
Opportunity Index Development for Bank Branch Networks

By

Heather Vance

**A thesis submitted in conformity with the requirements
for the degree of Masters of Applied Science
Graduate Department of Mechanical and Industrial Engineering
University of Toronto**

© Copyright by Heather Vance, 2000



National Library
of Canada

Acquisitions and
Bibliographic Services

395 Wellington Street
Ottawa ON K1A 0N4
Canada

Bibliothèque nationale
du Canada

Acquisitions et
services bibliographiques

395, rue Wellington
Ottawa ON K1A 0N4
Canada

Your file Votre référence

Our file Notre référence

The author has granted a non-exclusive licence allowing the National Library of Canada to reproduce, loan, distribute or sell copies of this thesis in microform, paper or electronic formats.

The author retains ownership of the copyright in this thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without the author's permission.

L'auteur a accordé une licence non exclusive permettant à la Bibliothèque nationale du Canada de reproduire, prêter, distribuer ou vendre des copies de cette thèse sous la forme de microfiche/film, de reproduction sur papier ou sur format électronique.

L'auteur conserve la propriété du droit d'auteur qui protège cette thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.

0-612-54116-9

Canada

Abstract

Technological progress over the past several years has provided the Financial Services Industry with the opportunity to develop a myriad of service channels from which customers can procure products. As these alternatives to traditional branch banking become more and more popular, it becomes vital for financial firms to monitor the cost and location issues associated with maintaining bank branch networks. The need for branch locations has not vanished however, branch networks need to keep pace with changes in customer demographics and behavior. The need to evaluate these branch networks has prompted this research.

This thesis addresses the need to evaluate factors such as the number of competitors and socioeconomic characteristics of clients within branch trade areas. A comprehensive overview of pertinent customer behaviour research and literature on possible methodologies for measuring trade area composition are presented. In addition, an innovative method defining trade areas based on assigning customers areas to branches is employed. This method provides the foundation for the Opportunity Index methodology, which uses Multiplicative Competitive Interaction theory and Statistics Canada census information to assess the probable dollar opportunity available to individual bank branches within a trade region.

In this research the Opportunity Index is employed to determine index values for over 1500 financial institution branches across the GTA and Niagara region. The Opportunity Index value provides a useful measure of the competitive and socioeconomic environment of a branch's trade area. The index values for the data set ranged from 0.0037 to 0.4365, while the average index value was 0.0991. Examination of index values revealed a right skewed distribution. This concentration of smaller index values implies that selection of a cut-off point for investigating lower opportunity will vary with the analyst's interests.

The Opportunity Index methodology was successful in identifying regions of less opportunity based only on customer residence. Conversely, the majority of branches with high index values were on the perimeter of the study area. These branches, on the perimeter should be treated as anomalies in evaluation. Individual firms were also isolated to measure the average performance of their branch networks. No real significant difference between firms was found except for the slightly lower average performance of the Laurentian Bank, which coincidentally had the lowest number of branches in the study region.

This research shows that the Opportunity Index derived is a useful tool to be used in identifying branches with low opportunity. The Opportunity Index can be used as a diagnostic tool, which could be used in preliminary investigation or as a component in more detailed multi-faceted analysis of branch location.

Acknowledgements

To begin, I would like to express my deepest gratitude to Professor Paradi who provided me with the opportunity, confidence and motivation to continue on to graduate studies. His competence, energy and positive attitude are truly contagious, as is apparent in the fantastic individuals who work here in the CMTE. The CMTE consists of some of the most intelligent, competent, fun, caring and creative people I have ever met. So, thank you Burcu, Fai, James, John, Kerry, Ozren, Paul, Rinku, Sandra, Taraneh, and Zijiang for creating one of the most positive and supportive groups I have ever been a part of.

I must also thank Professor Jones who provided me with invaluable advice and resources, without which this thesis would not have been possible. Similar to the CMTE, Professor Jones has created a fun learning environment in the CSCA. From the CSCA, I must specifically thank Marco and Gleb, for the numerous software tutorials, abundant technical knowledge and awesome programming expertise they provided.

Last and certainly not least, I must thank those people I love. Thank you to all my friends and family for their tireless support in everything I do. To my mother, Adrian whose caring and logical advice provides a steady keel that helps steer my life. To my father, Allan, whose endless energy and thirst for knowledge has always astounded me. To my brother, Russell, who I refer to as a best friend.

