitiveness residual include the domestic growth rates of productive factors, quality of exports, or productivity gains (Leamer and Stern 1970).

In its most general form, the CMS model measures X's total export growth (total exports = exports aggregated over all commodities and destinations) against global export growth, as follows:

1)  $V^2 - V^1 = rV^1 + (V^2 - V^1 - rV^1)$ 

Where:  $V^2 = Value \text{ of } X$ 's total exports in period 2

 $V^1$  = Value of X's total exports in period 1

r = percent increase in total world exports between periods 1 and 2

The last term in equation 1, " $(V^2-V^1-rV^1)$ " captures the difference between the growth of X's exports due to the world's growth of exports ( $rV^1$ ), and actual growth of X's exports  $(V^2-V^1)$ . This residual term is identified as the "competitiveness effect", which is discussed in greater detail below.

At this level of generality, the model has little explanatory power, allowing only a comparison between X's rate of export growth and the comparable global growth rate. A

more informative version of the CMS model does not treat exports as a single commodity, but rather allows for differentiation of exported commodities and their destinations. This more detailed CMS model can be expressed as follows:

2) 
$$V_{ij}^2 - V_{ij}^1 = r_{ij}V_{ij}^1 + (V_{ij}^2 - V_{ij}^1 - r_{ij}V_{ij}^1)$$

Where  $V_{ij}^2$  = Value of X's exports of commodity "i" to region "j" in period 2

 $r_{ij}$  = percent increase in world exports of commodity "i" to region "j" between periods 1 and 2

Aggregating<sup>4</sup> equation 2) over all exports and destinations yields:

3) 
$$V^{2}.. - V^{1}.. = \sum_{i} \sum_{j} r_{ij} V^{1}_{ij} + \sum_{i} \sum_{j} (V^{2}_{ij} - V^{1}_{ij} - r_{ij} V^{1}_{ij})$$

Where  $V^1$ ...,  $V^2$ .. = Total value of X's exports in periods 1 and 2 respectively.

In turn, equation 3) can be re-written:

4) 
$$V^2 ... - V^1 ... = rV^1 ... + \Sigma_i (r_i - r)V^1 i... + \Sigma_i \Sigma_j (r_{ij} - r_i)V^1 ij + \Sigma_i \Sigma_j (V^2 ij - V^1 ij - r_{ij}V^1 ij)$$
  
(a) (b) (c) (d)

Where  $r_i$  = percent increase in world exports of commodity "i" between

periods 1 and 2

 $V_{i}^{1} = Value of X's exports of commodity "i" in period 1$ 

The difference between equation 1) and 4) is the "level" of analysis (Learner and Stern 1970). The first equation explains the change in a country's value of exports only in

<sup>&</sup>lt;sup>4</sup> The results of the analysis can vary depending on the level of commodity aggregation. This study follows most often used level of aggregation in the CMS literature: the first and/or second digit of the SITC code.

terms of change in world demand (i.e. general growth of world exports), and the competitiveness residual. This level of analysis is not particularly informative, since it does not provide any insight into desirable policy options, or the appropriate commodity and export market mix. Equation 4), on the other hand, examines the change in exports at a much deeper level. It explains the growth in X's exports in terms of: (a) the growth of the world exports; (b) the composition of X's exports; (c) regions to which X's exports are sent; and (d) the competitiveness residual. Here, the competitiveness residual shows the difference between X's actual export growth rate, and the growth rate X's exports would achieve if they maintained their share of growth of each commodity to each region.

The first term (a), referred to as "the world trade effect", indicates the expected change in value of X's exports if X maintained its market share and proportionally exported all commodities at the rate of world export growth. If that were true, the remaining terms

The second term (b) explains the growth of X's exports in terms of composition. If, between two time periods, the average percentage increase in all world exports (r) is higher than the percentage increase of the world exports of commodities (r<sub>i</sub>) exported by X, this term will be negative in sign, indicating X's exports are composed of commodities with a declining relative demand. Alternatively, the term will be positive if country X exports commodities whose markets grew faster than the world average. The magnitude of the second term depends on its weight, which is determined by the value of the exported commodity "i" in period one  $(V_{i}^{1})$ .

The third term (c) explains the growth of X's exports in terms of their destination. The growth rate of X's exports depends on whether X is exporting to the stagnant regions, or faster-growing regions with above-average demand. Put differently, the third term compares the average increase in world exports of commodities exported by X to the average increase in these exports in each region. If, between two periods, X exported its commodities to the regions with the fastest growing demand for exports, X's export growth of those commodities will (ceteris paribus) be higher than the world average export growth of the same commodities, and the third term will consequently be positive. As before, the relative magnitude of the third term depends on its weight  $(V_{ij})^5$ 

Terms (b), and (c) are most commonly referred to as the "structural effects" in the CMS . model.

The last term, (d) labeled the "competitiveness residual", shows the difference between a country's actual export growth rate and the export growth rate it would have achieved had it maintained its market share of exports of each commodity group to each region. The competitiveness residual reveals how a country is able to compete with other

exporters, controlling for the structural effects. The residual captures numerous policy and non-policy variables that influence export performance. The policy variables captured in the competitiveness residual include: the exchange rate, the marketing of a country's exports (e.g. trade missions), the relative inflation rate, or a country's ability to negotiate trade agreements. Other factors captured by the residual include: domestic growth rates of productive factors, relative productivity gains, and the quality of exported goods. As a result, it is important to interpret the competitiveness residual as more than simply a "price" variable.

CMS analysis assumes that the structure of exports remains unchanged throughout the sample period, with export structure being held constant at its initial level. Consequently, the CMS model reveals how a country's initial structure (i.e. at the beginning of the sample period) contributed to its export performance. The static nature of CMS analysis presents various advantages and drawbacks, both of which will be discussed below.

### Shortcomings and Remedies of CMS Analysis

Before proceeding with examples of CMS analysis, it is worthwhile to first review relevant critiques of the CMS model. Papers to be reviewed in this chapter, as well as the present study, attempt to address some of the major shortcomings identified in these

<sup>&</sup>lt;sup>5</sup> It is arbitrary whether the commodity-composition (b) or the market-distribution (c) is calculated first; the sum of the two terms is the same. However, the order of the calculation may affect the sign and magnitude of each term. In this paper each term is calculated both ways and the average of the two values is used.

critiques. A basic familiarity with the model's weaknesses should facilitate a more cogent and concise discussion of the chosen remedies as the chapter progresses.

A 1970 dissertation by J.D. Richardson entitled "Constant Market Share Analysis of Export Growth", as well as his 1971 article of the same title, outline most of the key criticisms of the CMS model. Richardson, whose overall view of CMS analysis is skeptical, discusses a number of the model's limitations.

One of Richardson's main criticisms of the CMS model concerns the fact that it is based on an identity, rather than a behavioral theory. As such, the model will always "hold true". Richardson argues that the identity of the model holds regardless whether one employs the growth rates of exports to different regions, or the growth of different sexes of the "Japanese beetle population" (Richardson 1970).

It is true that the CMS model can be used to decompose growth ratios to measure deviations from averages. In fact, the CMS model is a popular tool in the study of regional economics, where the growth of a region is compared to the growth of the nation (or a relevant sub-section of the nation). The CMS model, often referred to as the Shift-Share model (Richardson, 1970), has been used to explain deviations from average in numerous fields. For example, a 1989 Statistics Canada publication used the CMS model to investigate how employment shifts between industries (Baldwin and Gorecki 1989). A more recent Canadian Tourism Commission paper employed the Shift-Share approach to analyze Canada's market share performance in numerous markets (Griffith University 1999).

Admittedly, the most significant problem with CMS analysis is not that it is based on an identity. They key problem, rather, comes from using CMS analysis <u>as if it were</u> based on a behavioral theory. In particular, the problems arise from using CMS analysis to predict the future export performance based on the commodity and market compositions, while dismissing the competitiveness residual. It is important to remember that CMS analysis shows how well a country's exports performed; it does not probe into the detailed causes of that performance. It does not, for example, compare the effectiveness of one policy option to another.

This study attempts to remedy the retrospective nature of CMS analysis by providing a probability basis for statements about a country's future export performance. The competitiveness residual is regressed on policy variables to estimate parameters correlated with a country's competitiveness, thereby facilitating conclusions about a country's future export growth.

Richardson's second major criticism of the CMS model is that the competitiveness residual lacks a clear-cut interpretation.

It can be demonstrated that a country's market share of the world exports is a function of relative prices of those exports (Richardson 1970a). This implies that the size and sign of the competitiveness residual (or the difference between a country's export growth and the world growth), depends on changes in the prices of its exports. Richardson argues that this is only true if the absolute value of the elasticity of substitution is greater than one. Whether the absolute value of the elasticity of substitution is larger or smaller than one, an increase in price of exports will decrease quantity demanded. If, however, the elasticity of substitution is less than one, the increase in export revenue due to a higher unit price will more than offset the decline in revenue due to decreased quantity demanded. In other words, if the elasticity of substitution is less than one, an increase in price will actually increase export revenue and the exporting country's market share. It can thus be seen that the interpretation of the competitiveness residual requires knowledge of the elasticities of substitution of a country's exports.

While it is true that the demand for a country's exports is a function of prices, it is also true that numerous other factors determine demand. Those factors include quality, service, financing arrangements, and waiting times – just to name a few. Consequently, it is inaccurate to define the competitiveness residual solely as a function of price. Barriers to trade, or the quality of transportation can further influence the sign of the competitiveness residual. It is important, therefore, to interpret the competitiveness residual in a context broader than one of "price". That being said, price certainly plays a key role in the competitiveness of a country's exports. This paper adopts the practice of numerous CMS papers (some of which are discussed below), where commodities classified at one- or two-digit level of the SITC code are assumed to have an elasticity of substitution greater than one (in absolute value terms).

Another weakness of the CMS model identified by Richardson involves the choice of reference period. As noted previously, a simple CMS analysis evaluates the performance of a "fixed" (reference period) export structure over a given time interval. As Richardson notes, however, the structure of a country's exports can change over time. Moreover, a poorly selected reference period (i.e. one capturing atypical economic circumstances) may lead to misleading model results.

This shortcoming, however, has a relatively simple remedy. One solution is to employ numerous reference periods within the model. For example, this paper looks at the export market share of the OECD countries between 1972 and 1992, but divides the 20-year period into five 4-year intervals. An interval of 4 years is sufficiently long to allow for structural change in export composition/destination, but sort enough for this change to be relatively minor over the interval period. Choosing several base periods also allows for a comparison between base years, and detection of any particular year that may be anomalous. In addition, the choice of relatively short time intervals allows for observation of "business cycle effects" on exports of various commodities.

A fourth prominent criticism of CMS analysis concerns the standard by which export performance is measured. It is a common practice in CMS analysis to evaluate the growth of a country's exports by comparing them to the growth of world exports. Richardson argues that a country does not necessarily compete with the whole world. For countries whose exports face a limited competition from other countries, the world's growth rate of exports might not be an appropriate standard by which to measure their performance. Such a standard might not provide the appropriate constant-shares norm. Richardson argues that the point of reference should be limited to the "competitors" of a country in question.

Numerous papers to be reviewed shortly, as well as this paper, attempt to address the matter of an appropriate standard. Because this paper investigates the performance of the OECD countries that account for approximately 70% of the world trade, the world growth rate of trade is selected as a standard. Moreover, use of the world rate allows for comparisons among a diverse cross-section of countries. Nevertheless, numerous standards can be used, depending on the research questions CMS analysis is attempting to address.

### The Statistical Model

CMS analysis is retrospective in nature, and does not provide a probability basis for statements about future export performance. Forecasts of export growth based on assumed continuation of current trends in export markets and commodities ignore the competitiveness effect, which may play an important role in export performance (Leamer and Stern 1970). Since the competitiveness effect reflects all factors influencing export performance (net of commodity composition and destination markets), it also reflects the influence of trade policy. To determine whether one can make statements about a country's future export performance based on its trade policy, this section presents a statistical model meant to examine whether trade policy is correlated with the competitiveness residual.

To examine the relationship between trade policy and the competitiveness residual, the competitiveness residual (R) is regressed on monetary and trade policy variables, and a time trend variable. The dependent variable (R) is defined as the percentage of a country's change in exports not explained by the commodity, destination, or world trade effects (Table Vb).<sup>6</sup>

<sup>&</sup>lt;sup>6</sup> Recall that the competitiveness residual shows the difference in value of a country's actual exports and the value of exports a country would have attained had it maintained its market share of exports of each commodity group to each region (equation 4). Since the dollar value of the competitiveness residual depends on the size of a country's economy, the residuals are expressed as a fraction of the total change in exports to allow for a cross-country comparison (Table Vb).

The "barriers to trade" variable (B) is defined as international trade tax revenues as a percentage of a country's trade sector. This is one of the most direct indicators of trade restrictions and the position of a country's trade policy (Rodriguez and Rodrick 1999).

The nominal exchange rate variable (X) is defined as: \$US/country i's currency unit, and is used as an indicator of a country's monetary policy.<sup>7</sup> While monetary policy has an impact on the competitiveness of a country's exports, its purpose is not equivalent to trade policy. Nevertheless, it has been argued that monetary policy reveals a country's trade policy if a country's exchange rate deviates from its Purchasing Power Parity<sup>8</sup> over an extended period of time (Dollar 1992). For this argument to hold, however, there must be no export taxes or subsidies, the law of one price must hold continuously, and there must be no systematic differences in national price levels due to geography, such as with transportation costs (Rodriquez and Rodrick 1999). This paper acknowledges the "startling empirical failure of the law of one price" (Rogoff 1996) and therefore does not attempt to use the exchange rate as a tool to measure the orientation of a country's trade policy. Rather, the exchange rate is an auxiliary variable used to disentangle trade and monetary policy effects, revealing more clearly the relationship between trade policy and the competitiveness residual.

<sup>&</sup>lt;sup>7</sup> The exchange rate may also reflect the influence of other factors, such as policies associated with political stability.

<sup>&</sup>lt;sup>8</sup> Accounting for the non-tradable sector of the economy

A time-trend variable (Y) is also included among the explanatory variables. Its purpose is to examine movements in the competitiveness residual over time, and to ensure that the influence of time on the competitiveness residual is not mistaken for the effect of trade policy.

The CMS model does not provide enough observations to estimate a time-series regression for each country, making it necessary to pool time-series and cross-country data together. The statistical model below uses 155 panel data observations from 23 OECD countries over five periods. The time periods for each country are: 1972-1976, 1976-1980, 1980-1984, 1984-1988, and 1988-1992. The data are arranged in stacked form, where all variables for a country are grouped together. The country cross-sections are stacked on top of one another, with variables arranged in columns.

An ordinary least squares (OLS) regression is performed<sup>9</sup> on the entire data set using the . following model:

5) 
$$R_{it} = \alpha + \beta_1 B_{it} + \beta_2 X_{it} + \beta_3 Y_t + E_{it}$$

Where: R<sub>it</sub> = The competitiveness residual of country "i" (as a percentage of country "i"'s change in exports) during period "t"

B<sub>i</sub> = Country "i"'s barriers to trade (import/export taxes as a percentage of country "i"'s total trade sector)

 $X_{it}$  = country "i"'s average nominal exchange rate during period "t"

 $Y_t = a$  time trend variable for period "t"

 $E_{it} = error term for country "i" in period "t"$ 

A possible shortcoming of the classical OLS model is that it does not take advantage of multiple observations per country to capture factors within countries that differentiate them from one another. To address this limitation, an alternative classical pooled regression model can be specified in terms of variable deviations from their group means (Greene 2000). The benefit of formulating the model this way is that it controls for unobserved fixed covariates, without including them in the regression. A "Fixed Effects" (FE) model performs an OLS regression on the transformed data (where a "within" mean is subtracted from each variable), and calculates a constant term for each cross section. Because the FE model assumes that intercepts are non-stochastic, calculated intercepts are specific to the sample. This is reasonable, because the sample includes all OECD countries.<sup>10</sup>

The fixed effects model is specified as follows:

6) 
$$r_{it} = \beta_{11}b_{it} + \beta_{22}x_{it} + \beta_{33}Y_{tt} + e_i$$

Where:  $r_{it}$  = Deviation of country "i"'s competitiveness residual from its mean over entire study period during period "t"

<sup>&</sup>lt;sup>9</sup>Statistical models are run using EViews4 statistical software.
<sup>10</sup> All countries that were OECD members between 1972 and 1992.

- b<sub>it</sub> = Deviation of country "i"'s barrier to trade from its mean over the entire study period during period "t"
- x<sub>it</sub> = Deviation of country "i"'s average exchange rate from its mean over the entire study period during period "t"
- $Y_{tt} = A$  time trend variable for period "t"
- e<sub>it</sub> = Deviation of country "i"'s error from its mean in period "t"

While both models attempt to explain the relationship between the competitiveness residual and trade policy, it could be argued that the effects of policy changes are not instantaneous. To correct for delayed policy impacts on competitiveness, regressions were also conducted on both models with the right-hand side variables lagged by one period.

#### **Review of Selected CMS Studies**

The purpose of this section is to inform the reader of the major 'lessons to be learned' from the CMS literature. To deepen the reader's understanding of CMS analysis, numerous examples of previous studies employing the CMS model will be presented, accompanied by a critical review of the findings of each study. In addition, this section will highlight how each paper evaluates the relationship between trade policy and trade performance. One of the more straightforward applications of CMS analysis can be found in a study entitled "Constant Market Share Analysis of Export Growth: The Indian Case" (Tiwari 1986). This study was motivated by the significant decline in India's market share of world exports since 1960. The paper attempts to evaluate the extent to which export competitiveness was responsible for India's declining export performance.

Tiwari's research paper examines India's export performance over an eight year period, from 1970 to1977. The paper does not examine India's market share of world trade. Rather, a sample of 29 countries are included (18 of them OECD), which in 1977 accounted for 60 percent of India's exports. The paper investigates India's market share performance within those 29 countries, in comparison to the rest of the world.

The Tiwari study aggregates the commodities at a one-digit level of Standard International Trade Classification code (SITC), and places them under either a "Traditional" or a "Non-Traditional" sector heading. The SITC commodity groups under the "Traditional" sector heading include: 0) Food and live animals, 1) Beverages and tobacco, 2) Crude materials, inedible, except fuels, 3) Mineral fuels, lubricants, and related materials, 4) Animal, vegetable oils and fats, and 6) Manufactured goods classified by materials. The commodity groups under the "Non-Traditional" heading include: 5) Chemicals, 7) Machinery and transport equipment, and 8) Miscellaneous manufactured articles. It is important to note that Tawari implicitly assumes an elasticity of substitution between India and alternative suppliers of greater than one (at the onedigit level of commodity aggregation).

Tiwari finds that three out of six commodity groups in the Traditional set were competitive, namely: 1) Beverages and tobacco, 4) Animal, vegetable oils and fats, and 6) Manufactured goods classified by materials. In other words, 3 of the 6 traditional sector groups were able to maintain their market share vis-à-vis the rest of the world. On the other hand, all 3 non-traditional export sectors were found to be competitive. Tiwari states that numerous exported Indian engineering goods are of a lower quality than their competition on the world market, and credits government export incentives with their competitive performance. The paper concludes that, overall, India's exports were competitive in the period studied, and suggests the increased use of export incentives<sup>11</sup> for both traditional and non-traditional commodity groups.

Tawari makes a vague link between the competitiveness residual and domestic policies, but does not explore it. He (apparently) assumes that India's failure to maintain her market share with respect to traditional commodities was due solely to unfavorable domestic policies. No examples of unfavorable domestic policies are provided.

Tawari acknowledges the limitations of his approach, which employs only two points in time, ignoring India's trade performance over the sample period. Also, the risk of using

an anomalous (i.e. unrepresentative) year as a reference point makes it difficult to draw conclusions regarding trends in Indian exports. If countries that consumed 60% of India's exports during the reference period consumed only 40% of India's exports in later years, the study would show a misleading picture of India's trade performance.

In his concluding remarks, Tawari acknowledges the need for a study that would differentiate between the price and non-price aspects of competitiveness.

Kapur offers an alternative CMS analysis of India's trade performance. His paper provides a comprehensive study of India's exports to Developed Market Economies (DMEs), namely Yugoslavia and 20 selected OECD countries<sup>12</sup> between 1962 and 1984. Kapur investigates whether, and to what extent, India's loss of market share in developed market economies was attributable to a decline in competitiveness. Rather than choosing a single year as a reference point, Kapur takes the average composition of India's exports over three years (1962-1964). Kapur also analyzes India's performance from 1972 to 1984, and again uses the average export structure over a 3-year period (1972-1974) as a reference point.

Exports were grouped according to the first digit of the SITC code, with groups 3 (mineral fuels, and related materials) and 9 (not elsewhere specified transactions)

<sup>&</sup>lt;sup>11</sup> Tiwari does not specify any desirable policies.

excluded from the analysis. Kapur argues that India is not endowed with group 3 commodities, and that the results of an export performance analysis incorporating all trade groups would be biased for India. Group 9 is also excluded on the basis that its component items are determined by bilateral political/economic considerations. The study further assumes that commodities aggregated at a one-digit level have an elasticity of substitution between India and alternative suppliers of greater than one.

Kapur finds that, for the period 1962-84, India's exports to Developed Market Economies (DMEs) grew at well below average rate. While the market effect was marginally positive (suggesting fast-growing destination markets), India's commodity composition had a large negative effect. India was a major exporter of commodities that were growing at a below-average rate over this period, such as primary commodities and food products. Consequently, Kapur argues that, *ceteris paribus*, India's export growth was largely depressed by external factors, namely external demand growth for particular commodity groups in the import markets (Kapur 1991).

The competitiveness residual was also negative, but small. Kapur considers the competitiveness effect to be an internal factor contributing to growth, and acknowledges the likelihood of a link between India's trade policy and the competitiveness residual.

<sup>&</sup>lt;sup>12</sup> USA, United Kingdom, Italy, Ireland, Denmark, Switzerland, Netherlands, Canada, Norway, Sweden, Belgium-Luxemburg, Austria, Australia, Japan, New Zealand, Spain, France, Germany, Finland, Greece.

Kapur also recognizes that the competitive residual includes a large number of non-policy factors.<sup>13</sup>

Kapur divides commodity groups into traditional and non-traditional categories, and looks at the competitiveness residual for each commodity group. He finds that commodities in the traditional export group, such as Food, Crude Materials, Beverages and Tobacco, and Basic Manufactured Goods have a negative competitiveness residual, in contrast to the non-traditional groups such as Chemicals, Machinery and Transport Equipment, and Miscellaneous Manufactured Goods. Kapur finds the sign and the magnitude of disaggregated competitiveness residuals consistent with India's trade policy, which favored non-traditional exports. India's export incentives, such as export subsidies or import policies, covered mainly non-traditional commodities and the competitiveness residual in this export category was positive. Traditional exports had a negative competitiveness residual, consistent with a discriminatory trade policy treatment.