TABLE OF CONTENTS

ABSTRACT	I
ACKNOWLEDGEMENTS.....	III
LIST OF FIGURES.....	VI
LIST OF TABLES.....	VII
1.0 INTRODUCTION.....	1
1.1 BACKGROUND	1
1.2 RETAIL BANKING SERVICE	2
1.3 THE SERVICE NETWORK.....	3
1.4 PROJECT IDENTIFICATION	3
1.5 THESIS OBJECTIVES	5
1.6 ORGANIZATION OF PAPER.....	6
2.0 ISSUES IN INDEX DEVELOPMENT	8
2.1 CUSTOMER BEHAVIOR AND THE BANKING INDUSTRY	8
2.1.1 <i>Bank Branch Users vs Profitable Customers</i>	9
2.1.2 <i>Concerns of Branch Users</i>	11
2.2 LOCATION FACTORS.....	11
2.4 TRADE AREAS.....	12
3.0 LITERATURE REVIEW	14
3.1 TRADE AREA METHODOLOGY	14
3.2 SPATIAL INTERACTION MODELS	16
3.2.1 <i>Reilly's Law</i>	17
3.2.2 <i>Huff's Use of Gravity Theory</i>	19
3.3 REVIEW OF RETAIL POTENTIAL MODELS.....	20
3.3.1 <i>Space-Sales Ratio Method</i>	21
3.3.2 <i>Sales Activity Index</i>	22
3.3.3 <i>Buying Power Index</i>	22
3.3.4 <i>Net Trade Flow Index</i>	23
3.3.5 <i>Index of Retail Saturation</i>	24
3.3.6 <i>Summary of Factors to Include in an Opportunity Index</i>	24
3.3.7 <i>Analog Method</i>	25
3.3.8 <i>Regression Analysis</i>	26
3.3.9 <i>Multiplicative Competitive Interaction Model</i>	28
4.0 BANK BRANCH PERFORMANCE ANALYSIS.....	32
WORK IN PRIVATE INDUSTRY.....	32
SOME GENERALLY ACCEPTED PRINCIPLES	33
REGRESSION ANALYSIS IN BRANCH OPPORTUNITY EVALUATION	34
5.0 MODEL FORMULATION.....	40
5.1 DEVELOPMENT OF THE UTILITY FUNCTION FOR FINANCIAL INSTITUTIONS.....	40
5.2 COMPETITION ANALYSIS	44
5.3 CONSUMER CHOICE REGION.....	45
5.4 OPPORTUNITY ANALYSIS	47
5.6 OPPORTUNITY INDEX FORMULATION	48

6.0	THE DATA	51
6.1	DATA REQUIREMENTS.....	51
6.2	GENERATION OF FINANCIAL FIRMS AND RETAIL LOCATIONS	52
6.2.1	<i>Financial Industry Firms:</i>	52
6.2.2	<i>Geocoding using Postal Codes:</i>	53
6.2.3	<i>Generation of Other Retailers</i>	54
6.3	STATISTICS CANADA BOUNDARY FILES AND CENSUS INFORMATION.....	56
6.3.1	<i>Enumeration Area Boundary Files</i>	56
6.3.2	<i>1996 Census Data</i>	57
6.3.3	<i>Random Rounding and Data Suppression</i>	58
7.0	ANALYSIS AND RESULTS	63
7.1	ISSUES IN SOFTWARE CAPACITY	63
7.2	CALCULATING BRANCH SCORE	66
7.3	FINDING THE 10 CLOSEST BRANCHES TO EACH EA.....	69
7.4	DETERMINING THE UTILITY VALUE AND PROBABILITY SCORE.....	72
7.5	OPPORTUNITY INDEX RESULTS.....	74
7.5.1	<i>Analysis of Opportunity Index Distribution</i>	75
7.5.3	<i>Branch Network Performance Among Firms</i>	81
8.1	CONCLUSIONS	83
8.1.1	REVIEW OF OPPORTUNITY INDEX METHODOLOGY.....	85
8.2	RECOMMENDATIONS FOR FUTURE RESEARCH	87
	REFERENCES	90
	GLOSSARY OF TERMS AND ABBREVIATIONS	94
	APPENDIX I: TRADE AREA METHODOLOGIES	96
	APPENDIX II: LIST OF FINANCIAL FIRMS	98
	APPENDIX III: QUERIES FOR RETAIL LOCATIONS	100
	APPENDIX IV: SAMPLE OF UTILITY AND PROBABILITY CALCULATIONS	101
	APPENDIX V: INDEX VALUES BY FINANCIAL FIRM	103
	BANK OF MONTREAL.....	104
	CANADIAN IMPERIAL BANK OF COMMERCE.....	107
	CANADA TRUST	111
	LAURENTIAN BANK.....	113
	ROYAL BANK OF CANADA	114
	TORONTO DOMINION BANK.....	117
	BANK OF NOVA SCOTIA.....	121
	CREDIT UNIONS.....	125
	APPENDIX VI: REVIEW OF OTHER INDICES	128
	APPENDIX VII: THE FINANCIAL SERVICES INDUSTRY IN CANADA	134
	CHARTERED BANKS.....	134
	CREDIT UNIONS.....	135
	TRUST COMPANIES.....	136

List of Figures

Figure 1 (a,b,c): Thiessen Polygon Construction.....	15
Figure 2: Reilly's Formula.....	18
Figure 3: Example of Proximity Scoring.....	42
Figure 4: Customer Choice Region.....	46
Figure 5: Illustration of 7221 EAs Chosen for Analysis	57
Figure 6: Branch Choices for EA Located Near Boundary of Study.....	65
Figure 7: Branch Choices for EA with Boundary Removed	65
Figure 8: Average Proximity Scores by Financial Institution	68
Figure 9: Example of Resultant Trade Area	70
Figure 10: Distribution of Trade Area Size.....	71
Figure 11: Comparison of Probabilities Based on Distance Rank.....	73
Figure 12: Distribution of Opportunity Index Values	76
Figure 13: Location of Branches with Opportunity Index < 0.01.....	77
Figure 14: Comparison of Suppressed EA Data & Low Opportunity Index Values.....	78
Figure 15: Location of Branches with an Index Value > 0.3	79
Figure 16: Average Index Values of Financial Institutions.....	81

List of Tables

Table 1: Calculation of Applebaum's per Capita Sales.....	26
Table 2: Summary of Regression Analyses on Bank Branches.....	35
Table 3: Results of Clawson's Stepwise Regression Analysis	37
Table 4: Results From Market Area Analysis Models	39
Table 5: Proximity Scoring Method.....	41
Table 6: Probability Matrix	48
Table 7: Data Requirements	51
Table 8: Final Database Components.....	55
Table 9: Sampling Error in Statistics Canada Data based on a 20% Sample.....	58
Table 10: Example of Proximity Computation using Grocery Stores	67
Table 11: Summary Statistics for Trade Area Generation	70
Table 12: Comparison of Proximity Score vs Distance Only Calculations	73
Table 13: Summary Statistics for Opportunity Index Values.....	75
Table 14: Characteristics of Branches with Opportunity Index > 0.3.....	80

1.0 Introduction

1.1 Background

Canadians are served by more than 3,000 organizations providing financial services. Canada's 54 banks employ more than 221,400 people and the six largest banks have a payroll of about \$13.8 billion. This number represents about 1.6% of Canadian employment. This large network of branches across the country has not only made Canadian banks one of the major private sector employers but has also provided Canadians with the highest ratio of full service bank branches to population in the world.

Moreover, Canada offers one of the most efficient, reliable and low-cost banking systems where 8,140 branches and 14,484 automated banking machines help manage and provide access to over \$1.2 trillion in assets. In 1992, the Bank Act and the legislation governing other types of financial institutions underwent major revisions and increased competition by permitting banks, trust and loan companies to diversify into each other's markets. As this public-policy framework continues to evolve, rapid industry changes are taking place. These changes are powered by technological innovation, globalized financial markets and shifting customer demographics, new expectations and diverse behaviour.

These changes in technology and competition have provided consumers with more innovative products, improved access to financial services, greater convenience and more attractive pricing. All of these changes have made traditional branch banking a high-volume, low-margin industry. On average in 1997, every \$100 of assets earned only 71 cents. In response, financial institutions are involved in numerous mergers, joint ventures, strategic alliances and acquisitions to improve returns. This situation has brought the cost of delivery channels and specifically the branch service network to the forefront of concern [CBA98].

In order to understand the concerns regarding the bank branch service network it is useful to review the primary functions a bank performs. A general description of these services follows.

1.2 Retail Banking Service

Bank activities can be divided into several different categories. Some of these activities are standard services provided through various media, while others are internal activities.

These different banking activities are:

1. Traditional banking

- Deposits
- Loans
 - Private individual service
 - Commercial service to small/medium businesses
 - Corporate service to large corporation

2. Investment banking

- Investment products and brokerage services for customers
- Strategic business investments

3. International banking services

- Retail, commercial and corporate lending
- Export financing
- Treasury
- Investment services

Most of the retail activities that provide service to individual customers fall under the category of traditional banking. The traditional retail banking activities include deposits, loans, private and commercial services as well as commercial lending. Within the deposit category for banks is personal deposit accounts. Personal deposit accounts include checking, savings and other accounts for their retail customers. Retail banks also offer personal term deposits with a fixed interest rate and fixed-return instruments like GICs as well as offering mutual funds for savings, which are eligible for tax-sheltered RRSPs.

As a complement to providing deposit services, retail banks also participate in consumer lending. These services come in the form of mortgages, automobile, student and personal and small business loans. Customer services are another key element of retail banking. The extensive list includes acceptance of bill payments, safety deposit boxes, lines of credit and trust services. To increase customer convenience in attaining these services banks have invested a lot of time and money into diversifying the service network through which services can be obtained [CBA98].

1.3 *The Service Network*

Historically the primary method of obtaining financial products and services was to frequent the branch office of a financial institution. With improvements in technology and a change in the way the world views financial services numerous other methods of obtaining financial products have evolved. These, now almost fully matured services include automated bank machines, telephone banking services and Internet or PC banking. Recently, banking services have also become available through third-party vendors such as retail stores, supermarkets and local postal outlets. These services mean that customers can now select from any one of these delivery channels to procure products or services [CBA98].

This variety of delivery channels has led financial institutions to re-evaluate the way branch services are provided and the costs associated with them. In order to improve branch efficiency and service, identifying best practice methods for retail branch service delivery has been a large concern for most financial firms.

1.4 *Project Identification*

The Canadian financial industry's extensive networks of branches provide a variety of retail financial services to clients through banks, credit unions and trust companies. Each type of financial institution incurs a significant portion of its business expenditures

providing these “bricks and mortar” based services. Consequently, many firms have undertaken the task of evaluating the performance of each of their branches across the country.

A variety of methods have been used to determine the best performance branches and to evaluate the costs associated with the services provided. Some of these methods include statistical regression analysis, score card evaluation, activity based costing, profit and revenue comparisons. One additional method of selecting best practice branches is the use of a linear programming technique called Data Envelopment Analysis (DEA). DEA is a multidimensional technique that can incorporate the many issues involved in providing branch service into one analysis.