Kapur concludes that India's market share has decreased primarily due to the high concentration of exports in traditional commodities facing declining demand. Also, viewing the competitiveness residuals by commodity, Kapur acknowledges the influence of India's trade policy on making its exports competitive.

<sup>&</sup>lt;sup>13</sup> Some of the factors listed include: industrial policy, rate of inflation, productivity growth, availability of productive factors, quality of exports, changes in prices, financing of exports, waiting times, etc.

Despite the clearly established link between India's trade policy and the competitiveness residual, Kapur does not show how trade policy affected the competitiveness residual visà-vis other factors (such as the exchange rate, for example).

The question raised by Kapur regarding India's exports is posed by Bowen and Pelzman in regard to U.S exports: to what extent is the market share decline of U.S. exports associated with a decline in U.S. competitiveness?

Bowen and Pelzman's paper examines U.S. exports over a 16-year period, between 1962 and 1977. To avoid the reference year problem, the observed period is partitioned into three intervals: 1962-69, 1970-73, and 1974-77.

Exports are grouped according to the three-digit level of the SITC code, and the export performance is compared to the "world", composed of Canada, Japan, Belgium-Luxembourg, Denmark, France, Germany, Ireland, Italy, Netherlands, Sweden, Switzerland, and the United Kingdom.

During the 1962-69 period, U.S. exports were found to be unable to maintain their market share. In Bowen and Pelzman's model, the commodity effect is negligible. The market effect is positive, but the competitiveness residual is large and negative. Since the CMS analysis observes the values -not the quantities-of exports, the authors acknowledge that a positive competitiveness residual may indicate an increase in prices of a country's exports, and not increased market share in terms of quantities of exports. The conclusion that U.S. exports were unable to maintain their market share was based on the fact that although the export unit values grew faster than those of U.S. competitors, the competitiveness residual was negative.

During the 1970-73 period, all three effects were negative, and the competitiveness residual had the largest magnitude. For the 1974-77 period, market and competitive effects were again negative, while the commodity effect was positive. During both periods, however, the U.S. export unit values grew slower than those of its competitors. Consequently, the negative competitiveness residual during those periods could reflect either a slower increase in prices, or a loss of market share in terms of quantities. In this case, Bowen and Pelzman argue, real GDP growth can be used as a proxy of the U.S. export performance. They maintain that because growth in U.S. GDP was lagging behind its major competitors, the negative competitiveness residual indicates a loss of market share.

Over the entire 16 year period, the authors find that the main factor behind U.S. growth was an increase in world demand for exports. On the other hand, the main factor hindering the performance of the U.S. exports was a loss of competitiveness.

To assess the reliability of these results, Bowen and Pelzman repeat the CMS analysis by re-aggregating exports according to one- and two-digit levels of the SITC code. It is reported that changes in the results due to different levels of export aggregation are not large enough to change the conclusions based on the third-level aggregation. In contrast, variations in results due to changes in the base year were significant. Also, the results were very sensitive to changes in definitions of the world market, suggesting that U.S. competitiveness varied across regions. When the world market was defined as the entirety of world trade, results of the CMS analysis resembled a weighted average of the U.S. trade performance across regions.

Bowen and Pelzman conclude that, over the full sample period, the United States experienced a loss of the world market share due to a decline in competitiveness. The variations in results in the sensitivity analysis were deemed insufficient to alter this general conclusion.

While Bowen and Pelzman focus on the U.S. export market share as a proxy for competitiveness, the authors do not discuss the factors affecting competitiveness.

A broader discussion of factors affecting competitiveness can be found in a 1990 study by Beaulieu and Johnson, entitled: "Kenya's Export Performance, 1971-1986: A Constant Market Share Analysis". Beaulieu and Johnson first provide an overview of Kenya's export performance since 1970, and then proceed to decompose Kenya's exports by applying CMS analysis over the 16 years sample period. To achieve a comprehensive understanding of Kenya's export trends, the study examines numerous periods, specifically: 1971-76, 1976-81, 1981-86, 1971-81, 1976-86, and 1971-86.

Kenya's primary exports over the 1971-86 period were tea, coffee, and petroleum products. Consequently, the tea/coffee group (SITC code #07) and the petroleum products (SITC code #33) are set aside from the food and fuel groups as separate commodity sets. The remaining commodities are grouped according the first digit of the SITC code, starting with 0 (foods, excluding tea/coffee) and ending with 9 (not elsewhere specified, miscellaneous). The study assumes that commodities aggregated at one- and two-digit levels have an elasticity of substitution greater than one.

Kenya's total exports are allocated among 20 destination groups by geographical regions, except for the Netherlands (a major European distribution hub), and the G7 countries, which are considered destinations in their own right.

Through the examination of various time periods, and a detailed discussion of the various commodity groups, the study is able to identify trends in Kenya's exports. Beaulieu and Johnson find that while the effect of world trade growth was positive for all periods, the commodity effect was negative for all but first period (1971-76), when world demand for tea, coffee, and petroleum (petroleum in particular) was especially high. When the tea/coffee and petroleum commodity groups are omitted from the CMS, the commodity
effect is more negative than when these groups are included. CMS analysis is also applied to only food, and only manufacturing commodity groups, to see how well these commodity exports perform vis-à-vis world food and manufacturing exports. Both of these commodity groups perform poorly, according to the model results. The analysis reveals that the tea/coffee and petroleum exports were the strongest performers in the basket of Kenya's exported products. Over the sample period, the paper indicates weaknesses in the structure of Kenya's exports.

The market effect is positive during every period, indicating that Kenya was exporting to rapidly growing markets. The competitiveness residual, on the other hand, is negative irrespective of which set of exports is examined, suggesting that the explanation is not sector-specific (quoted examples of sector specific factors include drought, coffee prices, or industrial policy).

The paper concludes with the claim that Kenya's negative competitiveness residual is the result of the overvalued exchange rate, without putting this assertion to empirical scrutiny. The study's discussion of the link between trade policy and trade performance is limited to a statement that policies promoting the diversification of Kenya's exports would be helpful.

Beaulieu and Johnson use world trade as a standard to measure Kenya's export growth. Arguably, the composition of Kenya's exports is to a large extent influenced by the fact that Kenya is a relatively poor African nation. Consequently, it may be more appropriate to compare Kenya's export growth to that of other African countries exporting similar commodities, rather than to the world growth -which is driven primarily by 'first world' nations (i.e. OECD countries).

The relationship between the competitiveness residual and the exchange rate noted by Beaulieu and Johnson is more fully discussed in an IMF working paper entitled "Measures of External Competitiveness for Germany" (Feldman 1994). This paper, motivated by the considerable real appreciation of the deutsche mark in the early 1990's, and the important role exports have played in Germany's economic growth, evaluates Germany's export competitiveness using numerous methods, including CMS analysis.

The Feldman study begins with a discussion of various effective exchange rate indices for the manufacturing sector (such as relative unit labour costs and relative export unit values), which point to a considerable loss of competitiveness throughout the 1980's and the early 1990's. Feldman argues, however, that there is a problem with the comparability of definitions of the manufacturing sector regarding treatment of suppliers and services across countries. It is also argued that unit labour costs are not very good indicator of cost competitiveness, because they show only labour costs of direct manufacturing, ignoring labour costs of inputs, or the prices of inputs other than labour. To examine Germany's cost competitiveness from a broader perspective, Feldman examines real effective exchange rate indices of the overall business sector. Feldman finds that the growth of unit labour costs in the business sector was considerably smaller than in the manufacturing sector. A significantly smaller real appreciation of the deutsche mark based on the broader indicators indicates that Germany was more competitive than suggested by the manufacturing indices alone. It also highlights the significance of non-manufacturing inputs in the manufacturing sector.

To support his findings, Feldman cites studies showing that export patterns are more closely correlated with relative unit labour costs in the overall business sector than in the manufacturing sector alone.

Nevertheless, Feldman acknowledges that the exchange rate indices are unable to capture numerous important aspects of competitiveness, such as quality, financing arrangements, ... waiting times, etc. Consequently, the study turns to CMS analysis to further evaluate Germany's export performance.

Feldman's study divides the world was into 11 markets, with the performance of German exports in these markets measured against all other OECD countries. Exports are grouped at a one-digit level of the SITC code, and it is assumed that the elasticity of substitution between German exports and other suppliers is larger than one. The study examines German exports between 1984-90, 1984-87, 1987-88, 1987-90, and 1991-92.

The CMS analysis reveals that, notwithstanding the implied deterioration in competitiveness in the real exchange indices, Germany had a positive competitiveness residual during the entire 1984-90 period, and in the 1984-87 and 1991-92 sub-periods. The commodity effect was positive during every period, and the destination effect was also positive over the whole 1984-90 period, including the 1984-87 and 1987-90 sub-periods.

In light of the fact that German exports increased their global market share over the sample period, the study concludes that Germany's competitive position was underestimated by the standard manufacturing sector measures. Feldman emphasizes the need to consider numerous factors when evaluating competitiveness. Some of the listed examples included export quality, composition, and destination markets.

One of the important contributions of Feldman's paper is its recognition of the importance of non-price factors affecting a country's competitiveness. Using CMS analysis, it shows that conclusions about competitiveness based on price factors alone can be misleading. The paper does not directly mention trade policy among the factors affecting competitiveness, but acknowledges numerous "factors that do not lend themselves to direct quantification" (Feldman 1994).

The final example of CMS analysis to be reviewed studies the trade performance of a group of countries from the Caribbean Basin. The purpose of this paper is to examine whether Mexico's entry into NAFTA has displaced exports from the Caribbean Basin<sup>14</sup> to the United States.

The study analyzes U.S. imports from Mexico, Canada, and the Caribbean Basin over two periods: prior to (1990-93) and following (1994-98) the implementation of NAFTA. The study aggregates exports at the two-digit level of the Harmonized System. It is assumed that, at this level of aggregation, exports have an elasticity of substitution greater than one.

The paper finds that NAFTA has increased Canada's and Mexico's portion of the U.S. market. Canadian market share has increased from 18.4% in 1990 to 19.1% in 1998, remaining United States' main trading partner. Mexico's market share increase was much more substantial: rising from 6.1% in 1990 to 10.4% in 1998. The Caribbean Basin countries also increased their share of U.S. imports from 0.9% in 1990 to 1.5% in 1998. In total, NAFTA and the Caribbean Basin countries increased their U.S. market share from 24.5% in 1990 to 31% in 1998. The increase was mainly at the expense of the European Union, South American countries, Japan, and the "Asian Dragons" (Taiwan, South Korea, Singapore, and Hong Kong).

<sup>&</sup>lt;sup>14</sup> Eight examined countries of the Caribbean Basin include: Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama, and the Dominican Republic.

To understand the observed market share changes, Pedilla examines the U.S. import market. He creates a "Competitiveness Matrix" with four quadrants. Two quadrants in the right half represent export products with a positive commodity effect, and those on the left represent products with a negative commodity effect. The two quadrants in the upper half of the matrix represent increase in market share, while those in the lower half represent a decrease. Accordingly, the lower right quadrant, for example, represents exports with a positive commodity effect and a negative market share.

Before the implementation of NAFTA, the Competitiveness Matrix indicates that about 65% of Canada's exports to the United States had a negative commodity effect (i.e. below average demand). Nevertheless, 70% of Canada's exports increased their share of the U.S. market (i.e. had a positive competitiveness residual). After the implementation of NAFTA, 61% of Canada's exports to the United States had a negative commodity effect, but only 34% of Canadian exports had positive competitiveness residuals.

On the other hand, approximately 57% of Mexico's pre-NAFTA exports to the United States indicated a positive commodity effect, and 88% had a positive competitiveness residual. After the implementation of NAFTA, the proportion of Mexican exports with a positive commodity effect decreased to about 37%. Nevertheless, approximately 97% of increased Mexican exports had a positive competitiveness residual. The paper finds that four commodity groups account for just over half of all exports to the United States: 1) Computer Goods, 2) Electrical Machinery and Equipment, 3) Automobiles and Auto Parts, and 4) Mineral Fuels. Between 1990 and 1998, groups 1) and 2) increased their market shares, respectively, from 13.5% to 16.9% and from 11.7% to 13.9%. In contrast, over the same time period, group 3) decreased its market share from 14.9% to 13.5%, and the market share group for 4) declined from 13.1% to 6.3%. About 63% of Mexican exports corresponded to the four groups listed above, supporting Mexico's increase of the U.S. market share. Accordingly, Mexico's growth was sustained largely by the displacement of other competitors, while Canada has grown at practically the same rate as total imports (Pedilla 2000).

In contrast to Mexico, the export structure of the Caribbean Basin countries did not correspond to the U.S. import structure. The observed Caribbean countries concentrated their exports in the garment and apparel sectors, where they managed to maintain their market share. In addition, they managed to increase their market share in tobacco, fish, and crustacean exports. The paper concludes that the increase of Mexico's market share was mainly in products not exported by the Caribbean countries, and that Mexico's entry into NAFTA has not significantly displaced Caribbean exports to the United States.

The study does not discuss trade policy, nor numerous price and non-price factors affecting the competitiveness residual. Rather, the paper focused on the importance of Canada's, Mexico's, and Caribbean Basin countries' export composition in gaining U.S. market share.

The reviewed papers provide a representative sample of works employing the CMS model. While each of the reviewed studies discuss the composition of exports, destination markets, and competitiveness in a country's trade performance, very few make an explicit link between a country's competitiveness and its trade policies. At best, this link is assumed, but not (to the author's knowledge) empirically investigated.

# **CHAPTER THREE: THE DATA**

All of the world's countries are listed in the WTDB, and are described according to their six-digit Standard Classification of Customs Areas and Territories, with a few countries aggregated into a single number. This paper groups countries into two groups.

The first group contains all<sup>15</sup> of the OECD countries (23 in total), whose export growth is being analyzed in the present study: Canada, United States, Japan, Belgium-Luxembourg (the data in WTDB has been combined for those two countries), Denmark (includes Faroe Islands), France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, United Kingdom, Austria, Finland, Iceland, Norway, Sweden, Switzerland, Australia, New Zealand, and Turkey. The availability and the reliability of the data guided the choice of the OECD countries, as well as the diversity of the member countries. For example, there are significant wealth differences among member states, as between Germany and Greece. There are also significant ideological (and thus policy) differences among some member states, as between Sweden and the United States.

The second group is comprised of export destinations. The group is created to analyze the export performance of each OECD country, in each market, and to differentiate between fast- and slow-growing markets. The export destinations have been grouped by region and by significant economic market areas. They are: 1) United States and Canada, 2) Mexico, Caribbean, and Central America, 3) South America, 4) South Africa and Nigeria, 5) Rest of Africa, 6) Middle East, 7) G4 (European members of G7 countries: France, United Kingdom, Italy, and Germany), 8) Eastern Europe and former USSR, 9) Rest of Europe, 10) Australia and Oceania,<sup>16</sup> 11) Japan and Newly Industrialized Asian Economies, 12) Rest of Asia, 13) Unspecified destinations. Those economic entities that are colonies are also classified as a part of a region. For example, French Guiana is classified under "South America". Even though French Guiana, uses the French flag and French currency, and issues French passports to it's citizens, the cost of non-tradable goods, and the cost of factors of production and the GDP per person are much more similar to the neighboring countries than to France. A detailed composition of each destination group is described in Appendix B.

Since it is unpractical to discuss thousands of exported commodities individually, export commodities are grouped by commodity type. As mentioned above, exports are classified according to the Standard International Trade Classification (SITC), Revision 2. Most export groups are grouped according to the first digit of the code.<sup>17</sup> However, groups labeled Oil & Gas, Textiles, and High Tech, are grouped according to the first two digits of the code. These commodities are considered at a more a detailed level for several reasons, as outlined below.

<sup>16</sup> To avoid double counting, Solomon Islands were not included in the Australia and Oceania group. Kiribati, which belongs to the group already includes Solomon Islands, as well as Tonga and Tuvalu

<sup>&</sup>lt;sup>15</sup> The study includes all countries that were members of OECD during the 1972-1992 period.

<sup>&</sup>lt;sup>17</sup> A prevalent practice in CMS analysis studies

The Oil & Gas group represents energy exports in form of petroleum products and natural gas. This group was singled out at the two-digit level due to the OPEC crises (and associated price fluctuations) that took place during the period of analysis. Oil & Gas exports also had a large influence on the market share of non-energy commodities over the sample period.

The Textiles and the High Tech groups were both considered at the two-digit level to clearly illustrate the structural change of international exports over the sample period.

Textiles represent a type of manufacturing widespread in the less developed countries (such as textiles or apparel), while the High Tech group represents the 'new economy' manufacturing (predominantly high technology items). Table I<sup>18</sup> contains a detailed specification of the commodity groups listed above.

The *exchange rate* data used in the statistical model was obtained from OECD's Annual National Accounts. The model uses the average exchange rate of the first and last period for which the competitiveness residual is calculated. For example, the 1972-76 residual is regressed on the average of 1972 and 1976 exchange rates.

The *barriers to trade* statistics were obtained from the <u>Economic Freedom of the World</u> 2002 Annual Report, which lists revenues from taxes on international trade in 5-year intervals, beginning in 1970. As CMS analysis uses 4-year periods, the competitiveness residual and the *barriers to trade* variable were matched as closely as possible. For example, the competitiveness residual from the 1980-84 period, was regressed on the average of observations from 1980 and 1985. The Belgian data served as a proxy for the barriers to trade for Belgium-Luxemburg.

The non-tariff trade barriers are not included in this study, owing to data limitations.

<sup>&</sup>lt;sup>18</sup> All tables are located at the end of Chapter IV

## **CHAPTER FOUR: THE ANALYSIS**

Although the OECD countries, representing most of the industrialized nations, had nearly the same market share of the world exports in 1992 (71.8%) as in 1972 (71.5%), this share varied over the sample period. For example, the OECD market share was substantially affected by high energy prices from the mid 1970's through the early 1980's. As Table II shows, the OECD countries' share of the world exports fell to 65.3% in the 1976, and decreased further to 63.8% in the 1980. High oil prices were strongly linked with this loss of the world market share. As Table III indicates, Oil and Natural Gas exports increased dramatically in market share terms (as a percentage of the value of world exports), from 8.5% in 1972 to 22.4% in 1980. As most of the OECD countries do not export oil, the OECD market share of exports fell during the period of high oil prices.

Collectively, the OECD countries' market share of world exports seemed to be relatively insensitive to the fluctuations of the business cycle; in other words, the commodities exported by OECD countries did not seem to be subject to a cyclical demand. In 1972, world output grew at the rate of 5.3%, compared to 1.3% in 1992 (World Bank 1995). Nevertheless, the OECD countries maintained a very similar market share of exports during both periods (71.2% in 1972 and 71.8% in 1992 -Table II). Thus, the losses in OECD countries' market shares in 1976, 1980, and 1984 seem to be associated with the high market share of Oil & Gas exports in these periods (Table III).

While the OECD countries (collectively) held approximately the same market share of the world exports in 1992 as in 1972, the shares attributed to individual countries changed dramatically in several instances. The change in market shares among OECD countries was associated with a reallocation of relative weights across commodity groups. For example, the High Tech commodity group accounted for 13.4% of world exports in 1992, more than double its 1972 share of 6.0% (Table III). Consequently, countries for which High Tech commodities comprised a significant portion of exports gained more market share than did countries exporting Crude Materials. A more detailed discussion of the commodity trends based on Table III follows.

#### World Commodity Trends

Over the 20-year sample period, the High Tech, Crude Materials, and Food commodity groups experienced the most significant changes in market share. The Crude Materials commodity group experienced the most dramatic decline, decreasing from an 8.3% share of world exports in 1972 to 4.1% in 1992. The Crude Materials commodity group is comprised of inedible crude materials such as wood, metalliferous ores, and textile fibers - excluding fuels. Surprisingly, the market share decline of the Crude Materials was continuous, and unrelated to the business cycle. As Table III shows, the Crude Materials comprised a smaller market share during the peak of the business cycle (1988), than during the preceding trough (1980).

As indicated in Table III, the Food commodity group experienced the second most dramatic deterioration of market share. It decreased gradually over the sample period, from 11.4% in 1972 to 7.6% in 1992. This group is comprised of all fresh, prepared and unprepared foods, as well as lives animals chiefly for food. As in case of Crude Materials, the decline of Food's market share was continuous, and unaffected by the

course of the business cycle.

The losses of market share in the Food and Crude Materials' groups contrasted sharply with the rapidly increasing market share of High Tech items (Figure 2), such as the office and electrical machines,



#### Figure 2.

Source: WTDB

telecommunications, sound recording apparatus, and automatic data processing equipment. As noted above, over the sample period the High Tech commodity group more than doubled its export market, moving from 6.0% in 1972 to 13.4% in 1992.

As with the Crude Materials and Food groups, the export share trend for High Tech was both continuous and insensitive to the stages of the business cycle. This suggests that a significant structural change in the composition of world exports was occurring over the sample period, as illustrated by Figure 2. Other commodity groups also experienced significant market share gains over the sample period, most notably the following: Miscellaneous exports, which increased by 48% (3.2 percentage points), and Chemicals, which grew by 28% (1.9 percentage points). Groups recording a loss of market share included: Manufactured Goods (-16%, or 2.3 percentage points), N.E.S. (not elsewhere specified)/Unidentified Products (-43%, or 2.6 percentage points), and Oil & Gas (-11%, or 0.9 percentage points).

After High Tech, the highest market share gain was recorded by the Miscellaneous export group, which increased its share of world exports from 6.7% in 1972 to 9.9% in 1992. This group includes miscellaneous manufactured articles that are not elsewhere specified, such as travel goods, handbags, furniture, plumbing fixtures, photographic apparatus, or professional scientific and controlling instruments.

Between 1972 and 1992, the Chemicals commodity group also posted strong gains, increasing its market share by 28%. This increase, however, fluctuated over the stages of the business cycle.

After Crude Materials and Food, the "unidentified and not elsewhere specified" (N.E.S.) product group recorded the third largest loss of market share (-43%), declining from 6.1% in 1972 to 3.5% in 1992. The N.E.S. group is a residual category; examples of not elsewhere specified products include Zoo animals, armored fighting vehicles, paper, special transactions, and postal packages not classified according to kind. This group's

market share was highly sensitive to the business cycles. At two "trough points" in the global business cycle – 1980 and 1992 – the group's market shares were 3.2% and 3.5%, respectively. In contrast, in 1972 and 1988 (two "peak points" in the cycle), the corresponding market shares were 5.3% and 6.1%. The decrease of the market share of the unidentified products was most likely due to an improved capacity to track exports and collect information.

The Manufactured Goods group also seemed to be sensitive to the business cycle. The group includes manufactured leather, rubber, wood, paper, metal, and non-metallic minerals. This group's market share declined by 16% (2.3 percentage points) over the sample period. The most significant decline in this group's market share (-11%) took place during a period of dramatic oil price increases, between 1972 and 1976. Once oil prices retracted, Manufactured Goods did not regain their former market share.

The 11% (0.9 percentage point) decline in the market share of Oil & Gas exports conceals significant spikes in this group's share at various points within the sample period. For example, Oil and Gas's market share more than doubled between 1972 and 1976, increasing from 8.5% to 17.1%. The group's share increased further by 1980, reaching 22.4% (an additional 31% rise). This was followed by a significant decline in the group's market share - to 18.4 percent by 1984, and to 6.6% by 1988 (a decline of over 70 percent from its 1980 level). By 1992, it had rebounded only slightly, to a 7.6% market share.

The remaining commodity groups – namely, Beverages and Tobacco, Textiles and Apparel, Fuels except Oil and Gas, Fats and Oils, and Machinery excluding High Tech, maintained relatively stable market shares over the sample period.

## World Destination Trends

This section examines patterns of consumption of world exports by region, based on the data presented in Table IV.

Table IV shows that the most popular destinations for world exports were Europe's largest economies, namely the G4 nations of France, Germany, Italy, and the United Kingdom. The G4's consumption share of world exports remained vary stable between 1972 and 1992, edging up a single percentage point over this period. While the consumption of world exports by G4 countries seemed unaffected by the stages of the business cycle, it did show a decline during the period of high oil prices in 1984.

The regions exhibiting the largest increases in export consumption over the sample period were Japan and the newly industrialized Asian economies (Japan & NIAEs), the rest of Asia, and the Middle East. Japan & the NIAEs nearly doubled their consumption share of world exports, rising from a 7.8% share in 1972 to 14.3% in 1992 (a 83% increase). The data is suggestive of strong regional economic growth. Indeed, during the late 1980's Japan's economic growth was among the fastest in the OECD, averaging 4.0%

annually between 1983 and 1992, and increasing to 4.6% between 1987 and 1992 (OECD Economic Survey: Japan).

This region's strong growth also had a positive impact on other Asian economies. Between 1972 and 1992, the "Rest of Asia" more than doubled its demand for exports, increasing its market share of consumption by 113% (3.5 percentage points) - the highest increase in export demand of any region. Similar to Japan & the NIAEs, the Rest of Asia increased its share of imports continuously over the 20-year period, without cyclical variations.

The Middle East was the third region showing a significant increase its consumption share of world exports. The region's consumption was dictated primarily by oil prices. During the OPEC crisis of the mid-1970's, the Middle East's consumption share of world exports increased by 78% (from 2.8% in 1972 to 5.0% in 1976). The Middle East maintained a high consumption share through 1984 (recording a share of 5.3% that year), before receding to a 3.2% share in 1988, mirroring the retreat of the global oil prices. By 1992, the Middle East's share had recovered slightly, to 3.7% of world exports (once again, following the trend in oil prices).

Regions recording major declines in export consumption included: Eastern Europe and the former USSR, South Africa and Nigeria, the Rest of Africa, and South America. Of the four regions, Eastern Europe and former USSR experienced the largest decline (-57.4%), from a 6.1% share in 1972 to 2.6% in 1992. The deterioration of the region's export consumption began in the early 1980's, corresponding not only with a period of high oil prices, but also with a period of growing domestic political unrest that preceded the difficult transition to market-based economies in the early 1990's.

Over the 20-year sample period, Nigeria and South Africa - the two largest economies on the African continent – saw their collective consumption share fall by 46% (from 1.1% in 1972 to 0.6% in 1992). A contributing factor was the deterioration in the terms of trade for the Food and Crude Materials commodity groups, which decreased the region's earnings significantly. In addition, the worldwide economic sanctions imposed on South Africa in relation to its policy of Apartheid, and the domestic unrest associated with these developments, helped to explain the declining consumption share for this region.

The demand for exports in the Rest of Africa followed a pattern of decline very similar to that of Nigeria and South Africa. The consumption share for this region fell 40.0%, from 3.0% in 1972 to 1.8% in 1992. This decline may also be explained with reference to the above-noted deterioration in terms of trade for the Food and Crude Materials commodity groups. These groups constitute the primary exports for most African countries (World Atlas).

South America's share of world export demand decreased by 26% over the sample period, falling from a 3.1% market share in 1972 to 2.3% in 1992. Beginning its decline

in 1984, the region's consumption share fell to1.9% by 1988, undoubtedly reflecting the effects of the 1980's Latin America debt crisis. The decline was also associated with the deterioration in terms of trade for the Food and Crude Materials commodity groups.

For the other regions in the sample, export consumption patterns were relatively stable from 1972 to 1992, with Australia and Oceania maintaining the most consistent share of world exports over this period. While the amount of exports to unspecified/unknown destinations decreased over time, this was most likely a byproduct of improved data collection. Exports to unspecified destinations also varied with the global business cycle.

## CMS Analysis

The Constant Market Share (CMS) analysis explains a country's change in exports in terms of the general growth of world trade, the basket of commodities chosen for export, the destination of exports, and their competitiveness. The discussion in this section focuses on the impact of growth in world export demand (the first term of equation #4, labeled (a), or the world trade effect).

The discussion of the world trade effect is based on the information presented in Tables Va, Vb, VIa, and VIb, which show the results of the CMS analysis for the OECD countries between 1972 and 1992. These tables also show the results of CMS analysis for five distinct 4-year periods within the sample, as well as cyclical variations from

trough-to-peak (1980-1988) and trough-to-trough (1980-1992) periods of the world business cycle.

Table Va presents the CMS results for all OECD countries between 1972 and 1992, with the second column showing the change in each country's export levels over the period. The remaining columns show the percentage contribution of individual CMS effects to the overall change in exports. The last column demonstrates that all the effects are additive (i.e. sum to 100% of the total effect in each case).

Table Vb is a compact transpose of Table Va for all investigated periods. In this table, the components of the CMS analysis are displayed in groups of six rows, with each group corresponding to a given time frame of analysis. Columns, on the other hand, represent CMS results for individual countries.

In Tables Va and Vb, a World Trade effect of below 100% indicates that a country's exports grew at a faster rate than did world exports.<sup>19</sup> A World Trade effect of above 100% indicates that the average growth of world exports exceeded that country's rate of export growth. If the level of world exports decreased (as, for example, between 1980 and 1984), the interpretation of the sign of the World trade effect depends upon whether the country's exports increased or decreased. If a country's level of exports decreased

<sup>&</sup>lt;sup>19</sup> The ratio of the (hypothetical) amount a country's exports would grow if they rose at the world rate, over the country's actual export growth, produces the percentage value of the World Trade effect.

alongside a decline in world exports, the sign of the world trade effect will be positive, indicating that the World Trade effect supported the decline in the level of exports. For countries that experienced increases in exports despite declining world exports, the world trade effect will be negative, indicating that the increase occurred against the global trend.

The commodity, destination, and competitiveness effects help to explain why a country's exports grew faster or slower than the world average. For example, the commodity effect shows the differences in export growth rates that are attributable to a country's choice of exported commodities. The destination and competitiveness effects similarly explain why a country's exports deviate from the world averages.<sup>20</sup> If a country's exports had grown at same rate as world exports, the commodity, destination, and competitiveness effects would cancel out.

# World Trade Effect

A comprehensive analysis of changing world trade levels over time is beyond the scope of this paper. Nevertheless, one objective of this study is to identify key factors that led some countries to experience above-average export growth over the sample period, and others to experience below-average export growth. A further objective is to identify the extent to which policy factors were responsible for a country's trade performance. Consequently, a brief discussion of the standard used to measure a country's trade performance – namely, the global rate of trade growth - provides appropriate background for a more detailed examination of the world trade effect.

Figure 3 (below), which shows OECD exports as a percentage of OECD GDP, illustrates the increasing importance of the world merchandise trade over the 20-year sample period.

As indicated by Figure 3, world trade grew throughout 1970's. This growth was supported by a general decline in the use of protectionist measures, and by decreasing transportation costs.

After the significant slowdown of the global economy in the early 1980s, merchandise exports declined as a share of GDP until around 1988, and increased thereafter. This category comprised the highest percentage of GDP during periods of slow economic growth in 1980 and 1992,



indicating that the growth of exports did not slow as much as the growth of GDP. A good approximation of the real growth of world trade is the difference between the nominal rate of increase and a trade deflator. Nominal world trade increased by 135%

<sup>20</sup> Review Chapter II, equation (4) for definitions of commodity, destination and competitiveness effects.

between 1972 and 1976, 101% from 1976 to 1980, -5% between 1980 and 1984, 49% from 1984 to 1988, and 35% between 1988 and 1992. Using the OECD's "export prices of goods and services" series as a crude proxy for a world trade deflator (OECD Economic Outlook 1994), real growth of merchandise exports was seen to be continuous during each period, with the exception of 1980 –1984 (a period which saw a world debt crisis and particularly slow global economic growth from 1980 to 1982). The average period-to-period price increase of OECD exported goods and services hovered around 20%. <sup>21</sup>

Among CMS effects, growth of world trade was the most important factor behind an increase of a country's level of exports. As Table VIa indicates, the unweighted average of the world trade effect between 1972 and 1992 was 65%.<sup>22</sup> Tables VIa and VIb illustrate the relative importance of each effect. Table VIa presents the same information as Table Va, but in a slightly different format. In Table Va, each effect is shown as a percentage of the total change in exports. Table VIa, on the other hand, shows each effect as a percentage of the absolute sum of all effects contributing to a country's change in exports. Consequently, the <u>absolute values</u> of each effect add up to one. By normalizing the effects outlined in Table Va, Table VIa illustrates the relative importance of each effect on the change in exports.<sup>23</sup>

<sup>&</sup>lt;sup>21</sup> Nominal rate of trade growth declined towards the end of the sample period, as did the rate of OECD export price increases.

<sup>&</sup>lt;sup>22</sup> The weighted average was 67%; however, to focus on the importance of each effect to an OECD country, more than to cumulative OECD exports, the un-weighted averages will be used from this point forward.

 $<sup>^{23}</sup>$  The relationship between Table VI a and VI b is exactly the same as between Table V a and V b.

By averaging the world trade effects listed in Table VIb, it is seen that between 1972 and 1976 the world trade effect accounted for 77% of export growth. In the following period (1976-1980), this effect declined marginally, to 75%. Thereafter, it continued to decline, reaching 65% in the 1988-1992 period. One possible explanation for this decline is an increase in the number of exporters of similar commodities, driven by the world's increased demand for exports. With increased competition among exporters, commodity specialization, relative prices, and other factors (commodity, competitiveness, and destination effects) would be expected to play an increasingly significant role in export growth.

Comparing OECD export growth to world export growth between 1972 and 1992 yields similar results to the comparison of 1988 and 1992. For both periods, export performance in times of strong economic growth (5.3% in 1972 and 4.4% in 1988) is compared to export performance at a time of a relatively weak growth (1.3% in 1992). Also, during both intervals there were eleven countries with export growth rates below the world average.<sup>24</sup>

The fact that both periods witnessed an increase the in number of countries with belowaverage export performance suggests that the structure of exports may vary according to

<sup>&</sup>lt;sup>24</sup> The seven countries whose exports grew below the world average during both periods included: Canada, Finland, Iceland, Netherlands, New Zealand, Sweden, and United Kingdom.

the strength of the world economy. Consequently, it may be advantageous to compare the performance of countries' export structures during similar stages of the business cycle. Recall that the CMS model assumes an unchanging structure of exports over the period of analysis. Accordingly, one would expect to have a greater degree of confidence in CMS model results involving a comparison of 'like' periods ('like' periods would presumably have greater similarity in their respective structures of world export demand than would 'unlike' periods; e.g., in comparing 'peak to trough' periods, or vice-versa).

#### The Commodity, Destination, and Competitiveness Effects

The commodity, destination, and competitiveness effects explain why a country's exports grew at a faster or slower rate than the world average. If the sum of all three effects is positive, this indicates that the world trade effect is less than 100%, and that the country increased its market share of exports. A negative 'sum of effects' (i.e. world trade effect above 100%) indicates that a country's share of exports declined. If - as is generally the case - the commodity, destination, and competitiveness effects are not of the same sign, a country's export market share will depend on the relative magnitudes of each effect.

As indicated in Table VI, the competitiveness and the commodity effects had (on average) the largest impacts on a country's export performance, after the world trade effect. Table VI, which illustrates relative influence of each effect on a country's change in exports, also shows that the commodity and competitiveness effects were of relatively similar magnitudes, on average.

On the other hand, the destination effect typically had a lesser influence on a country's export growth than did the commodity or competitiveness effects. The magnitude of the destination effect is determined primarily by two factors. The first factor relates to the choice of destination markets: specifically, to whether a country is exporting to quickly growing regions with strong export demand, or to regions with weaker growth and demand. The second factor is derived from the first; it refers to the allocation of exports among destinations with a strong or weak demand. The choice of export market allocation is highly 'country-specific', and thus requires detailed reference to the practices of individual countries. In contrast, the interaction between the competitiveness and the commodity effects displays less country-specific characteristics.

The period of negative growth of world exports in the sample (1980-84) deserves particular attention, since it underscores trends in all four effects.

The decrease in world trade during this interval (which coincided with high oil prices) reflected a decrease in the world demand for exports. A reduced demand for exports suggests a declining contribution from the world trade effect, and correspondingly a greater contribution from the commodity, destination, and competitiveness effects, reflecting intensified competition for shrinking export markets.

Indeed, as Table VIb shows, the competitiveness effect had its largest degree of influence during periods of reduced trade (1980-84) and reduced economic growth (1988-92). The

competitiveness effect accounted for 37% of the change in exports during the 1980-84 interval, and 24% between 1988 and 1992. In contrast, the average contributions of the competitiveness effect during expansionary periods of 1972-76 and 1984-88 were 10% and 16%, respectively. Over the 20-year sample period, the competitiveness residual accounted for 20.5% of the change of exports for the average OECD country.

Competition among exporters was visible not only through the competitiveness effect. As noted previously, a positive commodity effect indicates that a country's exports of a given commodity grew at a faster rate than did world exports. Further, an increase over time in the number of countries with positive commodity effects suggests increased specialization. Competition encourages exporters to focus on commodities for which they have a comparative advantage, or commodities for which there is an above-average world demand. A positive commodity effect might also indicate the impact of policies aimed at increasing exports (such as currency devaluation).

The degree of fluctuation in the competitiveness residual relative to other CMS effects seems to suggest that the competitiveness residual can change relatively quickly, possibly affected through policy variables. Table VIb illustrates how the contribution of the competitiveness effect varied over time across countries. The influence of this effect varied the least in Germany, where it moved within an interval of 25%. The greatest degree of variation was found it Turkey, where the competitiveness effect moved from -25.5% (in the 1976-80 period) to 94.5% (in 1980-84). On average, however, the

competitiveness residual fluctuated within an interval of 56%. The most competitive countries (with positive competitive effects for each period of analysis) included Ireland, Austria, Spain, and Norway.

It is important to recognize that a positive competitiveness effect is not equivalent to an increased market share. Over the 20-year sample period, Japan managed to increase its export market share from 6.8% in 1972 to 9% in 1992 (Table I), the largest market share increase among all OECD countries. Nevertheless, Japan experienced a negative competitiveness residual (-18%) over this period, as well as during the 1976-80, 1984-88, and 1988-92 sub-periods. During the 1988-92 interval, for example, Japan's competitiveness residual was -34.1%, but Japanese exports grew more than 10 % as fast as world exports. During this period, the primary force behind Japan's export growth was a positive commodity effect (60.6%). Demand for Machinery and High Tech commodities, the main Japanese export groups, had a greater influence on the growth of Japan's exports than did the competitiveness residual.

# Trade Policy and the Competitiveness Residual

Over the 20-year sample period, 80% of OECD countries recording a positive competitiveness effect also experienced an increase in market share (Table II, Table Va). The competitiveness effect is determined, among other factors, by a country's policies. Consequently, understanding the relationship between a country's trade policy and its competitiveness residual is an important component of understanding a country's trade performance.

The results (Table VIIa) of the ordinary least squares (OLS) regression with a common intercept (equation 5) suggest that there is no significant relationship between the competitiveness residual and trade policy. The trade policy (-2.175), exchange rate (34.441), and trend (-3.638) coefficients were not statistically significant, and the exchange rate coefficient had a positive sign. The weakness of the explanatory variables was also reflected in low  $R^2$  of 0.022. In addition, a low F-statistic (0.842) implied that the value all coefficients could simultaneously be zero.

To ensure that the regression results were not affected by a correlation between the exchange rate and trade policy variables, the exchange rate variable was regressed on the remaining explanatory variables to test for multicollinearity. The results (Table VIIb) show that the trade and exchange rate variables are not correlated.

An alternative explanation of the model's weakness could be that the model did not differentiate among cross-sections. A glimpse of the summary table of the model variables (Table VIIc) reveals that both the competitiveness residual and the exchange rate variables have large variances, reflecting diversity among sample countries.

The fixed effects model (equation 6) captured differences among sample countries by varying cross-section intercepts (Table VIIa). Again, however, the trade policy (0.103), exchange rate (7.347), and time trend (-5.302) coefficients were not statistically significant, and this time both trade policy and exchange rate coefficients were positive. Also, an the insignificant F-statistic (1.1071) once again cast a doubt on the overall significance of the regression.

It is reasonable to believe that the weak explanatory power of the model was due to cross-sectional heteroskedasticity, owing to the wide variety of countries in the sample. Accordingly, the fixed effects model was run using a Generalized Least Squares (GLS) specification with cross-sectional weights to address the problem of cross-sectional heteroskedasticity, and White Heteroskedasticity Covariance to correct for general heteroskedasticity.

This time both the trade policy (7.837), and exchange rate (-66.711) coefficients were statistically significant at 5% level of confidence (Table VIIa). The independent variables had the most explanatory power thus far, with a weighted adjusted  $R^2$  of 0.079.

However, the trade policy variable had a positive sign, suggesting that an increase in trade barriers had a positive effect on the competitiveness residual. Furthermore, as with the other specifications the F-statistic (1.389) was again not statistically significant. Finally, the time-trend variable (-0.919) was not statistically significant, suggesting that no definitive statements can be made about the competitiveness residual's movements over time.

It could easily be argued, however, that the effects of policy changes are not instantaneous. To test for delayed policy impacts on competitiveness, the right-hand side variables in above models were lagged by one period. Outcomes of those regressions (Table VIId) show that while the exchange rate variable is statistically significant in the standard OLS and fixed effects GLS models, it has a positive sign. The trade policy variable also has a positive sign throughout, but is statistically significant only in the fixed effects GLS model with White standard errors.

The lagged GLS fixed effects model with White heteroskedasticity-consistent standard errors shows all explanatory variables as statistically significant (Table VIId), with a significant F-statistic (3.78) and a weighted adjusted  $R^2$  of 0.433. However, both the trade policy (15.486) and exchange rate (219.605) coefficients are positive, suggesting that an increase in trade barriers and exchange rate promotes competitiveness. Also, the sign of the exchange rate coefficient appears to alternate over time (recall that the sign was negative when explanatory variables were not lagged).

The relationship between the exchange rate variable and the competitiveness residual, as well as the change of the sign of the exchange rate coefficient over time, is plausible from an economic standpoint. An increase in a country's exchange rate in period "t" decreases its competitiveness in period "t", which is consistent with observed results (Table VIIb). If the increase in the exchange rate is due to an increase in productivity, the contemporaneous decline in the competitiveness residual will be mitigated by an increase in exports over extended period. Consequently, an increase in a country's exchange rate in period "t-1" increases its competitiveness in period "t" (Table VIIf). It is important to keep in mind that one period in this paper represents 4 years.

It seems that regardless of the specification employed, the relationship between trade policy and the competitiveness residual cannot be unambiguously explained. There are numerous possible interpretations of the positive and significant trade barrier coefficient. For example, it could be that commodities aggregated at a 1-digit level of the SITC code do not have an elasticity of substitution greater than one, as is commonly assumed in numerous works employing CMS analysis.<sup>25</sup> Consequently, increasing trade taxes would result in an increased value of trade, even if the volume of trade declined. Following this interpretation, we would know only that commodities aggregated at the 1-digit level of the SITC code are relatively inelastic, but we would not be able to make any statements about the relationship between trade policy and the competitiveness residual.

Alternatively, an increase in the competitiveness residual (associated with an increase of trade barriers) indicates that an increased percentage of a country's change in exports cannot be explained through commodity, destination, or world trade effects. A decline in the competitiveness residual, on the other hand, suggests that the decline of trade barriers reduces 'noise', and makes a country's change in exports more transparent in terms of structural CMS effects.

Finally, an increase in a country's trade barriers might also reflect the country's export substitution, which in the short run might be correlated with an increase in the competitiveness residual.

In this study, the relationship between trade policy and the CMS competitiveness residual was found be very ambiguous. The residual is a very general term that captures almost all factors influencing exports (net of commodity composition and market destination). Consequently, it is difficult to isolate the relationship between trade policy and the competitiveness residual using just trade and monetary policy variables. When the trade policy variable is statistically significant, it has the wrong sign, one that contradicts standard economic theory. Thus, while numerous CMS studies interpret the competitiveness residual as representative of a country's trade policy, this paper could find no economically meaningful relationship between trade policy and the competitiveness residual.

<sup>&</sup>lt;sup>25</sup> Refer to the section entitled: Review of Selected CMS Studies

# Case Studies

Between 1972 and 1992, ten<sup>26</sup> out of twenty three OECD countries recorded a positive competitiveness effect (Table Va). Eight of these countries increased their world export market share, <sup>27</sup> suggesting a strong relationship between a positive competitiveness residual and an increased market share. As noted previously, however, a positive competitiveness effect does not necessarily indicate an increased market share. To illustrate, between 1972 and 1992 Japan experienced the largest percentage point increase in the market share of world exports, despite having a negative competitiveness residual.