When applied to bank branches, DEA evaluates the measurable inputs and outputs of a branch system to identify which branches best utilize their inputs to produce outputs. In Schaffnit's study of a large Canadian bank the inputs of personnel (as full time equivalent hours) and the output ability of a branch to perform a variety of transactions were the criteria for efficiency evaluation [Schaffnit97]. Using these criteria a set of efficient branches was derived through DEA investigation. The results of this study were very useful to the financial institution and left some opportunity for further investigation.

One potential area for future research is the expansion of the DEA model to include an essential variable that reflected the opportunity available to a bank branch. The original study provided a good analysis of how well the branches were using inputs to produce outputs but did not include the effects of the competitive environment in which, the firm was operating. By incorporating such factors as number and distance between competitors in the region, socioeconomic and demographic characteristics of the population and the predominance of the firm (market share) in that region, it is thought that a more robust model of the performance of a bank branch can be attained. The development of an opportunity index variable for each bank branch is the focus of this research.

1.5 Thesis Objectives

The goal of this thesis is to develop a methodology for determining the theoretical amount of commercial opportunity available to a bank branch. This methodology will provide a unique index measure for each bank branch with respect to a set of branches in its geographical vicinity. Once developed, it is hoped that this Opportunity Index can be used as one of the inputs in the analysis of a branch of any financial institution within any region of Canada.

This thesis investigates various possible analysis approaches and techniques for measuring retail opportunity. From this research various appropriate measures and methods which apply to the specific case of the branch banking industry are aggregated into an index measurement. This index has a value between zero and one and represents the opportunity a bank branch has within its geographical region. That is, the measure not only evaluates a selected region but also provides an index value for each bank branch. The Opportunity Index measurement method derived through this process is then performed within an actual region.

After the data requirements and a corresponding methodology for calculating opportunity have been determined, a sample database containing all pertinent information is generated for a region within Southern Ontario. This data assists in performing an evaluation of the proposed Opportunity Index methodology. This evaluation is accomplished by investigating the resultant index values and assessing their ability to differentiate between the various environments in which different branches operate.

The aim of this work is to provide a logical, practical methodology, which can be undertaken by any analyst to evaluate the competitive environment in which bank branches are operating. This framework includes the development of a concise database containing all pertinent information to the analysis and the sequential methodology of regional analysis resulting in an index value. The intent is that the Opportunity Index provides an accurate and useful evaluation of each branch's competitive environment. If

successful, this index should be a useful tool to assist financial institutions with a variety of managerial issues regarding branch networks. These issues may include analysis for refining delivery networks, identifying areas where the opportunity to extend services may exist or examining service overlap in the case of mergers.

1.6 Organization of Paper

❖ Chapter 2 – Issues in Index Development:

This chapter outlines the basic issues that effect bank branch opportunity. These issues range from very specific considerations about geographical location to general rules of customer behavior. Within this range of topics, factors such as trade area construction and the effect of various socio-economic and demographics of population characteristics are discussed.

❖ Chapter 3 – Literature Search:

Once key characteristics related to bank branch opportunity are identified the exploration of how to include these factors is carried out. This chapter outlines a variety of methods used in both retail and spatial analysis as well as describing the usage of some popular indices. Several of these concepts provide for direct translation into the locational analysis of bank branches and help build a base for the Opportunity Index developed in subsequent chapters.

❖ Chapter 4 – Previous Work in Bank Branch Analysis:

Chapter 4 provides a description of some previous research done within branch performance analysis. This exploration of previous work helps to identify key factors found (in previous research) that effect opportunity. The key issues, which may be incorporated into the index, are identified.

❖ Chapter 5 – Model Formulation:

This chapter defines in detail the methodology developed to define the Opportunity Index for a set of branches. This methodology is the basis of this thesis and provides a unique framework with which locational branch data can be analyzed.

❖ **Chapter 6 – Data:**

The data chapter of this work catalogs the sources of data as well as the specifics regarding data collection. In addition, the potential sources of error are outlined. Specific attention is focused on possible errors within the Statistics Canada Census data and possible approaches for minimizing such effects on this analysis.

❖ **Chapter 7 – Analysis and Results:**

This section details, step by step, the procedure for calculating the Opportunity Indices for the set of bank branches. Within each step, the results of the calculations are outlined and possible challenges are investigated. Also within this section is a detailed report on the Opportunity Index results.

❖ **Chapter 8 – Conclusions and Recommendations:**

This conclusions and recommendations section provides a summary of the Opportunity Analysis methodology derived in this thesis as well as a review of some of the assumptions the Opportunity Index makes. The strengths and weaknesses of this methodology are outlined and the consequent possibilities for future research are derived.

2.0 Issues in Index Development

To develop an opportunity index for the retail banking industry, the specific issues and characteristics of the industry must be considered. The factors considered in market opportunity analysis of some industries may differ from those factors that effect the banking industry. In this section, issues that are relevant to branch opportunity are outlined. Some information comes from referring to previous research, while other insights came from consulting industry specialists within the Canadian banking industry.

Key factors effecting the business of branch banking include:

- ◆ customer behaviour
- ◆ physical location characteristics
- ◆ the trade area
- ◆ demographic characteristics of trade areas

The following sections analyze the literature and research conducted with regard to these factors. Effort is made to highlight the pertinence of each factor and illustrate how each could be relevant to branch network problems.