Consequently, it is important to examine the interaction among all CMS effects to determine whether a country's market share of exports increased or decreased. The following case studies of Canada, Ireland, and Japan are meant to focus on the interaction of CMS effects, complementing the statistical analysis outlined above. The latter two countries are of particular interest, in that Japan experienced the largest absolute (percentage point) increase in market share of world exports over the sample period, while Ireland nearly doubled its market share - and also displayed one of the largest competitiveness residuals.

 <sup>&</sup>lt;sup>26</sup> Australia, Denmark, Finland, Greece, Iceland, Ireland, Norway, Portugal, Spain, and Turkey
<sup>27</sup> Two countries that did not increase their market share were Finland, and Iceland
#### Canada

The following discussion of Canadian export performance is based on the "Canada" tables (i.e. Tables VIIIa-h). The Canada tables provide a detailed illustration of the

Constant-Market-Share (CMS) analysis of changes in Canadian exports for all periods studied in this paper. This study is based on corresponding tables for each country in the sample.

For the 1972-1976 interval, Table VIIIa reveals that if Canadian exports had grown at the rate of



world exports, they would have been 1.65 times greater than their actual level. Canada was unable to maintain its market share during this period due to negative commodity (-1.5%), destination (-15.0%), and competitiveness (-48.5%) effects. Canada was unable to maintain its market share in the U.S. (the primary destination for Canadian exports), while the Canadian dollar was worth US \$1.01, on average (Figure 4). The G4 group made up the second most important destination, where again Canada was unable to maintain its market share. Japan and the Newly Industrialized Asian Economies (NIAE) comprised the third most important destination for Canadian exports, and here Canada did manage to increase its market share. South America, Africa, and the Middle East

were the only other destinations to which Canada was able to increase its market share during this period.

From 1972 to 1976, the top three Canadian exports were Machinery (including auto parts), Crude Materials, and Manufactured Goods. Recalling Figure 2, Food and Crude Materials exports experienced the largest loss in world market share, in contrast to the High Tech group, which experienced the largest increase. In order to understand Canada's trade performance, one must understand the relative importance of the Food, Crude Materials, and High Tech commodity groups within the framework of the Canadian export structure. Food exports, which comprised the fourth most important commodity group, were more than three times the value of exported High Tech commodities. The High Tech commodity group was the seventh largest Canadian export.

The Machinery, Crude Materials, and Manufactured Goods remained Canada's primary exported commodity groups during the 1976-80 and 1980-84 periods. During the 1976-80 period, Canadian export growth was again below the world average, and again the commodity and the competitiveness effects were negative (-7.6% and -28.8% respectively), while the value of exported Food was once more over 3.5 times the value of the exported High Tech group. The average exchange rate during this period had decreased (Cdn \$1 = US \$0.91), and the competitiveness effect increased by 20 percentage points, from -49% in the previous period to -29%.

Canadian exports to the United States were lower in 1980 than in 1976, as the U.S. economy was experiencing a significant slowdown. Although Canada was unable to increase its market share in the United States, it did increase its market share among the G4 members, as well as in Japan and the NIAEs - its second and third largest destinations, respectively. As a result, the Canada's destination effect was positive, at 3.5%.

On the other hand, during the general decline in world trade in the 1980-84 period, Canada actually increased its level of exports and surpassed the world rate of export growth. While both Canada and the United States were in a recession for much of this period, Canada's increase of exports to the United States may be explained by the very large competitiveness effect. The commodity effect was still negative (-5.5%), but the competitiveness (62.1%) and destination (61.9%) effects were significantly positive. During this time the value of the Canadian dollar decreased for the second consecutive period, down to US\$0.82. Whereas Canada has increased its exports to the United States, exports to the United States from the rest of the world actually decreased. The 1982 recession in the United States was one of the reasons for the generally declining level of exports to that country.

During the 1980-84 period, the Machinery commodity group was still Canada's largest export category, but the value of Manufactured Goods exports was nearing the value of exported crude materials, in large part due to the National Energy Program (NEP). By ensuring that the Canadian manufacturing sector acquired energy resources at well below world prices, the NEP lowered costs of production and gave Canadian manufacturers a competitive edge (Courchene and Telmer 1998).

During this period, the Oil and Gas group overtook the Food group, pushing the latter from fourth to fifth place. Nevertheless the value of Food exports remained over three times as large as that of High Tech exports.

According to Table VIIId, if Canadian exports had grown at the global rate of export growth during the 1984-88 period, they would have been 1.79 times larger than was actually the case. The destination and the competitiveness effects were both negative - at -39.6% and -54.6% respectively -, but for the first time the commodity effect was positive (at 14.9%). The positive commodity effect coincided with a structural change among Canada's principal exports. Whereas machinery was still Canada's leading export, manufactured goods became the second largest export group, pushing crude material exports into third place. Also, the value of the Food exports fell to 1.9 times the value of the High Tech exports, which supported the positive commodity effect. During the 1984-88 period, the value of world High Tech exports exceeded the value of the world Food exports (recall Figure 2). The value of the Canadian dollar decreased to US\$ 0.76, but Canada was again unable to maintain its market share in the United States.

In the late 1980s, there was a growing protectionist sentiment in the United States, which arguably prompted Canada to seek a bilateral free trade agreement with that country. In 1989 a free trade agreement came into effect, easing the flow of trade between the two countries. During the 1988-92 period, Canada experienced a positive competitiveness effect of 20.6%, despite the fact that the average exchange rate over this interval was US\$0.84, an increase from US\$0.76 during the preceding period (1984-88). Notwithstanding the positive competitiveness effect, Canadian export growth was below the world average rate, with negative commodity and destination effects, at -37.1% and -53.9% respectively. The negative destination effect was to a great extent due to the 1991 recession in the United States. Autos and auto parts were (and still are) the principal Canadian exports to the United States; it is consequently not surprising that, with a reduced U.S. demand, the Canadian commodity effect was negative. On the positive side, the value of exported Food decreased to 1.5 times the value of the exported High Tech commodities, and Manufacturing Goods remained the second largest exported group. However, these factors were not sufficient to make the commodity effect positive, as the value of the exported Crude Materials (for which there was a limited demand during the 1992 global economic slowdown) was nearly equivalent to the value of the exported Manufactured Goods.

Between 1972 and 1992, Canadian exports grew at well below the world average rate, with negative commodity (-25.5%) and competitiveness (-18.4%) effects, and only a marginally positive destination effect (0.9%). One of the key factors contributing to the

decline in Canada's market share of world exports over this 20 year period was the falling demand for (and thus relative value of) the Food and the Crude Materials commodity groups; both of which comprise a large share of Canadian exports. Keeping in mind that CMS analysis deals with the value - not the quantity - of exports, the declining demand for these commodity groups had a negative effect on Canada's market share of exports. Also, Canada's inability to substantially increase the High Tech group's share of Canadian exports lowered the country's trade performance.

#### Japan

In 1972, Japan began recovering from its 1971 recession with strong exports and manufacturing investment. Between 1972 and 1976, the country's exchange rate was lower than in any other period (Figure 5), helping to make it the interval with Japan's largest positive competitiveness residual (19.2%).



As Table Vb shows, Japan's commodity effect was negative over the period (-18.6%), with machinery as its largest export group, followed by manufacturing. Also, during the 1972-76 period Japan established a system of subsidies for the promotion of computer

development (OECD Economic Survey: Japan), which helped to establish Japan's High Tech sector.

During this period, Japanese exports grew marginally faster than the world rate of export growth (Table Vb). The competitiveness effect was slightly negative (-2.5%), concurrent with the appreciation of the Japanese yen. The Machinery and Manufacturing commodity groups remained Japan's two largest export categories, but the High Tech group had become a significant third. The oil shocks of the late 1980's deteriorated Japan's terms of trade, and expansionary fiscal and monetary policies resulted in strong investment, which in turn yielded high productivity gains. Japan's main markets during this period included the United States and the newly industrialized Asian economies (NIAEs).

With the decline of world exports from 1980 to 1984, Japan was one of the few countries that managed buck the trend, increasing its world market share of exports from 6.9% in 1980 to 9.1% in 1984. Japan's destination effect was 56.1%, with the United States, the NIAEs, and the Middle East comprising its main destinations. The Japanese commodity effect was 51.9%, and again Machinery and Manufacturing comprised Japan's main export groups, with High Tech running a very close third. By the start of the 1980-84 period , Japan's High Tech sector already established itself both domestically and internationally. The Japanese competitiveness effect during the period was 19.1%.

Between 1984 and 1988, the Japanese yen appreciated substantially (Figure 5). Over this period, Japan's competitiveness effect was a –34.1%. The destination effect was also negative over this period (-15.4%), but Japanese exports still managed to grow about 12% faster than the world average rate (Table Vb). This was attributable to Japan's commodity effect, measured at 60.6%. During the 1984-88 period Machinery was still Japan's number one export, but High Tech exports became the second largest exported commodity group - nearly doubling Manufacturing (which had previously occupied second place). The expansion of the Japanese High Tech sector was aided by large R&D expenditures. In 1983, for example, these expenditures were as large as 2.6% of GDP (OECD Economic Survey: Japan).

Concurrently with an appreciation of the Japanese yen (Figure 5), Japanese export growth declined in the 1988-92 interval. This was the first time in the study period that the growth of Japanese exports had declined below the world average. Japan experienced a negative competitiveness effect of -64.0%, though the commodity and destination effects were both positive, at 25.7% and 14.4% respectively. Machinery remained Japan's most important export group, with High Tech exports taking an increasingly close second place. The United States and the NIAEs remained Japan's main export destinations over this period.

Between 1972 and 1992, Japan's exports grew 40% faster than world exports, providing the largest gain in market share among OECD countries. This share increased from 6.8%

in 1972 to 9.0% in 1992. Japan's market share remained virtually constant until 1980, but increased significantly thereafter. Following the oil shocks of the 1970's and early 1980's, one of the consequences of the structural adjustment in depressed industries was Japan's rapid development of high value-added sectors, led by the electronics sector. Also, high interest rates during the early 1980s and weak domestic demand had helped to create an export-driven economy. Indeed, strong demand for Japanese exports led to strong economic growth, and between 1983 and 1992 Japan's average GDP growth was 4.0% (OECD Economic Survey: Japan). On the other hand, strong demand for Japanese exports led to substantial appreciation of the yen, which coincided with a negative competitiveness effect (-18.1%).

#### Ireland

Between 1972 and 1976, Ireland's exports grew at well below the world average rate, with negative commodity and destination effects (-22.6% and –10.5% respectively, Table Vb). Ireland's main export was Food (accounting for about 1/3 of GNP), with the Textiles and Apparel



group in a distant second place. During this period, Ireland's exports were mainly destined to the United Kingdom (54%), and although Ireland had joined the European

Economic Community (EEC) in 1973, the rest of Europe was in a second place (25%). During this period the Irish pound was relatively low (Figure 6), contributing to the positive competitiveness effect (5.9%).

After the Irish economy bottomed out around 1975, exports and high investment levels in non-agricultural products led its recovery during the 1976-80 period. An improvement in terms of trade, particularly in agriculture, had helped Ireland's exports to grow well above the world average rate. While the United Kingdom was still Ireland's main export destination (46%), the rest of Europe became a more important market (31%) , contributing to a positive destination effect of 5.5% (OECD Economic Survey: Ireland). Access to the European market, as well as a relatively low exchange rate, helped to keep Ireland's competitiveness effect positive (34.4%). The commodity effect was -8.2%, as Ireland's main export was Food.

While world trade decreased between 1980 and 1984, Ireland managed to increase its share of exports. The Food commodity group was still Ireland's number one export, but Chemical and High Tech commodity groups became second and third, respectively. The development of Irish High Tech and Chemical manufacturing industries (largely by foreign companies) was a result of generous capital grants, tax relief for industrial investment, and free access to the EEC market (OECD Economic Survey: Ireland). The development of export-oriented Irish industries helped to obtain a large positive commodity effect of 36.3% (Table Vb). During the same period, Ireland exported equal

shares of its exports to the EEC and the United Kingdom (34% each). Ireland's destination effect for the period was -39.1%, while the competitiveness effect was 132.1%, despite a strong appreciation in the Irish pound. (Figure 6.).

Between 1984 and 1988, Irish exports grew almost twice as quickly as world exports. A strong positive commodity effect (23.6%) was due to the fact that High Tech had become Ireland's primary export commodity group. A remarkable increase in Ireland's manufacturing sector was due primarily to the establishment of foreign firms, which concentrated in areas which gained most from the elimination of intra-EEC non-tariff barriers: such as High Tech and Food. A strong external environment helped to increase exports, resulting in a positive destination effect of 12.4%. A lower exchange rate also helped to maintain a positive competitiveness residual (13.9%).

With a further decline in the Irish pound in the 1988-1992 period (following a steep decline during the preceding four years), Ireland experienced a strong competitiveness effect of 26.5%. The commodity and destination effects remained barely positive, at 0.9% and 1.7% respectively. High Tech, Food, and Chemicals were Ireland's most important commodity groups during this period, with the principal contribution coming from the High Tech sector. Over this period, the number of foreign manufacturing firms increased, accounting for over 75% of Ireland's manufacturing exports by 1992 (OECD Economic Survey: Ireland). Foreign owned, export-oriented manufacturing contributed

substantially to making the EEC Ireland's most important market, followed by the United Kingdom.

Over the entire 20-year period of the sample, Ireland nearly doubled its export market share, from 0.4% to 0.7%. Over this interval, Ireland had one of the highest competitiveness residuals (45.7%) among all OECD countries. The high competitiveness residual was attributable to a number of factors: Ireland's gradual diversification of its main export destinations, Ireland's policy to establish an export-oriented manufacturing sector by attracting foreign investment, and the competitive exchange rate. As a result, Ireland's manufacturing exports increased from 10% of GDP in 1970 to just under 45% in 1992 (OECD Economic Survey: Ireland). Irish manufacturing concentrated primarily in high value-added sectors (such as High Tech), resulting in a positive commodity effect of 21.2%. Ireland also maintained a positive destination effect of 1.4%.

# TABLES

Ta	ble I: Commodity Gr	oups & Corresponding SI	<b>TC Codes</b>
Commodity	SITC Code	Commodity	SITC Code
1 – Food	0011 to 0XXX	8 – Manufactured	6112 to 64XX,
			6611 to 6XXX
2 – Bev & Tob	1110 to 1XXX	9 – Textiles	6511 to 65XX,
			8411 to 84XX
3 – Materials	2111 to 2XXX	10 – Machinery	7111 to 74XX,
			7810 to 7XXX
4 – Fuels	3221 to 32XX,	11 – Technology	7511 to 77XX
	3510 to 3XXX		
5 – Oil & Gas	3330 to 34XX	12 – Miscellaneous	8121 to 83XX,
			8510 to 8XXX
6 – Fats & Oils	4111 to 4XXX	13 – NES (not elsewhere	9110 to 9XXX
7 – Chemicals	5111 to 5XXX	specified)	

Table II: OECD	<b>Frade Export</b>	s as a Pe	rcentage	of the W	orld Expo	orts.
					<b>_</b>	
	1972	1976	1980	1984	1988	1992
Australia	1.5%	1.3%	1.1%	1.2%	1.2%	1.2%
Austria	0.9%	0.9%	0.9%	0.8%	1.0%	1.2%
Belgium-Lux.	3.8%	3.3%	3.2%	2.7%	3.2%	3.3%
Canada	5.1%	4.0%	3.5%	4.9%	4.2%	3.8%
Denmark	1.0%	0.9%	0.8%	0.8%	1.0%	1.1%
Finland	0.7%	0.6%	0.7%	0.7%	0.8%	0.6%
France	6.2%	5.7%	5.5%	5.0%	5.9%	6.1%
Germany	11.1%	10.5%	9.4%	9.2%	11.7%	11.2%
Greece	0.2%	0.3%	0.3%	0.3%	0.2%	0.3%
Iceland	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%
Ireland	0.4%	0.3%	0.4%	0.5%	0.7%	0.7%
Italy	4.4%	3.8%	3.8%	3.9%	4.6%	4.7%
Japan	6.8%	6.9%	6.9%	9.1%	9.5%	9.0%
Netherlands	4.5%	4.4%	3.8%	3.7%	3.8%	3.7%
New Zealand	0.4%	0.3%	0.3%	0.3%	0.3%	0.3%
Norway	0.8%	0.8%	0.9%	1.0%	0.8%	1.0%
Portugal	0.3%	0.2%	0.2%	0.3%	0.4%	0.5%
Spain	0.9%	0.9%	1.0%	1.2%	1.5%	1.8%
Sweden	2.2%	1.9%	1.5%	1.5%	1.8%	1.5%
Switzerland	1.6%	1.5%	1.5%	1.4%	1.9%	1.7%
Turkey	0.2%	0.2%	0.1%	0.4%	0.4%	0.4%
UK	5.8%	4.7%	6.1%	5.4%	5.8%	5.4%
USA	12.6%	11.9%	11.9%	12.3%	11.9%	12.6%
OECD exports as	a particular de la companya de la contra de la companya de la contra de la contra de la contra de la contra de					
% of World Total	71.5%	65.3%	63.8%	66.8%	72.5%	71.8%

Table III: Comr	nodities as %	of the I	fotal Wo	orld Exp	orts	
	1972	1976	1980	1984	1988	1992
1 Food	11.4%	10.2%	8.9%	8.7%	7.9%	7.6%
2 Beverages & Tobacco	1.3%	1.0%	0.9%	0.9%	1.0%	1.2%
3 Crude Materials	8.3%	7.0%	6.4%	5.8%	5.6%	4.1%
4 Fuels except Oil & Gas	0.9%	1.1%	1.0%	1.0%	0.8%	0.7%
5 Oil & Gas	8.5%	17.1%	22.4%	18.4%	6.6%	7.6%
6 Fats & Oils	0.6%	0.6%	0.7%	0.7%	0.4%	0.4%
7 Chemicals	6.9%	6.9%	7.4%	7.8%	9.1%	8.8%
8 Manufactured Goods	14.8%	13.2%	12.9%	12.0%	13.5%	12.5%
9 Textiles & Apparel	6.2%	5.1%	4.8%	5.3%	6.2%	7.0%
10 Machinery exc. High Tech	22.2%	20.6%	18.6%	19.9%	22.5%	23.3%
11 High Tech	6.0%	6.1%	6.6%	9.6%	12.1%	13.4%
12 Miscellaneous	6.7%	5.8%	6.3%	7.1%	8.9%	9.9%
13 NES/Unidentified Products	6.1%	5.4%	3.2%	2.7%	5.3%	3.5%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table IV: Dest	tinations a	s % of the	e Total W	orld Expo	orts	
	1972	1976	1980	1984	1988	1992
1 US & CAN	17.8%	15.7%	15.3%	21.4%	19.5%	17.3%
2 MEX, Caribbean ,Ctrl. America	2.3%	2.6%	2.8%	2.4%	1.8%	2.6%
3 South America	3.1%	3.0%	3.3%	2.2%	1.9%	2.3%
4 South Africa & Nigeria	1.1%	1.4%	1.4%	0.9%	0.6%	0.6%
5 Rest of Africa	3.0%	3.4%	3.0%	2.8%	2.0%	1.8%
6 Middle East	2.8%	5.0%	5.0%	5.3%	3.2%	3.7%
7 G4	25.8%	24.3%	25.7%	22.9%	26.1%	26.8%
8 Eastern Europe & former USSR	6.1%	6.1%	5.5%	5.1%	3.2%	2.6%
9 Rest of Europe	19.5%	18.7%	18.3%	15.7%	18.4%	18.3%
10 Australia & Oceania	1.5%	1.5%	1.4%	1.6%	1.5%	1.4%
11 Japan & NIAE	7.8%	9.3%	11.1%	12.2%	12.7%	14.3%
12 Rest of Asia	3.1%	3.1%	4.2%	5.0%	5.2%	6.6%
13 Unspecified/unknown	5.9%	5.7%	3.0%	2.3%	4.0%	1.7%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

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Tables Va, Vb, VIa, and VIb below served as the basis for the most Chapter Four's analysis. They show the level change in exports for each OECD country over the 20-year period (1972-1992). Tables V and VI are followed by detailed Canada tables, which provide an example of a detailed country-specific CMS analysis.

	1972-1992 Change in	World Trade	Commodity	Destination	0	
	Change in		Commonly	Desimation	Competitiveness	⊺otal %
		Effect	Effect	Effect	Effect	
	Level of Exports					
Australia	39648290	130.7	-53.7	32.3	-9.3	100
Austria	40601593	77.7	3.8	-9.2	27.8	100
Belgium*	109393317	121.0	7.1	3.3	-31.4	100
Canada	123565532	143.0	-25.5	0.9	-18.4	100
Denmark**	36291162	97.3	-3.4	-4.2	10.3	100
Finland	21360407	113.2	-15.4	-13.3	15.5	100
France	209324311	101.2	6.5	-4.9	-2.8	100
Germany	385556800	99.0	19.6	-5.8	-12.8	100
Greece	8998508	79.1	-11.1	-6.3	38.2	100
lceland	1357136	115.1	-36.5	-8.5	30.0	100
Ireland	27183249	48.2	-3.3	3.1	51.9	100
Italy	161100875	94.2	15.6	-5.1	-4.8	100
Japan	319287710	71.0	24.1	23.1	-18.1	100
Netherlands	123032410	126.4	15.6	0.8	-42.8	100
New Zealand	8167779	183.7	-78.9	10.5	-15.3	100
Norway	33593938	84.9	-4.6	-2.5	22.2	100
Portugal	17386222	60.8	0.2	-6.1	45.2	100
Spain	66359529	46.5	0.0	-2.9	56.5	100
Sweden	• 47765673	156.5	0.1	-4.7	-51.9	100
Switzerland	60216981	93.5	25.9	3.4	-22.8	100
Turkey	14066147	49.9	-15.7	-0.5	66.2	100
U.K.	183940056	109.2	13.9	-0.9	-22.2	100
U.S.A.	431262992	100.1	16.9	21.7	-38.6	100
* Belgium includ	les Luxemburg *	*Denmark inclu	udes Faroe Isla	inds		

**TABLE Va** 

	Australia	Austria	Belgium*	Canada	Denmark**	Finland	France	Germany
1972-76 Change	7025374	4679715	17059905	17964305	4847217	3463130	30269284	57414863
1) World Trade	123.1	112.9	129.8	165.0	121.9	116.6	117.9	112.5
2) Commodity	-22.1	-17.6	-12.7	-1.5	-17.1	-20.1	-15.4	-13.1
<ol><li>Destination</li></ol>	11.2	-1.1	-3.3	-15.0	-4.2	-2.2	1.3	-1.1
<ol> <li>Competitiveness</li> </ol>	-12.2	5.8	-13.9	-48.5	-0.6	5.6	-3.8	1.6
Total %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	) 100.0
1976-80 Change	9511434	8662834	30465882	30466884	7206845	7499603	53577650	84230196
1) World Trade	143.7	100.7	111.4	132.9	130.1	87.3	107.4	129.2
2) Commodity	-31.7	-5.9	-3.8	-7.6	-15.4	-9.8	-8.5	-8.4
<ol><li>Destination</li></ol>	6.1	-0.4	7.8	3.5	-0.2	-4.9	0.9	1.4
<ol> <li>Competitiveness</li> </ol>	-18.1	5.6	-15.5	-28.8	-14.4	27.4	0.1	-22.2
Total %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1980-84 Change	-131035	-1296255	-1.1E+07	23675344	-530914	-245399	-1.5E+07	-1.3E+07
1) World Trade	858.6	64.3	25.0	-18.5	150.7	277.4	31.6	70.3
<ol><li>Commodity</li></ol>	544.7	-43.5	-4.8	-5.5	-89.8	21.4	-31.7	-96.5
<ol><li>Destination</li></ol>	-1459.7	132.6	50.3	61.9	241.6	468.0	59.6	143.0
4) Competitiveness	156.3	-53.5	29.5	62.1	-202.5	-666.8	40.6	-16.8
Total %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1984-88 Change	10543933	13173526	39975383	26323553	13199591	8706741	72349914	1.58E+08
1) World Trade	106.7	59.4	63.7	179.2	59.0	77.5	62.8	50.5
2) Commodity	-15.0	27.8	24.5	14.9	10.1	18.0	22.3	30.2
<ol><li>Destination</li></ol>	0.8	2.8	16.1	-39.6	14.3	-2.1	3.2	13.5
4) Competitiveness	7.5	10.0	-4.4	-54.6	16.6	6.7	11.7	5.8
Total %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1988-92 Change	12698584	15381773	33210355	25135446	11568423	1936332	68267293	98524925
1) World Trade	92.0	66.1	97.6	170.4	88.1	408.4	85.1	121.5
2) Commodity ·	-53.0	-2.1	-3.7	-37.1	-4.8	-76.0	1.0	8.0
<ol><li>Destination</li></ol>	6.8	-3.9	4.5	-53.9	-2.3	-34.9	1.2	2.7
4) Competitiveness	54.2	40.0	1.6	20.6	19.0	-197.5	12.7	-32.3
Total %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Trough to Peak	10110000							
1980-88 Change	10412898	11877271	286571754	49998897	12668677	8461342	57210084	1.45E+08
1) World Trade	92.5	60.8	93.4	57.4	54.1	69.1	79.8	49.9
2) Commodity	-6.5	39.0	43.3	3.6	20.6	16.7	46.1	45.7
<ol> <li>Destination</li> </ol>	24.3	-21.3	-5.8	32.3	-0.5	-26.0	-21.1	-8.1
4) Competitiveness	-10.3	21.6	-31.0	6.7	25.7	40.2	-4.8	12.4
Total %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Trough to Trough								
1980-92 Change	23111482	27259044 (	618675307	75134343	24237100	10397674	1.25E+08	2.44E+08
1) World Trade	91.1	57.8	94.6	85.0	62.0	123.4	79.5	68.2
2) Commodity	-28.5	21.9	25.7	-11.3	13.9	4.4	30.3	39.9
3) Destination	15.4	-14.5	3.3	12.3	0.8	-33.5	-12.9	-9.6
<ol> <li>Competitiveness</li> </ol>	22.1	34.8	-23.6	13.9	23.4	5.7	3.1	1.5
Total %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100 0

TABLE Vb

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	Greece	Iceland	Ireland	Italy	Japan	Netherlands	New Zealand
1972-76 Change	1701226	214826	1730047	18845759	39623013	24982574	1013632
1) World Trade	69.8	121 4	127.2	136 5	08.0	103 1	247.3
2) Commodity	-13.4	-20.3	-22.6	.0.6	30.0 19.6	67	247.3
2) Destination	-10.4	-20.0	-22.0	-9.0	-10.0	0.7	-50.2
4) Competitivanese	2.0	-1.0	-10.5	00.0	1.4	-2.8	-8.6
4) Competitiveness	40.9	C.O	5.9	-29.9	19.2	-7.0	-88.5
I OTAT %	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1976-80 Change	2453583	508111	4983977	39120681	69775442	32115788	2888894
1) World Trade	106.8	81.5	68.3	97.7	99.5	141.0	100.8
2) Commodity	-7.7	-18.4	-8.2	-3.3	-7.5	6.3	-19.2
3) Destination	-0.8	-4.1	5.5	-0.2	10.4	0.1	3.4
4) Competitiveness	1.6	41.0	34.4	5.8	-2.5	-47.4	15.0
Total %	100.0	100.0	100.0	100.0	100.0	100.0	10.0
	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1980-84 Change	-114699	-162013	1409450	-2151913	36361672	-5028731	-142603
1) World Trade	213.5	27.4	-29.3	176.3	-27.2	72.5	196.4
2) Commodity	124.3	13.2	36.3	-177.3	51.9	-48.3	88.9
3) Destination	208.0	8.6	-39.1	281.8	56.1	132.5	-324.8
4) Competitiveness	-445.8	50.7	132.1	-180.8	19.1	-56.7	139.6
Total %	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1984-88 Change	480479	722045	9543969	58267864	95651551	36061315	3287542
1) World Trade	505.9	51.5	50.0000	61 7	0.08	00001010	94.2
2) Commodity	-11.2	-33	23.6	27.5	60.6	10.5	11 2
3) Destination	-11.2	-0.0	20.0	21.0	45.4	-19.0	11.3
A) Compotitivonese	-44.9	16.0	12.4	1.0	-15.4	28.7	1.6
Tetal 0/	-349.0	40.2	10.9	9.5	-34.1	-0.4	2.9
Totar %	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1988-92 Change	4477919	74167	9515806	47018484	77876032	34901464	1120314
1) World Trade	42.2	698.3	70.9	99.1	124.0	108.0	279.3
2) Commodity	1.5	-97.3	0.9	12.3	25.7	-4.1	-120.9
3) Destination	-0.3	10.9	1.7	-1.5	14.4	-4.5	9.2
4) Competitiveness	56.6	-512.0	26.5	-10.0	-64.0	0.6	-67.5
Total %	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Trough to Pook							
1000 00 Change	005700	F00000	40050440				
1900-00 Change	305780	560032	10953419	56115951	1.32E+08	31032584	3144939
1) world Trade	580.0	68.8	31.7	55.9	39.9	103.3	76.9
2) Commodity	-77.9	-18.8	21.2	39.5	59.4	11.6	-9.5
3) Destination	-259.1	-5.9	1.4	-14.7	17.2	4.0	16.8
4) Competitiveness	-143.1	55.9	45.7	19.4	-16.5	-18.9	15.8
Total %	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Trough to Trough							
1980-92 Change	4843699	634199	20469225	1.03E+08	2.1E+08	65934048	4265253
1) World Trade	95.5	132.7	37.2	67.2	57 6	106 4	124 1
2) Commodity	-7.7	-26.5	14 7	35.3	60.2	10.4	22.0
3) Destination	-27 6	_8 1	1 1	_11 Q	00.2 22 F	10.1	-00.8
4) Competitiveness	20.8	10	1.1	0.11-	20.0	-0.0	15.0
Total %	100.0	100.0	47.1	9.4 100 0	-41.3	~10./	-5.2
10tai 70	100.0	100.0	100.0	100.0	100.0	100.0	100.0

TABLE Vb (continued)

	Norway	Portugai	Spain	Sweden	Switzerland	Turkey	U.K	U.S.A.
1972-76 Change	e 4662277	531182	4991041	1E+07	8297720	1057871	2.2E+07	6.5E+07
1) World Trade	102.3	333.5	104.3	121.8	113.7	111.1	154 1	112 0
2) Commodity	-9.6	-56.7	-13.0	-17.5	-15.2	-22.8	-15.5	-13 7
3) Destination	-2.6	1.2	-0.9	-3.5	25	72	13.0	6.6
4) Competitivene	ss 9.0	-178.0	0.0 0.6	-0.0 -0.0	0	1.2	52.0	0.0
Total %	100 0	100.0	100 0	400 0	-0.9	4.0	-02.0	-4.9
Total 70	, 100.0	100.0	100.0	100.0	100.0	100.0	700.0	100.0
1976-80 Change	9 1.1E+07	2703431	1.2E+07	1.1E+07	14199346	899852	7.6E+07	1.2E+08
1) World Trade	76.6	69.1	77.3	177.8	109.3	217.8	60.7	99.3
2) Commodity	1.1	-6.3	-4.6	-16.6	0.1	-34.4	-2.8	-9.2
<ol><li>Destination</li></ol>	-0.4	-0.1	1.4	-3.6	7.4	4.2	0.8	9.7
4) Competitivene	ss 22.7	37.3	25.9	-57.6	-16.9	-87.5	41.3	0.2
Total %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1980-84 Change	710260	722564	2006074	000000	0700440	4000000	05.07	
1) World Trade	\$ 710300	733004	32002/1	-003008	-2780148	4303829	-2E+07	-4E+06
	-130.9	-30.4	-31.5	168.9	50.8	-3.3	25.3	359.9
2) Commodity	-149.9	16.8	13.3	-105.4	-76.7	-0.5	-36.5	-582.4
3) Destination	-207.3	-52.8	-50.1	264.4	59.9	-2.4	17.4	-276.0
4) Competitivenes	ss 588.1	166.4	168.3	-227.9	66.0	106.2	93.8	598.5
Total %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1984-88 Change	3289376	5957838	1.8E+07	2.2E+07	26243096	4866278	6.4E+07	1E+08
1) World Trade	298.1	43.5	64.0	66.3	49.4	72.1	78.6	112.9
2) Commodity	-289.8	14.2	11.7	22.0	29.1	52	-3.7	50 7
3) Destination	73.5	97	31	14.2	5.8	-28.2	5.0	7 /
4) Competitivenes	s 18.2	32.6	21.1	-2.5	15.7	-20.2 50.0	20.4	-7.4
Total %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
								100.0
1988-92 Change	1.4E+07	7460207	2.8E+07	5417479	14256967	2938317	4.2E+07	1.4E+08
1) World Trade	57.0	52.6	51.0	337.9	130.8	143.4	140.4	80.8
2) Commodity	3.8	1.0	0.2	-27.7	8.2	-10.2	13.2	1.8
3) Destination	0.9	-4.4	1.8	7.9	11.3	4.9	-5.6	23.8
4) Competitivenes	s 38.2	50.8	47.0	-218.1	-50.3	-38.0	-48.0	-6.5
Total %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Trough to Book								
1080.89 Ober	1007711	0004400	0 4	045.05	004000	o	=	
1960-66 Change	4007744	0091402	2.1E+07	2.12+07	23462948	9170107	4.4E+07	1E+08
1) World Trade	200.6	28.4	39.5	60.6	52.1	12.9	119.8	99.7
2) Commodity	-180.9	12.7	17.4	34.5	49.9	-0.3	48.9	90.8
3) Destination	-7.8	-3.6	-11.4	-6.0	-6.9	-5.8	-14.4	6.6
<ol><li>Competitivenes</li></ol>	s 88.1	62.5	54.5	10.9	4.9	93.3	-54.2	-97.2
Total %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Trough to Trough	'n							
1980-92 Change	- 1.8F+07	1.4F+07	5E+07	2 6F+07	37710015	1 26+07	8 65±07	215:00
1) World Trade	96.6	20 2	27 4	106 2	74 4	1.2,5707		2.45+00
2) Commodity	.55.2	29.3 0 A	10 0	24.0	11.4	21.4	133.0	88.6
3) Destination	-00.0	9.4	10.0	34.0	46.8	-1.2	40.2	48.7
() Destination	-2.2	-3.3	-0.3	-3.0	-3.4	-5.9	-18.4	13.1
H) Competitivenes	5 60.8	04./	57.6	-36.7	-14.8	85.7	-55.3	-50.4
I otal %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

TABLE Vb (continued)

	World Trade	Commodity	Destination	Competitiveness	Total %
1972-1992	(as a % of all	(Absolute			
	CMS effects)	CMS effects)	CMS effects)	CMS effects)	Value)
Australia	58%	-24%	14%	-4%	100%
Austria	66%	3%	-8%	23%	100%
Belgium*	74%	4%	2%	-19%	100%
Canada	76%	-14%	0%	-10%	100%
Denmark**	84%	-3%	-4%	9%	100%
Finland	72%	-10%	-8%	10%	100%
France	88%	6%	-4%	-2%	100%
Germany	72%	14%	-4%	-9%	100%
Greece	59%	-8%	-5%	28%	100%
lceland	61%	-19%	-4%	16%	100%
Ireland	45%	-3%	3%	49%	100%
Italy	79%	13%	-4%	-4%	100%
Japan	52%	18%	17%	-13%	100%
Netherlands	68%	8%	0%	-23%	100%
New Zealand	64%	-27%	4%	-5%	100%
Norway	74%	-4%	-2%	19%	100%
Portugal	54%	0%	-5%	40%	100%
Spain	44%	0%	-3%	53%	100%
Sweden	73%	0%	-2%	-24%	100%
Switzerland	64%	18%	2%	-16%	100%
Turkey	38%	-12%	0%	50%	100%
U.K.	75%	9%	-1%	-15%	100%
U.S.A.	56%	10%	12%	-22%	100%
AVERAGE	65%	10%	5%	20%	
Absolute value					
* Belgium inclu	des Luxemburg		**Denmark ind	cludes Faroe Island	ds

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TABLE VIa

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Recall that the <u>absolute value</u> of each influence on export growth sum to 100%. A sign indicates whether a particular influence supported (+) or hindered (-) export growth.

	Australia	Austria	Beigium*	Canada	Denmark**	Finland	France	Germany
1972-76								
1) World Trade	73.0%	82.2%	81.3%	71.7%	84.8%	80.7%	85.2%	87.7%
2) Commodity	-13.1%	-12.8%	-7.9%	-0.6%	-11.9%	-13.9%	-11.2%	-10.2%
3) Destination	6.7%	-0.8%	-2.1%	-6.5%	-2.9%	-1.5%	0.9%	-0.8%
4) Competitiveness	-7.2%	4.2%	-8.7%	-21 1%	-0.4%	3.9%	-2 7%	1 30/
Total %	100.0%	100.0%	100.0% <sup>.</sup>	100.0%	100.0%	100.0%	100.0%	100.0%
1976-80								
1) World Trade	72.0%	89.4%	80.5%	76.9%	81.2%	67.4%	91.9%	80.1%
2) Commodity	-15.9%	-5.2%	-2.7%	-4.4%	-9.6%	-7.5%	-7.2%	-5.2%
3) Destination	3.0%	-0.3%	5.6%	2.0%	-0.1%	-3.8%	0.8%	0.0%
4) Competitiveness	-9.1%	5.0%	-11.2%	-16.7%	-9.0%	21.2%	0.0%	-13.8%
Total %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1980-84								
1) World Trade	-28.4%	-21.9%	-22.8%	-12.5%	-22.0%	-19.4%	-19.3%	-21.5%
2) Commodity	-18.0%	14.8%	4.4%	-3.7%	13.1%	-1.5%	19.4%	29.6%
3) Destination	48.3%	-45.1%	-45.9%	41.8%	-35.3%	-32.6%	-36.4%	-43.8%
4) Competitiveness	-5.2%	18.2%	-26.9%	42.0%	29.6%	46.5%	-24.8%	5 1%
Total %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1984-88								
1) World Trade	82.1%	59.4%	58.6%	62.2%	59.0%	74.3%	62.8%	50.5%
2) Commodity	-11.5%	27.8%	22.5%	5.2%	10.1%	17.3%	22.3%	30.2%
3) Destination	0.6%	2.8%	14.8%	-13 7%	14.3%	-2.0%	3.2%	13 5%
4) Competitiveness	5.8%	10.0%	-4.0%	-18.9%	16.6%	6.4%	11 7%	5.9%
Total %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1988-92								
1) World Trade	44.6%	58.9%	90.9%	60.4%	77.1%	57.0%	85 1%	73.8%
2) Commodity	-25.7%	-1.9%	-3.4%	-13.2%	-4.2%	-10.6%	1.0%	1 00/
3) Destination	3.3%	-3.5%	4.2%	-19.1%	-2.0%	-10.0%	1.076	4.370
4) Competitiveness	26.3%	35.7%	1.5%	7 3%	16 7%	-4.3%	1.2/0	10 60/
Total %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Trough to Peak								
1980-88								
1) World Trade	69.2%	42.6%	53.9%	57.4%	53.6%	45.5%	52.5%	43.0%
2) Commodity	-4.9%	27.3%	25.0%	3.6%	20.4%	11.0%	30.4%	39.3%
<ol><li>Destination</li></ol>	18.2%	-15.0%	-3.3%	32.3%	-0.5%	-17.1%	-13.9%	-7.0%
4) Competitiveness	-7.7%	15.2%	-17.9%	6.7%	25.5%	26.5%	-3.2%	10.7%
Total %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Trough to Trough								
1980-92								
1) World Trade	58.0%	44.8%	64.3%	69.4%	62.0%	73.9%	63.2%	57.2%
2) Commodity	-18.2%	17.0%	17.4%	-9.2%	13.9%	2.6%	24.1%	33.5%
<ol> <li>Destination</li> </ol>	9.8%	-11.2%	2.3%	10.0%	0.8%	-20.1%	-10.2%	-8.0%
<ol> <li>Competitiveness</li> </ol>	14.0%	27.0%	-16.0%	11.4%	23.4%	3.4%	2.5%	1.2%
Total %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

TABLE VIb

	Greece	Iceland	Ireland	Italy	Japan	Netherlands	New Zealand
	010000	Iocialiu	neianu	italy	Japan	neurenanus	New Zealanu
1972-76							
1) World Trade	55.0%	77 9%	76.6%	76 2%	71 4%	86.2%	62.7%
2) Commodity	-10.6%	-13.0%	-13.6%	-5.4%	-13.6%	5.6%	-12 7%
3) Destination	2.2%	-4.9%	-6.3%	1 7%	1 0%	-2.3%	-12.170
4) Competitiveness	32.2%	4.0%	3.5%	-16 7%	14.0%	-2.5 %	-2.270
Total %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	-22.470
	100.070	100.070	100.070	100.070	100.078	100.078	100.076
1976-80							
1) World Trade	91 4%	56.2%	58 7%	91 4%	83.0%	72 4%	72 8%
2) Commodity	-6.6%	-12 7%	-7.0%	-3.1%	-6.3%	3.2%	-13 0%
3) Destination	-0.7%	-2.8%	A 7%	-0.1%	-0.076	0.0%	-13.970
4) Competitiveness	1 4%	28.3%	20.5%	5 1%	-2 1%	.24.2%	10.90/
Total %	100.0%	100.0%	100.0%	100.0%	100.0%	-24.3%	10.0%
10101 70	100.078	100.078	100.076	100.0%	100.0%	100.0%	100.0%
1980-84							
1) World Trade	-21 5%	-27 4%	-12.4%	-21.6%	-17.6%	-23 4%	-26.2%
2) Commodity	-12.5%	-13.2%	15.3%	21.0%	33.6%	-20.4%	-20.276
3) Destination	-21.0%	-8.6%	-16.5%	-34 5%	36.4%	-12.0%	-11.5%
4) Competitiveness	45.0%	-50.7%	55.8%	22 1%	12 / %		-18.6%
Total %	100.0%	100.0%	100.0%	100.0%	100.0%	10.0%	100.0%
10101 70	100.070	100.070	100.070	100.076	100.076	100.0%	100.0%
1984-88							
1) World Trade	55 5%	48 3%	50 1%	61 7%	11 7%	64.0%	91 201
2) Commodity	-1.2%	-3.1%	23.6%	27.5%	20 404	12 90/	14.270
3) Destination	-1.2.70	-5.1%	10 /0/	1 20/	7 70/	-12.0%	1 60/
4) Competitiveness	-38 /0/	J.Z /0	12.470	0.5%	-1.170	10.9%	1.0%
Total %	100.476	100.0%	100.0%	100.00/	100 00/	-4.270	2.9%
1014170	100.076	100.076	100.076	100.0.76	100.0%	100.0%	100.0%
1988-92							
1) World Trade	42.0%	53.0%	70 0%	80.6%	51 104	02.2%	59 60/
2) Commodity	1.5%	-7 4%	0.0%	10.0%	11 30/	32.270	25.0%
3) Destination	-0.3%	0.8%	1 7%	-1 2%	6 30/	-3.5%	-2.0.4 /0
4) Competitiveness	-0.070	-38.8%	26.5%	-1.2.70	29.10/	-3.0%	1.970
Total %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100 00/
10101 70	100.070	100.070	100.070	100.070	100.076	100.076	100.0%
Trough to Peak							
1980-88							
1) World Trade	54.7%	46.1%	31.7%	43.1%	30.0%	75.0%	64 7%
2) Commodity	-7.3%	-12.6%	21.2%	30.5%	44 7%	8.4%	-8.0%
3) Destination	-24.4%	-3.9%	1 4%	-11 4%	12 9%	2 9%	14 1%
4) Competitiveness	-13.5%	37.4%	45 7%	15.0%	-12.0%	-13.7%	13 3%
Total %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1010170	100.070	100.070	100.070	100.070	100.070	100.078	100.0 %
Trough to Trough							
1980-92							
1) World Trade	56.0%	78.4%	37.2%	54.3%	31.5%	80.0%	69 7%
2) Commodity	-4.5%	-15.6%	14 7%	28.5%	33.0%	7 6%	_10 N%
3) Destination	-16.2%	-4.8%	1 1%	-9.6%	12 9%	% ۵.7 %م ۱ <sub>-</sub>	-13.070 8 A0/
4) Competitiveness	23.3%	1 1%	47 1%	7.6%	-22 6%	_0.070 _11 Q0/	0.4% 2 G0/
Total %	100.0%	100.0%	100.0%	100.00%	100 00/	-11.0%	-2.9%
	100.070	100.070	100.070	100.0%	100.0%	100.0%	100.0%

TABLE VIb (continued)