2.1 *Customer Behavior and the Banking Industry*

Needs of bank customers have changed in accordance with technological change and societal perception of the services that banks and other institutions can provide.

Consumers now expect more information, choice and convenience. The aspects of choice and convenience are becoming larger issues in the changing financial industry of today because of the numerous venues for doing banking transaction. For example, branchless banking is growing through telephone and the Internet service offerings within companies like ING. ING is also providing banking transactions at local Canadian Tire stores while other retailers such as Loblaws and Zellers are offering financial products from other banks. Moreover, new legislation now allows credit unions and banks to provide insurance coverage. Given the myriad of products and media through which customers may obtain these products it is necessary to consult recent surveys within the

banking industry to identify the nature of consumers and the corresponding products they use.

2.1.1 Bank Branch Users vs Profitable Customers

It is important to clarify in this customer behavior section that there is a difference between general opportunity for banks, and the opportunity for branch services in an area. Opportunity for banks refers to the number of profitable financial service customers in an area. These customers may use various channels (Internet, telephones, ABMs and branches) to perform transactions but the products they procure result in significant profits for the firm. Opportunity for branch operation refers to the number of people in the area who will require specifically, branch services. In this research, the primary concern is to evaluate customers who require branch services while the potential profitability of the customer is a secondary concern.

Many studies have been done for and by the banking industry to identify the characteristics of profitable clients. First Manhattan Consulting Corp performed such a study and identified some common and distinct attitudes and behaviour that seem to identify profitable customers. The most common of these were found to be:

1. Individuals who keep a lot of money in the bank
2. People who are not usually active investors and do not follow the stock market carefully
3. Customers that are usually not detail-oriented money managers.

In general this study found that 20% of households represent the bulk (80-90 percent) of a bank's profitability. Further analysis showed that these people come from all income levels and walks of life so traditional segmentation schemes such as age, education, and income demographics are not always reliable. In fact, in this study all income levels were found to be both profitable as well as unprofitable. The study did identify that certain life events such as starting to aggressively save for retirement or the need to set up college funds seem to be reliable profitability indicators.

It was also identified that many high-profit households rely heavily on branch services such that simply eliminating branch services may be not be the answer to increasing returns [Dalton97]. This study shows that profitable customers alone would not only be difficult to target but would also not correctly identify the branch users who are the focus of this study. Therefore it is important to identify which customers typically use branch services.

A recent survey done by the American Bankers Association attempts to determine which access method is used most often. This survey identifies that 57% of people use a traditional branch while 28% use ATMs and 8% bank by telephone. The study also identifies that 2% use a nontraditional branch and the remaining 2% use online services [ABA99]. These statistics may not be directly applicable to Canadian banking industry clients, however, some of the demographic information that accompanies these statistics may be useful. This demographic information provides information about the common characteristics of users that correspond to various service media.

The demographic research found that high school graduates, people living in small towns, those people with lower incomes, and women are more likely to say they use a branch most often. Also, members of generation X (defined in this study as those people born between 1965 and 1978 who are now between the ages of 22 and 35), with at least some college education, and urban/suburban dwellers are most likely to use an ATM. When asked which access point they use most often, Generation X consumers favored ATM use over branches 44% to 37%. Only 3% indicate they use online banking most often, but 20% of them say they use it, the highest percentage of any generation. Finally this study found, consumers who have \$75,000 or more in household income are the most likely to report they use computers for banking [ABA99]. This information provides a general description of branch users, which is very pertinent to the development of an opportunity index.

2.1.2 Concerns of Branch Users

The foundation of maintaining branch locations in the changing financial industry is that firms must interact with their customers, face-to-face, and maintain a relationship in order to expand their business and establish customer loyalty. One current concern of this customer loyalty is that the physical location of their branches must provide customers with convenience before customer loyalty can be developed. With all the possible media for banking services branch users now view convenience as the primary issue.

For this reason, the opportunity index developed needs to incorporate location and competition as a function of the physical separation between a financial institution, the competitors and the customer. In this way the physical distance between financial institutions and their customer and other convenience items is an essential component to any opportunity measure.

2.2 *Location Factors*

Despite the sophisticated business transactions they provide, financial institutions are not excluded from location concerns that plague retailers in various other industries. The characteristics of a branch site may have a large effect on a customer's decision to enter and obtain services. Location issues are complex. Factors that may deter some customers from frequenting a branch in one area may not be the same as another. These differences come from the type of community (rural, urban, and suburban) in which the branch operates. Some of these location factors are outlined below.

Site Characteristics [Salvenechi96] and [Ghosh87]:

- ◆ Visibility and Accessibility: far corner, not on a curve, level location, not a one way road, not a dead end
- ◆ Regional Exposure: not an transitional area, right side of street, not an irregular property
- ◆ Area of High Density: urban, rural, residential, professional or industrial classification
- ◆ Area with Growth: building permit trends for new construction, position relative to growth areas, general economy of area
- ◆ Operational Convenience - parking spots and distances, transit system, traffic flow and shopping patterns, complementary neighboring stores, physical barriers (rivers, lakes, busy roads and large highways)

In terms of an opportunity index, the enormous amounts of data collection required to measure and record all of these specific locational issues into an analysis may be daunting. However, the final point of operational convenience is viewed as an important issue in customer convenience. The location of the branch in relation to other frequently procured items is considered to have a large impact on a branch's opportunity. For example, every customer frequently needs food items. For this reason the branch's proximity to a grocery retailer or other convenience product retailers will affect the perceived convenience of the branch [Salvenechi96]. This issue of convenience should be adequately addressed within a branch opportunity evaluation.