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	Norway	Portugal	Spain	Sweden	Switzerland	Turkey	U.K.	U.S.A.
1972-76								
1) World Trade	82.2%	58.6%	81 7%	84 8%	85 9%	76 3%	65.6%	81.6%
2) Commodity	-7 7%	-10.0%	-10.2%	-12 2%	-11 5%	-15.7%	-6.6%	-10.0%
3) Destination	-2.1%	0.2%	_0.7%	-12.270	1 0%	5.0%	5 7%	10.076
4) Competitiveness	8.0%	-31 3%	7.5%	-0.6%	-0.7%	3 10/	-22 10/	4.0 %
Total %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100 00/	-3.0%
10101 70	100.070	100.078	100.070	100.076	100.0%	100.0%	100.0%	100.0%
1976-80				J.				
1) World Trade	76.0%	61.3%	70.7%	69.6%	81.7%	63 3%	57 5%	83.9%
2) Commodity	1.1%	-5.6%	-4.2%	-6.5%	0.1%	-10.0%	-2.7%	-7.8%
3) Destination	-0.4%	-0.1%	1.3%	-1 4%	5.6%	1 2%	0.8%	8 2%
4) Competitiveness	22.6%	23.1%	23.7%	-22 5%	-12.6%	-25 5%	20.1%	0.270
Total %	100.0%	100.0%	100.0%	100 00/	100.0%	100 00/	100 00/	100.00/
10101 70	100.076	100.078	100.076	100.0%	100.0%	100.0%	100.0%	100.0%
1980-84								
1) World Trade	-12.2%	-11.4%	-12.0%	-22.0%	-20.0%	-3.0%	-14.6%	-19.8%
2) Commodity	-13.9%	6.3%	5.1%	13.8%	30.3%	-0.4%	21.1%	32.1%
3) Destination	-19.3%	-19.8%	-19.0%	-34.5%	-23.7%	-2.1%	-10.1%	15.2%
4) Competitiveness	54.6%	62.5%	63.9%	29.7%	-26.0%	94.5%	-54.2%	-32.9%
Total %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
								1001070
1984-88								
1) World Trade	43.9%	43.5%	64.0%	63.2%	49.4%	46.1%	73.2%	46.0%
2) Commodity	-42.6%	14.2%	11.7%	21.0%	29.1%	3.3%	-3.5%	24.4%
3) Destination	10.8%	9.7%	3.1%	13.5%	5.8%	-18.0%	4.6%	-3.0%
4) Competitiveness	2.7%	32.6%	21.1%	-2.4%	15.7%	32.5%	18.8%	-26.6%
Total %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1988-92								
1) World Trade	57.0%	48.4%	51.0%	57.1%	65.2%	73.0%	67.7%	71.6%
2) Commodity	3.8%	0.9%	0.2%	-4.7%	4.1%	-5.2%	6.4%	1.6%
<ol> <li>Destination</li> </ol>	0.9%	-4.1%	1.8%	1.3%	5.6%	2.5%	-2.7%	21.1%
4) Competitiveness	38.2%	46.6%	47.0%	-36.9%	-25.1%	-19.3%	-23.2%	-5.7%
Total %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Trough to Peak								
1980-88								
1) World Trade	42.0%	26.5%	32.2%	54.1%	45.8%	11.4%	50.5%	33.9%
2) Commodity	-37.9%	11.9%	14.1%	30.8%	43.8%	-0.3%	20.6%	30.9%
3) Destination	-1.6%	-3.3%	-9.3%	-5.4%	-6.1%	-5.1%	-6.1%	2.3%
4) Competitiveness	18.4%	58.3%	44.4%	9.7%	4.3%	83.1%	-22.8%	-33.0%
Total %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
			1001070	100.070	100.070	100.070	100.070	100.070
Trough to Trough								
1980-92								ļ
1) World Trade	.45.0%	27.4%	33.5%	58.8%	52.3%	18.7%	54.0%	44.1%
2) Commodity	-25.7%	8.8%	9.6%	18.8%	34.3%	-1.1%	16.3%	24.3%
3) Destination	-1.0%	-3.3%	-4.8%	-2.0%	-2.5%	-5.1%	-7.4%	6.5%
4) Competitiveness	28.3%	60.5%	52.1%	-20.3%	-10.9%	75.1%	-22.3%	-25.1%
Total %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

TABLE VIb (continued)

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#### **TABLE VIIa**

Fixed Effects	No	Yes	Yes <sup>1</sup>	Yes <sup>2</sup>
Exchange Rate	34.441 (24.363)	7.347 (119.747)	-	7.152 (114.311)
Trade Barriers	-2.175 (9.317)	0.103 (17.648)	-0.200 (16.848)	-
Time Trend	-3.638 (9.783)	-5.302 11.109	-5.427 (10.862)	-5.272 (9.761)
N	115	115	115	115
F-Statistic	0.842	1.071	1.128	1.128
Adjusted R-squared	0.022	0.015	0.026	0.026

Pooled OLS	estimates	of the	CMS	residual

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<sup>1&2</sup> The CMS residual was also estimated using only trade barriers and trend (1), as well as using only exchange rate and trend (2). NOTE: Figures in parenthesis represent standard errors

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#### TABLE VIIb

Pooled GLS <sup>1</sup> estimates of the CMS residual								
Fixed Effects	Yes	Yes <sup>2</sup>	Yes <sup>3</sup>					
Exchange Rate	-66.711* (14.455)	-	-80.326* (15.207)					
Trade Barriers	7.837** (3.585)	11.658* (3.754)	-					
Time Trend	-0.919 (0.620)	-1.978* (0.549)	0.119 (0.641)					
Ν	115	115	115					
F-Statistic	1.389	1.351	1.413					
Adjusted R-squared	0.079	0.069	0.080					

<sup>1</sup> General Least Squares was estimated using White heteroskedasticity-consistent standard errors and covariance.

<sup>2&3</sup> The CMS residual was also estimated using only trade barriers and trend (2), as well as using only exchange rate and trend (3).

NOTE: Figures in parenthesis represent standard errors \*Denotes significance at 1 per cent; \*\*denotes significance at 5 per cent

# Table VIIc

OLS estimation of the exchange rate variable (multicollinearity test)

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Trade Barrier	-0.048 (0.036)
Time Trend	-0.014 (0.038)
N	115
F-Statistic	1.294
Adjusted R-squared	0.005

# Table VIId

## Variable Summary statistics

	Competitiveness Residual	Exchange Rate	Trade Barriers	Time <sup>1</sup> Trend
Mean	-8.010	0.437	8.666	13.000
Median	5.598	0.179	9.167	13.000
Maximum	598.484	2.147	9.900	15.000
Minimum	-666.764	0.0004	0.243	11.000
Standard Deviation	139.380	0.543	1.502	1.420
Observations	115	115	115	115
Cross-sections	23	23	23	23

<sup>1</sup> Periods begin with 11 (representing 1972-76 period) and end with 15 (representing 1988-92)

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### TABLE VIIe

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Lagged <sup>1</sup> pooled OLS estimates of the CMS residual									
Fixed Effects	No	Yes	Yes <sup>2</sup>	Yes <sup>3</sup>					
Exchange Rate	52.493 (29.462)	199.487 (146.156)	-	182.729 (142.111)					
Trade Barriers	0.726 (10.522)	11.739 (21.608)	5.515 (21.257)	-					
Time Trend	-11.876 (15.030)	-9.248 17.359	-16.584 (16.612)	-5.015 (15.427)					
Ν	92	92	92	92					
F-Statistic	1.395	1.355	1.316	1.414					
Adjusted R-squared	0.013	0.089	0.077	0.098					

<sup>1</sup> Right-hand side variables of equation 5) and 6) were lagged by one period <sup>2&3</sup> The CMS residual was also estimated using only trade barriers and trend (2), as well as using only exchange rate and trend (3). NOTE: Figures in parenthesis represent standard errors

#### **TABLE VIIf**

Lagged <sup>1</sup> pooled GLS <sup>2</sup> estimates of the CMS residual								
Fixed Effects	Yes	Yes <sup>3</sup>	Yes⁴					
Exchange Rate	219.604* (8.084)	-	147.137* (15.082)					
Trade Barriers	15.485* (1.036)	1.700 (3.641)	-					
Time Trend	-4.649* (0.780)	-7.996* (1.236)	-0.877 (0.699)					
Ν	92	92	92					
F-Statistic	3.782	1.695	2.110					
Adjusted R-squared	0.433	0.155	0.226					

<sup>1</sup> Right-hand side variables of equation 5) and 6) were lagged by one period <sup>2</sup> General Least Squares was estimated using White heteroskedasticity-consistent standard

errors and covariance. <sup>3&4</sup> The CMS residual was also estimated using only trade barriers and trend (3) as well as using only exchange rate and trend (4).

NOTE: Figures in parenthesis represent standard errors

\*Denotes significance at 1 per cent

#### **CANADA TABLES**

Canada Tables located on the following pages illustrate the Constant Market Share of changes in Canadian Exports over each of the investigated periods (Learner and Stern 1970).

The "rij" term was computed separately from the cross classification of world exports of every commodity to every destination, and then multiplied by Vij, the cross classification of every Canadian Commodity to every destination.

The  $\Sigma\Sigma$  term signifies summation over all commodities (i), and all destinations (j).

### Table VIIIa

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#### Illustration of Constant-Market Share Analysis of Changes in Canadian Exports, 1972-76 (Thousands of Dollars)

	Canadian	Canadian Exports World Exports						
	1972	1976	1972	1976				
Destination	V.j	V'.j			r.j	r.iV.i	rVi	ΣriiVii
US & CAN	1.5E+07	2.7E+07	6.1E+07	1.3E+08	1.1	1.7E+07	2.1E+07	1.9E+07
Mex., Cri. Ctr Am.	3.6E+05	7.4E+05	9.6E+06	2.5E+07	1.6	5.8E+05	5.0E+05	4 1E+05
S. America	4.2E+05	8.7E+05	1.3E+07	2.9E+07	1.3	5.5E+05	5.8E+05	4 7E+05
S.Africa & Nigeria	6.9E+04	1.3E+05	4.8E+06	1.4E+07	1.9	1.3E+05	9.5E+04	1 2E+05
Rest of Africa	1.2E+05	3.0E+05	1.3E+07	3.4E+07	1.7	2 1E+05	1 7E+05	2 2E+05
Middle East	1.0E+05	4.7E+05	1.2E+07	5.0E+07	32	3 3E+05	1 4E+05	3 3E+05
G4	2.3E+06	3.9E+06	1.1E+08	2.4F+08	12	285+06	3 2E+06	2 2 =+06
Est. Eur.&ex. USSR	4.1E+05	8.5E+05	2.6E+07	6 0E+07	14	5.5E+05	5.6E+05	8 7E+05
Rest of Europe	7.9E+05	1.4E+06	8.2E+07	1.9E+08	13	1.0E+06	1 1E+06	8 5E+05
Austral.& Oceania	2.0E+05	4.2E+05	6.4E+06	1.5E+07	14	2 7E+05	2 8E+05	2 3E+05
Japan & NIAE	1.2E+06	2.8E+06	3.2E+07	9.0E+07	1.8	2.1E+06	1.6E+06	1 5E+06
Rest of Asia	5.1E+05	6.6E+05	1.3E+07	3.0E+07	14	6.9E+05	7 0E+05	5.8E+05
Unspec./Unknown			2.5E+07	5.7E+07	1.3	0.02.00	1.02.00	0.02.00
Total	2.2E+07	4.0F+07	4 0F+08	9.6E+08	14	275+07	3 0E+07	2 7E+07
	ΣΣ\/ii	ΣΣ\/'ii	1.02.00	0.02.00	r	$\Sigma riVi$	<u>Σr\/ i</u>	<u> </u>
	22 v ij	<i>⊐⊷</i> • ij				21) V.j	24 V .J	2211j V IJ
	1972	1976	1972	1976				
Commodity	Vi.	V'i.	1072	1010	ri	ri Vi	r\/i	∑rii\/ii
Food	2.2E+06	4 1E+06	4 7E+07	9 7E+07	11	245+06	3 0E+06	2.65+06
Bev. & Tob	3 0E+05	3 4E+05	5 3E+06	9.4E+06	0.8	230+05	4 15+05	1 05+05
Crude mat.	4.5E+06	8 1E+06	3 1E+07	6 2E+07	1.0	4 5E+06	6 2E+06	4 0E+06
Fuels (no oil&gas)	2 1E+05	7 9E+05	3.8E+06		1.0	3 65+05	2 95+05	4.85+05
Oil and Gas	1.6E+06	4 7E+06	3.5E+07	1.00.07	1.1 2 Q	635+06	2.30-100	9.05+06
Fats & Oils	3.6E+04	7 3E+04	2.5E+06	5.5E+06	11	4 15+04	5 0 =+04	3.8E+04
Chemicals	6 7E+05	1.5E+06	2.0E+07	6.7E+07	1.1	9 0E+05	0.0E+05	8 4 5 + 0 5
Manuf, Goods	4 0E+06	6.5E+06	5 9 =+ 07	135+08	1.0	4.4E+06	545+06	3.05+06
Text. & Ann	2.3E+05	2 7E+05	2 6 =+07	5 1 = +07	n a	2 2 5 + 05	3 25+05	1 85+05
Mach. (no High T.)	6 7E+06	1 1F+07	8.8E+07	2 05+08	12	8 1 5+06	0.20100	5 1 5 + 06
Hich Tech	6.4E+05	1 1 5+06	2 5E+07	6 0E+07	1.2	8 8 5 + 05	8.8E±05	8 65+05
Miscellaneous	4 1E+05	7.5E+05	2.8E+07	5.7E+07	1.7	435+05	575+05	335+05
NES/unid.	7.7E+04	1.0E+00	2.65+07	5.4E+07	1.0	845+04	1 1 = +05	1 05+05
Total	2 2E+07	4 0E+07	4 0E+08	9.6E+08	1.1	2 95+07	3.05+07	2 75+07
	ΣΣVii	ΣΣ\/'ii	1.02.00	0.02.00	r.	<u>Σri\/i</u>	<u></u>	<u>Σ</u> rii\/ii
	i	<u> </u>			•	2011	21 11.	221 ij V ij
Exports								
197	2					-2 2E+07	1	nfluence
197	6					4 05+07	( (	n export
Change	•					1.85+07=	100% c	rowth
endinge						1.02.07-	10078 9	<i>i</i> owin
Due to increase in World	d Trade 🛛 🤉	:rVi				3 05+07	165.0	71 7%
Due to Commodity com	nosition A		Σr\/i & ΣΣν	ii\/ii_∑r i\/ iì	\$	-2 65+05	.15	_0 60/
Due to choice of Destination	ations A		 ΣrV i & ΣΣτί	i\/ii_∑ri \/i \	Ϋ́	-2 7E+06	-1.J _15.0	-6.070
Due to Competitiveness	5	$\Sigma V $ ii- $\Sigma \Sigma V $ ii	-ΣΣrii\/ii	( ۱۱۰ v ۱۰ اسم وا • ر	,	-8 7 =+06	-10.0	-0.070
	- <u>-</u>		ر، v ر، ، <i>ت ت</i>			1 85+07	10.00/	1000/
						1.02707	100%	100%

## Table VIIIb

## Illustration of Constant-Market Share Analysis of Changes in Canadian Exports, 1976-80 (Thousands of Dollars)

	Canadiar	Exports	World E	xports				
	1976	1980	1976	1980				
Destination	V.j	V'.j			r.j	r.jV.j	rVi	ΣriiVij
US & CAN	2.7E+07	4.4E+07	1.3E+08	2.6E+08	1.0	2.8E+07	2.8E+07	2.7E+07
Mex., Cri, Ctr Am.	7.4E+05	1.4E+06	2.5E+07	5.5E+07	1.2	8.9E+05	7.6E+05	1.3E+06
S. America	8.7E+05	2.3E+06	2.9E+07	6.4E+07	1.2	1.0E+06	8.9E+05	8.9E+05
S.Africa & Nigeria	1.3E+05	2.8E+05	1.4E+07	2.7E+07	1.0	1.3E+05	1.4E+05	1.4E+05
Rest of Africa	3.0E+05	8.3E+05	3.4E+07	6.0E+07	0.8	2.4E+05	3.1E+05	2.3E+05
Middle East	4.7E+05	7.6E+05	5.0E+07	1.0E+08	1.0	4.7E+05	4.8E+05	4.0E+05
G4	3.9E+06	7.2E+06	2.4E+08	5.1E+08	1.1	4.5E+06	4.0E+06	3.4E+06
Est. Eur.&ex. USSR	8.5E+05	2.0E+06	6.0E+07	1.1E+08	0.8	6.9E+05	8.7E+05	4.9E+05
Rest of Europe	1.4E+06	3.4E+06	1.9E+08	3.6E+08	1.0	1.3E+06	1.4E+06	1.2E+06
Austral.& Oceania	4.2E+05	7.2E+05	1.5E+07	2.8E+07	0.8	3.6E+05	4.3E+05	3.6E+05
Japan & NIAE	2.8E+06	5.3E+06	9.0E+07	2.2E+08	1.4	3.9E+06	2.9E+06	2.6E+06
Rest of Asia	6.6E+05	1.7E+06	3.0E+07	8.3E+07	1.7	1.2E+06	6.8E+05	9.5E+05
Unspec./Unknown			5.7E+07	6.0E+07	0.0			
Total	4.0E+07	7.0E+07	9.6E+08	1.9E+09	1.0	4.2E+07	4.0E+07	3.9E+07
	ΣΣVij	ΣΣV'ij			r	ΣrjV.j	ΣrV.j	ΣΣrijVij
	1976	1980	1976	1980				
Commodity	Vi.	V'i.			ri.	ri.Vi.	rVi.	ΣrijVij
Food	4.1E+06	7.2E+06	9.7E+07	1.7E+08	0.8	3.1E+06	4.2E+06	3.4E+06
Bev. & Tob.	3.4E+05	4.6E+05	9.4E+06	1.8E+07	0.9	3.0E+05	3.4E+05	2.7E+05
Crude mat.	8.1E+06	1.4E+07	6.2E+07	1.2E+08	0.9	7.1E+06	8.3E+06	7.3E+06
Fuels (no oil&gas)	7.9E+05	1.5E+06	1.0E+07	1.9E+07	0.9	6.8E+05	8.1E+05	2.5E+05
Oil and Gas	4.7E+06	8.6E+06	1.7E+08	4.4E+08	1.7	7.8E+06	4.8E+06	7.2E+06
Fats & Oils	7.3E+04	2.1E+05	5.5E+06	1.3E+07	1.4	1.0E+05	7.4E+04	1.1E+05
Chemicals	1.5E+06	3.7E+06	6.7E+07	1.4E+08	1.1	1.7E+06	1.5E+06	1.2E+06
Manuf. Goods	6.5E+06	1.2E+07	1.3E+08	2.5E+08	1.0	6.3E+06	6.7E+06	5.7E+06
Text. & App.	2.7E+05	5.5E+05	5.1E+07	9.5E+07	0.9	2.3E+05	2.7E+05	2.1E+05
Mach. (no High T.)	1.1E+07	1.6E+07	2.0E+08	3.6E+08	0.8	9.4E+06	1.1E+07	1.1E+07
Hich Tech	1.1E+06	2.3E+06	6.0E+07	1.3E+08	1.2	1.3E+06	1.1E+06	1.1E+06
Miscellaneous	7.5E+05	1.5E+06	5.7E+07	1.2E+08	1.2	8.8E+05	7.6E+05	7.8E+05
NES/unid.	1.7E+05	2.2E+06	5.4E+07	6.2E+07	0.1	2.4E+04	1.7E+05	3.3E+05
Total	4.0E+07	7.0E+07	9.6E+08	1.9E+09	1.0	3.9E+07	4.0E+07	3.9E+07
	ΣΣVij	ΣΣν'ij			r	ΣriVi.	ΣrVi.	ΣΣrijVij
Exports								
197	6					-4.0E+07	1	Influence
198	0					7.0E+07	(	on export
Change						3.0E+07=	100% g	growth
Due to increase in World	d Trade 2	ErVi.				4.0E+07	132.9	76.9%
Due to Commodity com	position A	Avg (Σri.Vi	$\Sigma rVi. \& \Sigma \Sigma i$	rijVij-Σr.jV.j	)	-2.3E+06	-7.6	-4.4%
Due to choice of Destina	ations A	Avg (ΣrjV.j-Σ	ΣrV.j & ΣΣri	ijVij-Σri.Vi.	)	1.1E+06	3.5	2.0%
Due to Competitiveness	Σ	ΣΣV <b>ij-</b> ΣΣV'ij	-ΣΣrijVij			-8.8E+06	-28.8	-16.7%
						3.0E+07	100%	100.0%

.

### **Table VIIIc**

### Illustration of Constant-Market Share Analysis of Changes in Canadian Exports, 1980-84 (Thousands of Dollars)

	Canadiar	n Exports	World E	Exports			
	1980	1984	1980	1984			
Destination	V.j	V'.j		r.j	r.jV.j	rVj	ΣrijVij
US & CAN	4.4E+07	7.1E+07	2.6E+08	3.4E+08 0.3	1.3E+07	-2.8E+06	1.2E+07
Mex., Cri, Ctr Am.	1.4E+06	1.1E+06	5.5E+07	4.5E+07 -0.2	-2.6E+05	-8.8E+04	-2.5E+05
S. America	2.3E+06	1.5E+06	6.4E+07	4.0E+07 -0.4	-8.5E+05	-1.4E+05	-8.8E+05
S.Africa & Nigeria	2.8E+05	2.4E+05	2.7E+07	1.8E+07 -0.4	-1.0E+05	-1.7E+04	-7.4E+04
Rest of Africa	8.3E+05	9.9E+05	6.0E+07	5.3E+07 -0.1	-1.0E+05	-5.2E+04	-3.8E+04
Middle East	7.6E+05	1.0E+06	1.0E+08	1.0E+08 0.0	1.4E+04	-4.7E+04	4.0E+04
G4	7.2E+06	4.8E+06	5.1E+08	4.3E+08 -0.2	-1.1E+06	-4.5E+05	-1.3E+06
Est. Eur.&ex. USSR	2.0E+06	2.1E+06	1.1E+08	9.6E+07 -0.1	-2.4E+05	-1.2E+05	-4.3E+05
Rest of Europe	3.4E+06	2.1E+06	3.6E+08	3.0E+08 -0.2	-6.2E+05	-2.1E+05	-5.9E+05
Austral.& Oceania	7.2E+05	6.4E+05	2.8E+07	3.0E+07 0.1	6.5E+04	-4.5E+04	1.8E+04
Japan & NIAE	5.3E+06	6.1E+06	2.2E+08	2.3E+08 0.1	2.7E+05	-3.3E+05	1.1E+05
Rest of Asia	1.7E+06	2.2E+06	8.3E+07	9.4E+07 0.1	2.2E+05	-1.0E+05	8.5E+04
Unspec./Unknown		1.6E+04	6.0E+07	4.5E+07 -0.2			
Total	7.0E+07	9.4E+07	1.9E+09	1.8E+09 -0.1	1.0E+07	-4.4E+06	9.0E+06
	ΣΣVij	ΣΣV'ij		r	ΣrjV.j	ΣrV.j	ΣΣrijVij
	1980	1984	1980	1984			
Commodity	Vi.		1000	ri.	ri.Vi.	rVi	ΣriiVii
Food	7.2E+06	8.5E+06	1.7E+08	1.6E+08 -0.1	-6.1E+05	-4.5E+05	-7.6E+05
Bev. & Tob.	4.6E+05	5.7E+05	1.8E+07	1.7E+07 0.0	-2.0E+04	-2.9E+04	8 5E+04
Crude mat.	1.4E+07	1.3E+07	1.2E+08	9.9E+07 -0.1	-2.0E+06	-8.5E+05	-1.4E+06
Fuels (no oil&gas)	1.5E+06	2.8E+06	1.9E+07	1.7E+07 -0.1	-1.8E+05	-9.6E+04	3.4E+05
Oil and Gas	8.6E+06	9.6E+06	4.4E+08	3.4E+08 -0.2	-1.9E+06	-5.4E+05	-2 7E+06
Fats & Oils	2.1E+05	2.4E+05	1.3E+07	1.3E+07 0.0	7.6E+03	-1 3E+04	5 2E+04
Chemicals	3.7E+06	4.5E+06	1.4E+08	1.4E+08 0.0	1.4E+04	-2.3E+05	1.3E+06
Manuf. Goods	1.2E+07	1.4E+07	2.5E+08	2.2E+08 -0.1	-1.5E+06	-7 7E+05	2.5E+06
Text. & App.	5.5E+05	5.9E+05	9.5E+07	1.0E+08 0.1	3 1E+04	-3 5E+04	1 35+05
Mach. (no High T.)	1.6E+07	3.1E+07	3.6E+08	3.5E+08 0.0	-3.3E+05	-9.95+05	5.5E+06
Hich Tech	2.3E+06	4.4E+06	1.3E+08	1 8E+08 0.4	8.65+05	-0.5E+05	2 5 = +06
Miscellaneous	1.5E+06	2.3E+06	1.2E+08	13E+08 01	1 1 =+05	-9 6E+04	6 95+05
NES/unid.	2.2E+06	2.6E+06	6.2E+07	5 0E+07 -0 2	-4 4E+05	-0.0E:04	6 8 =+05
Total	7.0E+07	9.4E+07	1.9E+09	1.8E+09 -0.1	-6.0E+06	-4 4F+06	9.0E+06
3	ΣΣVij	ΣΣV'ij		r	ΣriVi.	$\Sigma$ rVi.	ΣΣrijVij
Evporto							
1090					7 05.07		0
1980					-7.0E+07	1	ntiuence
Change					9.4E+07	(000)	on export
Change					2.4E+07=	:100% <u>(</u>	rowth
Due to increase in World	Trade D	ErVi.			-4.4E+06	-18.5	-12.5%
Due to Commodity compo	osition A	Avg (Σri.Vi	-ΣrVi. & ΣΣ	rijVij-Σr.įV.j)	-1.3E+06	-5.5	-3.7%
Due to choice of Destinat	ions A	Avg (ΣrjV.j-)	ΣrV.j & ΣΣr	ijVij-Σri.Vi. )	1.5E+07	61.9	41.8%
Due to Competitiveness	Σ	ΞΣ <mark>νij-</mark> ΣΣν'ij	-ΣΣrijVij	/	1.5E+07	62.1	42.0%
			-	-	2.4E+07	100%	100.0%
							-

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## Table VIIId

### Illustration of Constant-Market Share Analysis of Changes in Canadian Exports, 1984-88 (Thousands of Dollars)

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	Cana	adian	Exports	World E	xports				
	198	4	1988	1984	1988				
Destination	V.j		V'.j			r.j	r.jV.j	rVi	ΣriiVii
US & CAN	7.1E	+07	8.8E+07	3.4E+08	4.7E+08	0.4	2.7E+07	3.6E+07	2.9E+07
Mex., Cri, Ctr Am.	1.1E	+06	1.3E+06	4.5E+07	5.0E+07	0.1	1.4E+05	5.7E+05	3.3E+05
S. America	1.5E	+06	1.5E+06	4.0E+07	5.3E+07	0.3	4.8E+05	7.7E+05	7.8E+05
S.Africa & Nigeria	2.4E	+05	1.5E+05	1.8E+07	1.8E+07	0.0	1.6E+02	1.2E+05	-5.5E+04
Rest of Africa	9.9E	+05	9.1E+05	5.3E+07	5.7E+07	0.1	7.4E+04	5.0E+05	5.7E+04
Middle East	1.0E	+06	8.1E+05	1.0E+08	9.1E+07	-0.1	-1.1E+05	5.1E+05	-1.0E+05
G4	4.8E	+06	7.4E+06	4.3E+08	7.4E+08	0.7	3.4E+06	2.4E+06	3.6E+06
Est. Eur.&ex. USSF	R 2.1E	+06	1.2E+06	9.6E+07	9.1E+07	-0.1	-1.3E+05	1.1E+06	-6.6E+04
Rest of Europe	2.1E	+06	3.9E+06	3.0E+08	5.2E+08	0.7	1.6E+06	1.1E+06	1.7E+06
Austral.& Oceania	6.4E	+05	9.4E+05	3.0E+07	4.1E+07	0.4	2.3E+05	3.2E+05	3.5E+05
Japan & NIAE	6.1E	+06	1.1E+07	2.3E+08	3.5E+08	0.5	3.3E+06	3.1E+06	3.9E+06
Rest of Asia	2.2E	+06	3.5E+06	9.4E+07	1.4E+08	0.5	1.2E+06	1.1E+06	1.4E+06
Unspec./Unknown	1.6E	+04		4.5E+07	1.1E+08	1.5	2.4E+04	8.0E+03	-1.1E+04
Total	9.4E	+07	1.2E+08	1.8E+09	2.7E+09	0.5	3.7E+07	4.7E+07	4.1E+07
	ΣΣν	 ′ij	ΣΣV'ij			r	ΣrjV.j	ΣrV.j	ΣΣrijVij
		-	-					•	
	198	4	1988	1984	1988				
Commodity	Vi.		V'i.			ri.	ri.Vi.	rVi.	ΣrijVij
Food	8.5E	+06	9.6E+06	1.6E+08	2.2E+08	0.4	3.2E+06	4.3E+06	1.7E+06
Bev. & Tob.	5.7E	+05	5.4E+05	1.7E+07	2.8E+07	0.7	3.8E+05	2.9E+05	2.0E+05
Crude mat.	1.3E	+07	1.8E+07	9.9E+07	1.4E+08	0.4	5.8E+06	6.7E+06	5.0E+06
Fuels (no oil&gas)	2.8E	+06	2.6E+06	1.7E+07	2.0E+07	0.2	4.8E+05	1.4E+06	2.1E+05
Oil and Gas	9.6E	+06	8.2E+06	3.4E+08	1.8E+08	-0.5	-4.6E+06	4.8E+06	-3.9E+06
Fats & Oils	2.4E	+05	2.6E+05	1.3E+07	1.2E+07	-0.1	-2.4E+04	1.2E+05	-1.6E+04
Chemicals	4.5E	+06	6.6E+06	1.4E+08	2.5E+08	0.7	3.4E+06	2.3E+06	2.8E+06
Manuf. Goods	1.4E	+07	1.9E+07	2.2E+08	3.7E+08	0.7	9.5E+06	7.0E+06	6.2E+06
Text. & App.	5.9E	+05	1.0E+06	1.0E+08	1.8E+08	0.8	4.5E+05	3.0E+05	3.3E+05
Mach. (no High T.)	3.1E	+07	3.9E+07	3.5E+08	6.0E+08	0.7	2.2E+07	1.5E+07	1.9E+07
Hich Tech	4.4E	+06	6.5E+06	1.8E+08	3.4E+08	0.9	4.0E+06	2.2E+06	3.0E+06
Miscellaneous	2.3E	+06	4.0E+06	1.3E+08	2.5E+08	0.9	2.1E+06	1.2E+06	1.6E+06
NES/unid.	2.6E	+06	4.3E+06	5.0E+07	1.5E+08	2.0	5.0E+06	1.3E+06	4.7E+06
Total	9.4E	+07	1.2E+08	1.8E+09	2.7E+09	0.5	5.2E+07	4.7E+07	4.1E+07
	ΣΣV	ïj	ΣΣV'ij			r	ΣriVi.	ΣrVi.	ΣΣrijVij
Exports									
	1984						-9.4E+07	1	nfluence
	1988						1.2E+08	c	on export
Change							2.6E+07=	100% g	rowth
								-	
Due to increase in \	Norld Trade	Σ	crVi.				4.7E+07	179.2	62.2%
Due to Commodity	composition	A	.vg (Σri.Vi	·ΣrVi. & ΣΣ	rijVij-Σ <mark>r</mark> .jV.	i)	3.9E+06	14.9	5.2%
Due to choice of De	stinations	A	.vg (ΣrjV.j-)	ΣrV.j & ΣΣr	ijVij-Σri.Vi.	)	-1.0E+07	-39.6	-13.7%
Due to Competitive	ness	Σ	ΣVij-ΣΣV'ij	-ΣΣrijVij		_	-1.4E+07	-54.6	-18.9%
						_	2.6E+07	100%	100.0%

## **Table VIIIe**

### Illustration of Constant-Market Share Analysis of Changes in Canadian Exports, 1988-92 (Thousands of Dollars)

	Canadiar	n Exports	World E	xports				
	1988	1992	1988	1992				
Destination	V.j	V'.j			r.j	r.jV.j	rVi	ΣrijVij
US & CAN	8.8E+07	1.1E+08	4.7E+08	5.6E+08	0.2	1.7E+07	3.1E+07	1.0E+07
Mex., Cri, Ctr Am.	1.3E+06	1.9E+06	5.0E+07	1.0E+08	1.0	1.3E+06	4.5E+05	1.0E+06
S. America	1.5E+06	1.9E+06	5.3E+07	8.6E+07	0.6	9.7E+05	5.5E+05	7.9E+05
S.Africa & Nigeria	1.5E+05	1.7E+05	1.8E+07	2.3E+07	0.3	4.5E+04	5.3E+04	7.2E+04
Rest of Africa	9.1E+05	6.9E+05	5.7E+07	6.9E+07	0.2	1.9E+05	3.3E+05	1.4E+05
Middle East	8.1E+05	9.6E+05	9.1E+07	1.4E+08	0.6	4.5E+05	2.9E+05	3.1E+05
G4	7.4E+06	7.9E+06	7.4E+08	1.0E+09	0.4	2.9E+06	2.6E+06	1.6E+06
Est. Eur.&ex. USSR	1.2E+06	1.3E+06	9.1E+07	9.9E+07	0.1	1.1E+05	4.3E+05	2.9E+05
Rest of Europe	3.9E+06	4.5E+06	5.2E+08	7.0E+08	0.4	1.4E+06	1.4E+06	1.1E+06
Austral.& Oceania	9.4E+05	7.4E+05	4.1E+07	5.3E+07	0.3	2.8E+05	3.4E+05	1.2E+05
Japan & NIAE	1.1E+07	1.0E+07	3.5E+08	5.4E+08	0.5	5.7E+06	3.8E+06	2.8E+06
Rest of Asia	3.5E+06	3.6E+06	1.4E+08	2.5E+08	0.7	2.6E+06	1.3E+06	1.2E+06
Unspec./Unknown			1.1E+08	6.6E+07	-0.4			
Total	1.2E+08	1.5E+08	2.7E+09	3.7E+09	0.4	3.2E+07	4.3E+07	2.0E+07
	ΣΣVij	ΣΣV'ij			r	ΣrjV.j	ΣrV.j	ΣΣrijVij
	4000	4000	1000	1000				
Commodity	1988	1992	1988	1992	:		AB	5-10 /11
Food		4 45 107	0.05.00	0.05.00	<u>n.</u>	<u> </u>	<u> </u>	
Pour & Tab	9.0E+00	1.10	2.25+08	2.8E+08	0.3	2.9E+06	3.4E+06	2.6E+06
Dev. & TOD.	0.4E+00	1.12+00		4.75+07	0.7	3.6E+05	1.9E+05	2.1E+05
Eucle (no cill acc)	1.0E+07	1.75+07		1.40	0.0	-1.4E+05	0.4E+00	2.1E+05
Oil and Cas	2.00+00	2.30+00	2.00+07	2.50+07	0.2	6.4E+05	9.2E+05	3.7E+05
	0.20105		1.00000		0.0	4.65+06	2.9E+06	2.5E+06
Chamicala	2.0E+03	2.00+00	1.25+07		0.2	5.8E+04	9.45+04	3.9E+04
Monuf Coodo		7.5E+06		3.35+08	0.3	2.0E+06	2.4E+06	2.8E+06
Text & App	1.9E+07	2.22+07	3.72+08	4.65+08	0.3	5.0E+06	6.9E+06	2.0E+06
Mach (no High T)	2.05+00			2.7 =+08	0.5	5.3E+05	3.66+05	4.3E+05
Wach. (no migh 1.)	3.9E+07	4.40+07	0.UE+08	8.00+08	0.4	1.62+07	1.4+07	3.7E+06
	0.50+00	1.00+07	3.42+08	5.1E+08	0.5	3.2E+06	2.3E+06	2.8E+06
MEQuinid	4.00+00	5.6E+06	2.5E+08	3.8E+08	0.5	2.0E+06	1.4E+06	1.5E+06
	4.3E+06	8.90+00	1.5E+08	1.3E+08	-0.1	-6.3E+05	1.5E+06	8.3E+05
10(a)	1.2E+08	1.52+08	2.76+09	3.7E+09	0.4	3.7E+07	4.3E+07	2.0E+07
	22VIJ	2.2.V 1j			r	Σrivi.	ΣrVi.	ΣΣτιງVij
Exports								
198	8					-1.2E+08	1	nfluence
199	2					1.5E+08	 C	n exnort
Change					_	2.5E+07=	100% o	rowth
-								
Due to increase in Wor	ld Trade	ΣrVi.				4.3E+07	170.4	<sup>.</sup> 60.4%
Due to Commodity com	position /	Avg (Σri.Vi	ΣrVi. & ΣΣ	rijVij-Σ <mark>r</mark> .jV.j	i)	-9.3E+06	-37.1	-13.2%
Due to choice of Destin	ations /	Avg (ΣrjV.j-Σ	Σ <b>rV.j &amp;</b> ΣΣr	ijVij-Σri.Vi.	)	-1.4E+07	-53.9	-19.1%
Due to Competitiveness	s 2	ΣΣVij-ΣΣV'ij	-ΣΣrijVij		-	5.2E+06	20.6	7.3%
					_	2.5E+07	100%	100.0%

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### Table VIIIf

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# Illustration of Constant-Market Share Analysis of Changes in Canadian Exports, 1980-88 (Thousands of Dollars)

	Canadian Exports		World Exports					
	1980	1988	1980	1988				
Destination	V.j	V'.j			r.j	r.jV.j	rVi	ΣrijVij
US & CAN	4.4E+07	8.8E+07	2.6E+08	4.7E+08	0.8	3.4E+07	1.8E+07	3.8E+07
Mex., Cri, Ctr Am.	1.4E+06	1.3E+06	5.5E+07	5.0E+07	-0.1	-1.3E+05	5.8E+05	1.1E+05
S. America	2.3E+06	1.5E+06	6.4E+07	5.3E+07	-0.2	-4.1E+05	9.2E+05	-2.1E+05
S.Africa & Nigeria	2.8E+05	1.5E+05	2.7E+07	1.8E+07	-0.4	-1.0E+05	1.1E+05	-1.1E+05
Rest of Africa	8.3E+05	9.1E+05	6.0E+07	5.7E+07	-0.1	-4.6E+04	3.4E+05	7.7E+03
Middle East	7.6E+05	8.1E+05	1.0E+08	9.1E+07	-0.1	-6.7E+04	3.1E+05	-3.7E+04
G4	7.2E+06	7.4E+06	5.1E+08	7.4E+08	0.5	3.2E+06	2.9E+06	3.1E+06
Est. Eur.&ex. USSR	2.0E+06	1.2E+06	1.1E+08	9.1E+07	-0.2	-3.4E+05	8.0E+05	-4.7E+05
Rest of Europe	3.4E+06	3.9E+06	3.6E+08	5.2E+08	0.4	1.4E+06	1.4E+06	1.4E+06
Austral.& Oceania	7.2E+05	9.4E+05	2.8E+07	4.1E+07	0.5	3.5E+05	3.0E+05	4.0E+05
Japan & NIAE	5.3E+06	1.1E+07	2.2E+08	3.5E+08	0.6	3.3E+06	2.2E+06	3.7E+06
Rest of Asia	1.7E+06	3.5E+06	8.3E+07	1.4E+08	0.7	1.2E+06	6.8E+05	1.1E+06
Unspec./Unknown			6.0E+07	1.1E+08	0.9			
Total	7.0E+07	1.2E+08	1.9E+09	2.7E+09	0.4	4.3E+07	2.9E+07	4.7E+07
	ΣΣVij	ΣΣV'ij			r	ΣrjV.j	ΣrV.j	ΣΣrijVij
	1980	1988	1980	1988				
Commodity	Vi.	V'i.			ri.	ri.Vi.	rVi.	ΣriiVii
Food	7.2E+06	9.6E+06	1.7E+08	2.2E+08	0.3	1.9E+06	3.0E+06	9.4E+05
Bev. & Tob.	4.6E+05	5.4E+05	1.8E+07	2.8E+07	0.6	2.7E+05	1.9E+05	2.7E+05
Crude mat.	1.4E+07	1.8E+07	1.2E+08	1.4E+08	0.2	3.1E+06	5.6E+06	3.2E+06
Fuels (no oil&gas)	1.5E+06	2.6E+06	1.9E+07	2.0E+07	0.0	5.3E+04	6.3E+05	4.8E+05
Oil and Gas	8.6E+06	8.2E+06	4.4E+08	1.8E+08	-0.6	-5.1E+06	3.5E+06	-5.1E+06
Fats & Oils	2.1E+05	2.6E+05	1.3E+07	1.2E+07	-0.1	-1.4E+04	8.4E+04	3.5E+04
Chemicals	3.7E+06	6.6E+06	1.4E+08	2.5E+08	0.8	2.8E+06	1.5E+06	4.4E+06
Manuf. Goods	1.2E+07	1.9E+07	2.5E+08	3.7E+08	0.5	5.9E+06	5.0E+06	9.5E+06
Text. & App.	5.5E+05	1.0E+06	9.5E+07	1.8E+08	0.9	4.8E+05	2.3E+05	5.5E+05
Mach. (no High T.)	1.6E+07	3.9E+07	3.6E+08	6.0E+08	0.7	1.1E+07	6.5E+06	1.9E+07
Hich Tech	2.3E+06	6.5E+06	1.3E+08	3.4E+08	1.6	3.8E+06	9.6E+05	5.7E+06
Miscellaneous	1.5E+06	4.0E+06	1.2E+08	2.5E+08	1.0	1.6E+06	6.3E+05	2.3E+06
NES/unid.	2.2E+06	4.3E+06	6.2E+07	1.5E+08	1.4	3.1E+06	9.1E+05	5.7E+06
Total	7.0E+07	1.2E+08	1.9E+09	2.7E+09	0.4	2.9E+07	2.9E+07	4.7E+07
	ΣΣVij	ΣΣV'ij			r	ΣriVi.	ΣrVi.	ΣΣrijVij
Exports								•
. 198	0					7.0E+07	1	nfluence
198	8					1.2E+08		n exnort
Change						5.0E+07=	:100% g	rowth
Due to increase in Wor	ld Trade	∑rVi				2 05+07	67 A	57 10/
Due to Commodity com	The to Commodity composition $\Delta va$ (Sri Vi -			.5r\/i & 55rii\/ii_5r i\/ i\			26	2 60/
Due to choice of Destinations $\Delta vg$ (SriV) SrV ( $2 \times 10^{-21}$ VI. $\approx 22 \Pi$ )			i y v y=∠i . j v . ji\/ii_∑ri \/i	וי 1	1 65-107	20.0	20.0%	
Due to Competitiveness	s 5	$\Sigma V ii - \Sigma \Sigma V ii$	-ΣΣriiVii	ŋvŋ⁻∠n.vi.	/	3 45+06	52.5 67	52.5% 6 70/
	- 2				_	5 0 = 100	1000/	100.00/
						0.00000	10070	100.070