2.4 Trade Areas

A trade area is the geographic area from which a branch draws most of its customers (75-80%) and within which its market penetration is the highest. Many factors affect the size and shape of the trade area. These include branch characteristics such as size, type and attractiveness of the facility, product characteristics such as variety and price of services, and characteristics of the region including number of customers in the area, location of competitors and geographic boundaries (highways and rivers) [Ghosh87].

For example, the trade area of shopping malls will be larger than the drawing region of individual retail locations. Conversely, the less frequently a good is needed or purchased the further a customer will be willing to travel to get it. In addition, a customer's income and consequently their access to transportation will also affect the range or size of the trade area. It should also be noted that a trade area is never static. It changes through time in response to marketing strategies, prices, store aesthetics and the presence of competitors.

These factors all have a great impact on the resulting size and shape of a trade area. To address this issue for bank branches, several possible methods of estimating and approximating the size and shape of a trade area are available. These methods will be discussed in detail in the literature review section (Chapter 4) of this thesis. Nevertheless, it should be noted that in reality a trade area is never uniformly shaped (a circle, square or polygon), which many of the proposed estimation techniques employ. In actuality the trade area does not only vary in shape, it also varies with the dynamics of the community surrounding it and is as unpredictable as the behavior of the people who live in it.

In reality, to get a truly precise idea of how a business functions at a specific location one must survey the customers who patronize the location. With a survey one can determine its exact customers, where they live along with information on how people move within the trade area and to which locations they gravitate. One can also identify under-served areas, gauge the frequency of visits, understand the relationship to other competitive locations and apply marketing and advertising dollars effectively. Without detailed questioning it is hard to know exactly the customer behaviour but by marking subdivisions such as airports, parks, shopping centers, grocery stores and schools and using a developed retail trade estimation technique one can get an idea of a trade area [Salvenechi96]. Some of these retail trade area estimation techniques are summarized in the trade area literature review in the following section of this thesis.

3.0 Literature Review

3.1 Trade Area Methodology

Various trade area definition methods are available. Some are more prominent than others. The most basic method of estimating trade areas is assuming that the area a retail location covers is roughly a circle of some radius (criteria for radius is devised by the evaluator). Once established these circles may also be trimmed to better fit the geographic characteristics of the location.

These methods are relatively simple and easy to understand however what is lost with simplicity is a level of accuracy. To ensure that the trade area better reflects reality, some more complex methods of trade area measurement have been derived.

Some of these methods include:

1. Drive distance or drive time polygons
2. Proximal area methods
3. Spatial Interaction models

Drive distance and drive time polygons are modifications of the circular trade area definition. The difference between these methods is essentially the unit the circular radius is measured in. That is, the boundary is constructed by setting a reasonable driving distance or time, which a customer would travel. This measure results in a boundary that is more realistic than the standard circular definition [Lea97].

The proximal method is also referred to as Dirichlet or Thiessen polygons. This method assumes that customers always frequent the closest "store" within a region. With this "nearest neighbour" assumption the trade area takes on a polygon form. Figure 1a, 1b and 1c provide an illustration of how a Thiessen polygon is constructed for a set of four locations.

Figure 1 (a,b,c): Thiessen Polygon Construction

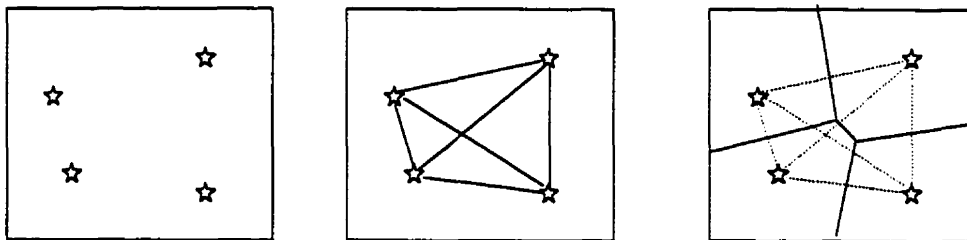


Figure 1a illustrates the locations of four competing retail stores within a region. The second diagram (figure 1b) shows the distances between all locations and their competitors. The half way point of all of these connecting lines represent, in theory, the distance at which the population splits their decision about which location to frequent (both groups to the closest location). Figure 1c shows the resultant trade area, which is constructed by drawing perpendicular lines crossing through the half way markings of figure 1b.

These polygons provide intuitive information about a trade area. For example, large polygons may imply less competition while small polygons indicate a region of high competition. This method can also be used to predict the effect new stores will have on competition dynamics. Lastly, Thiessen polygons may assist in predicting the drawing area for a new location [Ghosh87].

Many other variations on these trade area methods exist. The most prominent of these methods are summarized within the table found in Appendix I. These methods are all relatively easy to understand and compute however this simplicity sacrifices the detailed consideration of competitors and operating environment. The theory and methodology of

spatial interaction models better lend themselves to detailed market analysis. A basic formulation and detailed description of related methodologies is given in the following section.

3.2 Spatial Interaction Models

In the '60's and '70's, many prominent researchers suggested that patronage behavior could be estimated by using variants of Newton's gravity model. These new models came to be called spatial interaction models [Ghosh87].

Gravity models try to explain a series of spatial interaction phenomena between two points by an analogy with physical phenomena. The Newtonian theory says that the attraction exerted by two bodies upon each other is proportional to their masses and inversely proportional to the squared distance between those bodies [Klaassen88]. This relationship in our physical world is given by the following formula:

$$F_{12} = G \frac{M_1 M_2}{r_{12}^2}$$

In Newton's equation, F_{12} is the magnitude of the gravitational force acting between masses M_1 and M_2 separated by distance r_{12} , while G , is the universal constant, having the physical dimensions $(\text{length})^3/(\text{mass})(\text{time})^2$; its numerical value depends on the physical units of length, mass, and time used.

Using this formula objects that are closer to each other will tend to interact more than objects that are farther away. In retail terms, customers who are closer to a particular store are more likely to shop there than those who are farther away. This theory also implies that the amount of attraction is dependent upon the size of the objects. A larger object has a higher attraction than a smaller object [Dudley98]. In retailing, size or attraction can be measured by the square footage area in the store or amount of shelf space; or many other measures of store "attractiveness". This measure of attraction

requires an analyst to create mathematical models based on experienced judgements with regard to which factors attract customers to industry locations [Salvenchi96].

Two of the most prominent uses of the retail gravity formulation are Reilly's Law of Retail Gravitation and Huff's model. The two formulations and applications are detailed below.

3.2.1 Reilly's Law

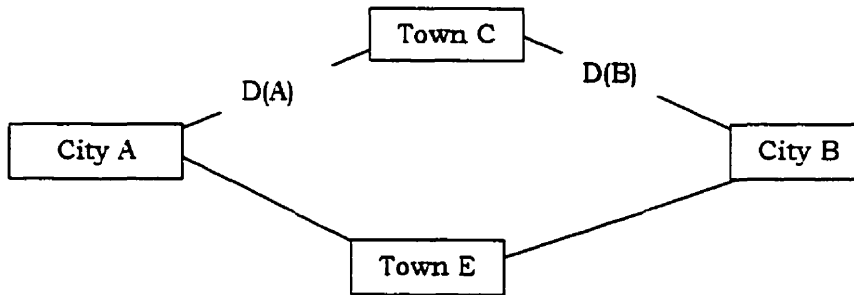
Reilly's Law was invented as an instructive technique called the Law of Retail Gravitation, originally used to compare the degree of business attractiveness that single towns have on each other [Ghosh87]. Although distance is important it may not always be the determining factor. Customers may pass closest locations if the extra travel effort is compensated by better shopping opportunities.

Reilly's Law states that the proportion of retail trade attracted from intermediate towns by two competing urban areas is in direct proportion to their population and in inverse proportion to the square of the distances from those cities to the intermediate towns.

$$\text{For Town } C: \frac{R(A)}{R(B)} = \frac{P(A)D(B)^2}{P(B)D(A)^2}$$

Where: *R is the proportion of retail trade*
 P is the population
 D is the distance

Figure 2: Reilly's Formula



Reilly's Law is often referred to as the breaking point theory where:

$$\text{Distance from Breaking Point to city B} = \frac{\text{Distance between cities A \& B}}{1 + \sqrt{P(A) / P(B)}}$$

A number of empirical studies have used Reilly's Law to define the trade areas of urban centers. Reilly himself conducted extensive field research of inter-metropolitan trade areas. The results generally supported the hypothesis that customers between two cities gravitate toward the larger city in a manner similar to that postulated by the Law of Retail Gravitation. Note should be made that the predictive power of this technique tends to decline when the centers are of approximately equal size[Ghosh87].

Caution should also be taken when using this model in that great inaccuracies will occur when other factors of equal importance are ignored. For example, when applying this to retail centers' total square footage and square footage of major tenants becomes a larger factor in retail gravitation [Salvenchi96].

Reilly's method may be translated into an effective way of determining trade areas for retail locations through some modifications. These location attractiveness concepts in retail gravitation have been incorporated into retail analysis research carried out by Huff. Huff's modification of gravity theory is outlined in the following section.

3.2.2 Huff's Use of Gravity Theory

Basis of the Huff model [Huff63] is that the share of customers that an outlet attracts is inversely proportional to the distance and directly related to the attractiveness of the store. The roots lie not only in an analogy to Newtonian physics, but in empirically observed consumer behaviour.

Huff argued that shopping patronage patterns depends on the consumer's evaluation of the relative utility of each store.

$$\text{Utility Function: } U_{ij} = A_j^\alpha D_{ij}^\beta$$

Where: A_j is the attractiveness of retailer j
 D_{ij} is the distance between customer i and store j
 α is the parameter for a customer's sensitivity to store attraction
 β is the parameter for a customer's sensitivity to distance

In this way, β will be a negative co-efficient because the further away a customer is from a store, the less utility that customer will have for that store. If the model has a large negative β then the formula approaches the nearest center hypothesis. In Reilly's formula the values for $\alpha= 1$ and $\beta= -2$ are fixed. Actual customer choices can be used to determine consumer utility functions (ie. calibrating the model to best fit observed consumer shopping patterns) [Ghosh87]

Huff suggested that the utility of a store depends on its size in square footage in addition to the inverse of the distance a customer is from that location. Various other attractiveness factors can be incorporated into the model, depending on the type of industry being studied. The measure of square footage may be a very good criteria for evaluating some retailers, however in the case of bank branches, location size may have less of an impact on a customer's decision to procure services from a branch.