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# Table VIIIg

# Illustration of Constant-Market Share Analysis of Changes in Canadian Exports, 1980-92 (Thousands of Dollars)

	Canadian Exports		World Exports					
	1980	1992	1980	1992				
Destination	V.j	V'.j			r.j	r.jV.j	rVj	ΣrijVij
US & CAN	4.4E+07	1.1E+08	2.6E+08	5.6E+08	1.1	4.9E+07	4.0E+07	4.5E+07
Mex., Cri, Ctr Am.	1.4E+06	1.9E+06	5.5E+07	1.0E+08	0.8	1.2E+06	1.3E+06	1.4E+06
S. America	2.3E+06	1.9E+06	6.4E+07	8.6E+07	0.3	7.5E+05	2.1E+06	9.5E+05
S.Africa & Nigeria	2.8E+05	1.7E+05	2.7E+07	2.3E+07	-0.2	-4.6E+04	2.6E+05	-5.3E+04
Rest of Africa	8.3E+05	6.9E+05	6.0E+07	6.9E+07	0.1	1.1E+05	7.6E+05	1.3E+05
Middle East	7.6E+05	9.6E+05	1.0E+08	1.4E+08	0.4	3.2E+05	6.9E+05	3.6E+05
G4	7.2E+06	7.9E+06	5.1E+08	1.0E+09	1.0	7.3E+06	6.6E+06	5.7E+06
Est. Eur.&ex. USSR	2.0E+06	1.3E+06	1.1E+08	9.9E+07	-0.1	-1.9E+05	1.8E+06	-1.6E+05
Rest of Europe	3.4E+06	4.5E+06	3.6E+08	7.0E+08	0.9	3.1E+06	3.1E+06	2.6E+06
Austral.& Oceania	7.2E+05	7.4E+05	2.8E+07	5.3E+07	0.9	6.6E+05	6.6E+05	5.4E+05
Japan & NIAE	5.3E+06	1.0E+07	2.2E+08	5.4E+08	1.5	7.9E+06	4.8E+06	5.8E+06
Rest of Asia	1.7E+06	3.6E+06	8.3E+07	2.5E+08	2.0	3.3E+06	1.5E+06	2.3E+06
Unspec./Unknown			6.0E+07	6.6E+07	0.1			
Total	7.0E+07	1.5E+08	1.9E+09	3.7E+09	0.9	7.4E+07	6.4E+07	6.5E+07
	ΣΣVij	ΣΣV'ij			r	ΣriV.j	ΣrV.j	ΣΣτijVii
							•	
	1980	1992	1980	1992				
Commodity	Vi.	V'i			ri.	ri.Vi.	rVi.	ΣrijVij
Food	7.2E+06	1.1E+07	1.7E+08	2.8E+08	0.6	4.6E+06	6.6E+06	3.4E+06
Bev. & Tob.	4.6E+05	1.1E+06	1.8E+07	4.7E+07	1.6	7.4E+05	4.2E+05	4.9E+05
Crude mat.	1.4E+07	1.7E+07	1.2E+08	1.4E+08	0.2	2.9E+06	1.2E+07	3.4E+06
Fuels (no oil&gas)	1.5E+06	2.3E+06	1.9E+07	2.5E+07	0.3	4.5E+05	1.4E+06	6.2E+05
Oil and Gas	8.6E+06	1.3E+07	4.4E+08	2.8E+08	-0.4	-3.2E+06	7.8E+06	-4.0E+06
Fats & Oils	2.1E+05	2.8E+05	1.3E+07	1.5E+07	0.1	2.8E+04	1.9E+05	6.9E+04
Chemicals .	3.7E+06	7.5E+06	1.4E+08	3.3E+08	1.3	4.7E+06	3.4E+06	7.8E+06
Manuf. Goods	1.2E+07	2.2E+07	2.5E+08	4.6E+08	0.9	1.1E+07	1.1E+07	1.2E+07
Text. & App.	5.5E+05	1.5E+06	9.5E+07	2.7E+08	1.8	1.0E+06	5.1E+05	1.1E+06
Mach. (no High T.)	1.6E+07	4.4E+07	3.6E+08	8.6E+08	1.4	2.2E+07	1.4E+07	2.3E+07
Hich Tech	2.3E+06	1.0E+07	1.3E+08	5.1E+08	2.9	6.7E+06	2.1E+06	9.1E+06
Miscellaneous	1.5E+06	5.6E+06	1.2E+08	3.8E+08	2.0	3.1E+06	1.4E+06	3.8E+06
NES/unid.	2.2E+06	8.9E+06	6.2E+07	1.3E+08	1.0	2.3E+06	2.0E+06	4.0E+06
Total	7.0E+07	1.5E+08	1.9E+09	3.7E+09	0.9	5.6E+07	6.4E+07	6.5E+07
*	ΣΣVij	ΣΣV'ij			r	ΣriVi.	ΣrVi.	ΣΣrijVij
Exports	-							
1980	0					7.0E+07		Influence
1992	2				_	1.5E+08	1	on export
Change		7.5E+07=100% growth					growth	
Due to increase in Work	d Trade	∑r\/i				6 4 5 + 07	85.0	60 49/
Due to Commodity composition Ava (Sri Vi SrVi & SSriiVii Sri Vi			i)	-8 55+06	-11 2	.0 20/		
Due to choice of Destinations Avg (211.VI.~21VI. & 2211)VIJ-2[.]V.)			7 1	0.35+06	-11.J 10 2	-9.270		
Due to Comnetitiveness	$\Sigma \Sigma V ii - \Sigma \Sigma V ii - \Sigma \Sigma r ii V ii$				1 05-107	12.0	10.070	
	2		را ۷ را العلم		_	7 65±07	10.9	100.00/
						1.00001	100%	100.0%

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# Table VIIIh

### Illustration of Constant-Market Share Analysis of Changes in Canadian Exports, 1972-92 (Thousands of Dollars)

	Canadian Exports		World E	Exports				
	1972	1992	1972	1992				
Destination	V.j	V'.j			r.j	r.jV.j	rVj	ΣrijVij
US & CAN	1.5E+07	1.1E+08	6.1E+07	5.6E+08	8.2	1.2E+08	1.2E+08	1.0E+08
Mex., Cri, Ctr Am.	3.6E+05	1.9E+06	9.6E+06	1.0E+08	9.4	3.4E+06	3.0E+06	3.5E+06
S. America	4.2E+05	1.9E+06	1.3E+07	8.6E+07	5.8	2.4E+06	3.5E+06	2.1E+06
S.Africa & Nigeria	6.9E+04	1.7E+05	4.8E+06	2.3E+07	3.8	2.6E+05	5.7E+05	2.6E+05
Rest of Africa	1.2E+05	6.9E+05	1.3E+07	6.9E+07	4.4	5.6E+05	1.0E+06	5.9E+05
Middle East	1.0E+05	9.6E+05	1.2E+07	1.4E+08	10.9	1.1E+06	8.6E+05	1.1E+06
G4	2.3E+06	7.9E+06	1.1E+08	1.0E+09	8.5	2.0E+07	1.9E+07	1.3E+07
Est. Eur.&ex. USSR	4.1E+05	1.3E+06	2.6E+07	9.9E+07	2.9	1.2E+06	3.4E+06	1.5E+06
Rest of Europe	7.9E+05	4.5E+06	8.2E+07	7.0E+08	7.6	6.0E+06	6.5E+06	4.4E+06
Austral.& Oceania	2.0E+05	7.4E+05	6.4E+06	5.3E+07	7.3	1.5E+06	1.7E+06	1.2E+06
Japan & NIAE	1.2E+06	1.0E+07	3.2E+07	5.4E+08	15.7	1.8E+07	9.6E+06	9.6E+06
Rest of Asia	5.1E+05	3.6E+06	1.3E+07	2.5E+08	18.5	9.4E+06	4.2E+06	5.7E+06
Unspec./Unknown			2.5E+07	6.6E+07	1.6			
Total	2.2E+07	1.5E+08	4.0E+08	3.7E+09	8.2	1.9E+08	1.8E+08	1.5E+08
	ΣΣVij	ΣΣV'ij			r	ΣrjV.j	ΣrV.j	ΣΣrijVij
	1972	1992	1972	1992				
Commodity	Vi.	V'i.			ri.	ri.Vi.	rVi.	ΣrijVij
Food	2.2E+06	1.1E+07	4.7E+07	2.8E+08	5.1	1.1E+07	1.8E+07	1.1E+07
Bev. & Tob.	3.0E+05	1.1E+06	5.3E+06	4.7E+07	7.8	2.3E+06	2.4E+06	1.5E+06
Crude mat.	4.5E+06	1.7E+07	3.1E+07	1.4E+08	3.5	1.6E+07	3.7E+07	1.6E+07
Fuels (no oil&gas)	2.1E+05	2.3E+06	3.8E+06	2.5E+07	5.4	1.2E+06	1.7E+06	1.1E+06
Oil and Gas	1.6E+06	1.3E+07	3.5E+07	2.8E+08	7.1	1.2E+07	1.3E+07	1.3E+07
Fats & Oils	3.6E+04	2.8E+05	2.5E+06	1.5E+07	4.8	1.7E+05	3.0E+05	1.8E+05
Chemicals	6.7E+05	7.5E+06	2.9E+07	3.3E+08	10.5	7.0E+06	5.5E+06	8.1E+06
Manuf. Goods	4.0E+06	2.2E+07	5.9E+07	4.6E+08	6.8	2.7E+07	3.2E+07	2.2E+07
Text. & App.	2.3E+05	1.5E+06	2.6E+07	2.7E+08	9.3	2.1E+06	1.9E+06	2.1E+06
Mach. (no High T.)	6.7E+06	4.4E+07	8.8E+07	8.6E+08	8.7	5.8E+07	5.4E+07	5.2E+07
Hich Tech	6.4E+05	1.0E+07	2.5E+07	5.1E+08	19.2	1.2E+07	5.2E+06	1.4E+07
Miscellaneous	4.1E+05	5.6E+06	2.8E+07	3.8E+08	12.4	5.1E+06	3.4E+06	4.9E+06
NES/unid.	7.7E+04	8.9E+06	2.6E+07	1.3E+08	3.9	3.0E+05	6.3E+05	1.4E+06
Total	2.2E+07	1.5E+08	4.0E+08	3.7E+09	8.2	1.5E+08	1.8E+08	1.5E+08
	ΣΣVij	ΣΣV'ij			r	ΣriVi.	ΣrVi.	ΣΣrijVij
Exports								
1973	2					2.2E+07	1	nfluence
199:	2					1.5E+08	-	on export
Change						1.2E+08=	:100% g	growth
Due to increase in Worl	d Trade	ErVi.				1 8 <b>E</b> +08	1 <i>4</i> 3 በ	76 2%
Due to Commodity com	position /	Ava (Σri.Vi.	-ΣrVi, & ΣΣ	riiVii-Σr iV	.i)	-3 2E+07	-25.5	-13.6%
Due to choice of Destinations $\Delta_{VG}$ ( $\Sigma_{IV}$ ) $\Sigma_{VI}$ $\lambda_{ZI}$ $V_{I}$ $\lambda_{ZI}$ $\lambda_{ZI}$ $V_{I}$ $\lambda_{ZI}$ $\lambda_{ZI}$ $V_{I}$ $\lambda_{ZI}$ $\lambda$				) 	1 1 = +06	-20.0 N Q	0.5%	
Due to Competitiveness	ΞΣΥίι-ΣΣΥ'ί	-ΣΣrjiVii	., • ., • • •	,	-2 3E+07	-18 A	_0.0%	
	-	, <b></b>	,, <b>, , ,</b> ,			1.2E+08	100%	100.0%

,

### **CHAPTER FIVE: CONCLUSION**

In the Constant Market Share (CMS) Model, differences in export growth among countries are explained on the basis of three general factors: competitiveness, composition of exports, and the level of demand in destination markets. Using CMS analysis for the period 1972-92, it was found that competitiveness and composition of exports were the two most important factors leading to increased export shares among OECD countries. In fact, all countries showing an increase in market share between 1972 and 1992 (Table II) had either a positive commodity or a positive competitiveness effect (Table Va).

Over the 20-year sample period, 80% of OECD countries recording a positive competitiveness effect also experienced an increase in market share. The competitiveness effect is determined, among other factors, by a country's policies. It was found that movements in the exchange rate variable did have predicative power in relation to the competitiveness residual. In contrast, a trade policy variable (represented by trade tax revenue as a percentage of total trade) did not meaningfully explain the behavior of the competitiveness residual.

A positive competitiveness residual is not equivalent to an increase in the market share. Over the 20-year sample period, Japan gained the largest market share (2.2 percentage points), even though it displayed a negative competitiveness residual. More generally, it is evident that no single CMS effect is sufficient to increase a country's market share of world exports, and that changes in market share depend upon the relative magnitudes of all CMS effects.

The study also highlighted the changing structural composition of world exports over the sample period. In 1972, crude materials and food accounted for 20% of world exports, whereas the high-tech exports comprised only 6%. By 1992, the share of crude materials and food exports had decreased by more than three-fifths (to less than 12%), whereas the share of high-tech exports had more than doubled (to 13%). As illustrated in Table II (which shows changes in market shares among OECD countries), these structural changes had significant negative effects on commodity-exporting countries such as Australia and Canada, and highly positive effects on countries specializing in high-tech exports, such as Japan and Ireland.

One issue this paper does not address – outlining a path for future research – concerns the need for improved measurement of policy variables in the CMS model. Possibly, a trading partner's trade policy could be examined when explaining the competitiveness residual. In addition, the phenomena of declining merchandise trade and expanding trade in services bear further examination within the CMS framework; for example, addressing the question of whether a country may be able to increase its share of world trade despite declining merchandise trade exports.

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### **APPENIX A: DATA PROCESSING**

This chapter describes the methodology behind the construction of Statistics Canada's World Trade Database (WTDB) used in this paper, and how the WTDB data was organized for the purposes of CMS analysis (Feenstra, Lipsey, Bowen 1997). As mentioned above, this paper uses the World Trade Database (WTDB) constructed by Statistics Canada, which tracks the bilateral trade flows for all countries over the 1970-1992 period. The data is classified according to the Standard International Trade Classification (SITC), Revision 2. The WTDB is based on the United Nations "Commodity Trade Statistics" (CTS) publication, but it also includes countries that do not report to the United Nations. Because of the symmetrical nature of trade transactions, a great deal of missing export reports from a particular country can be reconstructed with the import data of that country's trading partners, and vice-versa.

The value-added of the WTDB is that while the CTS does not ensure consistency of the reported figures across the countries or years, the WTDB attempts to accommodate the variations in the way countries report their data. The difference between the exporter's and the importer's recorded value of a trade can be a result not only of an attempt to evade taxes or regulations, but also of a different treatment of the transport costs. Additional differences come from the uncertainty of the commodity valuations and designations, or the uncertainty of exports' source or destination.

The WTDB reports a single value for an export/import transaction. Country A's total exports were referenced to the total imports from a country A, reported in the International Monetary Fund's highly detailed "The Directions of Trade" (DOT). The import values are generally reported on the c.i.f. basis (cost, insurance, freight), where as the exports are reported on the f.o.b. basis (free on board). Consequently, the value of reported imports would generally be higher than the value of exports. The discrepancies are adjusted on the regional level, if they are below 15%. Above 15%, the world discrepancies are distributed among three regions of the world (Europe/Mediterranean, the Americas, and Asia), and then proportionately distributed among the countries within each region.

Many exports or imports are reported for groups of partner countries (such as "EEC, not elsewhere specified (n.e.s.)"). Again, in the following cases Statistics Canada relies on the symmetry of trade to allocate transactions using records of parties involved. For example, if a country's reported exports to a region are higher than region's recorded imports, recorded imports are taken as correct and surplus exports are considered to be mistakenly recorded or to have gone elsewhere. If in the above example a country's recorded exports to a region are smaller than region's recorded imports, exports to the unspecified destinations are allocated among those countries reporting excess imports, up to the levels recorded in DOT. Statistics Canada also attempts to address yet another reason for the difference between the export and the import reports; the so-called "Entrepot Trade". The "Entrepot Trade" takes place when a country B imports from a country A, but instead of reporting the import it exports it to a country C. Country C, in turn records the import as if it came straight from the country A. The discrepancy comes from the fact that the country C claims to be the final destination, while the country A recorded the country B (the entrepot) as its final destination. In the above example, there is an entrepot surplus between countries A and B, and an entrepot deficit between countries A and C. Following the example above, if the entrepot surplus (between A and B) is larger than the entrepot deficit (between A and C), the difference is added to country B's imports. If, on the other hand, the surplus (between A and B) is smaller than the reported deficits (of numerous C countries in country B's region), then that surplus is distributed within the region among those C countries reporting the deficit.

Statistics Canada designed the WTDB in with a particular purpose in mind; namely, to be able to evaluate Canada's international trade position. As the data is classified according to the Standard International Trade Classification (SITC), some alterations were made to ease comparison with the Canadian data. Additional alterations were a result of incomplete reporting at the 4<sup>th</sup>, 3<sup>rd</sup>, or 2<sup>nd</sup> digit level. For example, 773X represents a good in the 773 group where either there is not enough information to classify it at the forth digit level, or the good does not match any of the classified groups. By the same token, 6XXX represents unallocated manufactured goods in SITC section 6.

The WTDB begins in 1970. In 1975 SITC revision 2 was published to provide a better treatment of computers and high technology sectors. In cases where Revision 1 did not correspond well with Revision 2, Statistics Canada often aggregated old categories into new ones, ending with a letter "A" in place of the fourth digit. The same procedure was followed if aggregating two SITC revision 2 groups into one would allow for a better comparison with the Canadian data. For example, group 5241 (Fissile Chemical Elements and Isotopes) and group 5249 (Other Radioactive and Associated Materials) were aggregated into group 524A (Radioactive and Associated Materials).

The WTDB data files are in an ASCII format, with each file organized into four columns: 1) Importing country, 2) SITC, Revision 2 code, 3) Exporting country, 4) Value of trade (thousands of U.S. dollars). Initial work on the data was done in Excel and Access. First, six workbooks were created in Excel, each workbook corresponding to a four-year interval, starting in 1972 and ending in 1992. Each workbook had numerous worksheets to accommodate the data for the entire year (since each worksheet is limited to 65,000 records). The order of columns was rearranged to: 1) Exporting Country, 2) Importing Country, 3) SITC code, 4) Value of imports. Thereafter, each worksheet was sorted according to the SITC code. Neither Excel nor Access are able to operate on a column of data which contains both text and numbers, so sorting according to the SITC code separated those codes that were numbers only, and those codes ending with an X or an A, which were considered text. As mentioned above, exports were grouped according to the first, or first two digits of the SITC code. Consequently, the detailed classification at the 3<sup>rd</sup> or 4<sup>th</sup> digit level was irrelevant. Accordingly, for all codes ending with an X, XX, or A, the last two digits were replaced with  $01^{28}$ . That allowed the computer to process SITC codes as numbers. Nevertheless, some codes were unassigned at the 2-digit (division) level (ex. 7XXX – Machinery and Transport Equipment). In following instance Excel would return an error message instead of a code ending with 01. Another column was created to check for the error messages where SITC code was unassigned at the division level. In case of error messages, SITC code was corrected manually (ex. 7XXX was re-entered as 7001)<sup>29</sup>. Once the column with the codes contained only numbers, the files were exported to Access.

Six table files were created in Access, one for every interval year. Within each file, additional two columns were created: "Commodity", and "Destination"<sup>30</sup>. The commodity column grouped all SITC codes into 13 commodity groups, and the destination column grouped all of importing countries into 13 regions, both of which were described above. After countries and commodities were grouped, six tables (one for each year) were recreated, this time containing only four columns: 1) Exporting country,

<sup>&</sup>lt;sup>28</sup> Another column was created with the Excel code which allowed replacing the last two digits with "01". The code was as follows: =if((left(SITC cell address,2)\*1)<10,left(SITC cell address,2)\*100+1,left(SITC cell address,2)\*100+1) The value returned by the code was cut and pasted as a value in place of the original SITC codes. <sup>29</sup> The Excel code which checked for the empty cells or cells with the SITC code incomplete at the 2 digit

<sup>&</sup>lt;sup>29</sup> The Excel code which checked for the empty cells or cells with the SITC code incomplete at the 2 digit level was as follows: =if((isnumber(cell address in column with "01" endings),0,if(isblank(cell address of in a SITC code column),1,1))

2) Destination of exports, 3) Commodity group being exported, and 4) Value of exports. Each table was sorted by three categories: exporting country, destination of exports, and commodity group being exported. Sorted tables were again exported to Excel.

If each country exported every commodity group to every destination, there would be 169 observations for each country for every interval year (13 commodity groups sent to 13 destinations). Unfortunately, observations for each country were not continuous over the five four-year intervals. There was no data where a country stopped exporting to a region, or all together stopped exporting a given commodity group. Similarly, data was not continuous if a country began to export a commodity group or began to export to a particular region. As a result, blank spaces had to be inserted where there was no export data (bringing the total number of observations for each country up to 169) to allow for consistent comparison of exports of each commodity to each destination across countries and interval years. Once each country had 169 observations, a summary table was created containing nine columns: exporting country, destination of exports, commodities exported, and six columns reporting value of exports for every interval year – starting with 1972 and ending with 1992.

One of the reasons why blank spaces, or "no exports" pose difficulty, is because the growth or decline rates of exports between periods become very volatile. For example, if

<sup>&</sup>lt;sup>30</sup> Commodity and destination columns were a result of summing dummy columns; one dummy column for each destination or commodity.

export growth is examined over three periods, and there are no exports in the second period, there will be a 100% decline in exports between period one and period two, and a substantial increase between period two and period three.

In order to achieve a balanced view of OECD countries' real export growth, four scenarios have been created. The first scenario examines growth rates in five four-year intervals. The second scenario observes growth of exports between a trough and a peak of the world business cycle. The third scenario observes growth of world exports between two troughs. The purpose of the last two scenarios is to examine the variability of export growth due to the business cycle fluctuations. World Bank's World Tables<sup>31</sup> were used to determine which of the six observed years (1972 '76 '80 '84 '88 '92) corresponds to the through or a peak of world output. The final scenario observes each country's export growth between 1972 and 1992.

Accordingly, 8 summary tables were created for each country: 5 tables for the first scenario corresponding to each 4-year interval, 1 table for second and third scenario, and one table for the 20-year period (184 tables in total). Each summary table displayed a chart grouping exports by their destination, a chart grouping exports by the commodity being exported, and analysis attributing the growth of exports to four factors: world

<sup>&</sup>lt;sup>31</sup> World Growth for year 1972 was taken from the World Bank's World Tables 1993. World growth for the remaining years was taken from World Tables 1995. The world output growth rates were as follows: 1972 5.3%, 1976 5.0%, 1980 1.6%, 1984 4.5%, 1988 4.4%, 1992 1.3%. Trough years were 1980 and 1992. For trough-to-peak growth 1980 and 1988 figures were used. Albeit 1984 growth was 0.1% higher than in 1988, 1988 growth represents more advanced stage of the world business cycle.

growth of exports, commodity composition, market distribution, and competitiveness effect. Each factor is shown as a percentage of the change in exports, in dollars totaling to change in exports, and as a percentage of all factors resulting in the change in exports. Above tables served as the source of information for the remaining aggregate summary tables and graphs. An example of country-specific table can be found in the Analysis chapter, which contains summary tables for Canada.

Destination	Corresponding WTDB Codes					
United States and Canada	218400, 211240					
Mexico, Caribbean, Central America	220600,368962,334840,365900					
	341880-360840					
South America	330320-332180, 336000-338960					
	362380-363280, 367400-368960					
South Africa and Nigeria	117100, 165660					
Rest of Africa	130120-168960, excluding 165660					
Middle East	413760, 440480-448960					
G4 Members	532500, 532800, 533800, 538260					
Eastern Europe, former USSR	580080-688100					
Rest of Europe	223040, 530560-578960					
e.	excluding: 532500,532800, 533800, 538260					
Australia and Oceania	728882, 710360-728960					
	excluding: 720900					
Japan, Newly Industrialized Asian Economies	413920, 454100					
	457020 457640, 58960					
Rest of Asia	457640, 450040-451440, 453560-453600					
	454180-456080,481560-488960					
Unspecified/Unknown Destinations	908960, 999999					