Using Huff's model it is not necessary to construct trade area boundaries. The modeling of customer behaviour in this way creates a utility value for each region. As the distance

from the retail location increases, the utility a certain customer area has for that location decreases. In this way, every customer in the region of study may be considered.

Now that possible methods of determining the trade area to investigate have been outlined it is useful to investigate the possible ways of analyzing the opportunity within these areas. For that reason focus is now turned to a review of possible retail potential models.

3.3 *Review of Retail Potential Models*

As mentioned in Chapter 2 of this thesis, certain demographic characteristics commonly identify frequent bank branch users. Being able to use demographic census information to identify these customers within a trade area is essential to this analysis.

In general, any retail analysis would evaluate numerous attributes of the population within the defined trade area: demographics, ethnic profile, lifestyle, the presence of certain industries, educational institutions, commercial developments, and professional buildings. A firm may also wish to look at the number of single dwellings and high-density developments, location of health care institutions and even the presence of recreational areas [Salvenchi96]. The type of characteristics used to evaluate a region depends greatly on the type of industry being studied. For this reason it is valuable to investigate different methods that provide some heuristics regarding which demographic features within a trade area that should be evaluated. The following literature section will describe many of the potential market opportunity analysis methods.

Geographic retail market analysis is not a new field and many methods exist for analyzing location. The purpose of this literature search is to identify some of the previously developed measurement methods used in industry. Effort is made to highlight suitable applications for analyzing retail-banking environments. This section identifies some existing indices used for measuring market potential and retail outlet performance

while subsequent sections identify some more involved performance measurement models.

3.3.1 Space-Sales Ratio Method

This method assumes that a retail location's share of the retail trade area will be proportional to retail space. This assumption implies that the size of the store will directly reflect its ability to draw customers to its location. The space sales ratio can be derived by the following three steps:

1. Estimate the trade area by subjective judgement. Typically a circle with the radius equaling the distance a customer is willing to travel. It is usually better to examine a couple of different circles to forecast travel patterns
2. Combine the data on per capita sales of the area with the population. Therefore (# of people) x (per capita sales) = sales potential.
3. Compare the size of the outlet to the retail space (in that category) in that area. The result will be some % of area the location covers (in square feet) or a % of retail space. Then multiply this percentage by the sales potential in the area in question.

The result of these actions is the Space-Sales Ratio Method (SSR)

$$SSR = \left(\frac{\text{ft}^2 \text{ store space}}{\text{ft}^2 \text{ in category for area}} \right) \times (\text{per capita sales in category}) \times (\text{number of people in area})$$

This index assumes the larger the square footage the larger the SSR and therefore more opportunity. Using just this method has several disadvantages. To begin with, if the trade area is not properly defined, the index may be measuring the wrong area. In addition, the method requires specific retail information for the trade area, which may not be readily available. If the information is available it should be adjusted with particular store information like the chain's average sale per square footage if possible. Not only does this method ignore a manager's ability, marketing and merchandising techniques that may effect sales, it also dangerously assumes that square footage is a reflection of a store's market share [Ghosh87]. When applied to the banking environment this

assumption is most definitely incorrect however some other indices not based on size of retail location are available. One of these methods is the Sales Activity Index.

3.3.2 Sales Activity Index

The Sales Activity Index (SAI) measures market performance based on a ratio of the specific market area as a percentage of the national sales to the percentage of the market population to the national population.

$$SAI = (Market\ Sales/National\ Sales) / (Market\ Population/National\ Population)$$

This measure provides a good indication of the performance of retail stores [Brockway98]. It requires detailed financial information not only on the given location but also the entire business segment's performance. When studying numerous competing firms, this data may be difficult to obtain. Hence, it would be difficult to evaluate bank branches with this measure. Another model that incorporates sales data with other demographic characteristics is the Buying Power Index.

3.3.3 Buying Power Index

The Buying Power Index (BPI) was developed to reflect the market potential for consumer goods that are frequently purchased and moderately priced. This measure is not recommended for industrial products or high-priced consumer goods that face selective demand. The BPI is a weighted measure combining effective buying income, retail sales and population [Brockway98].

BPI rates the overall sales potential for an area, expressed as a percentage of the total retail sales potential in a country. The weights are as follows:

$$\begin{aligned} BPI = & 0.5 (\% \text{ of country's buying income} *) \\ & + 0.3 (\% \text{ of retail sales}) \\ & + 0.2 (\% \text{ of population}) \end{aligned}$$

**Effective buying income is personal income adjusted for taxes.*

It should be noted that even modifications to the BPI do not measure market potential alone. BPI measures the interplay of demand and supply that creates market opportunities. The market may have potential but the level of competition may be fierce. Similarly, the BPI may indicate low potential in an area but there may be opportunity in the area because of the significantly low level of competition [Ghosh87]. In this way, a method that incorporates competition may be more ideal for a branch banking study. Despite the fact that competition is excluded from this model the introduction of effective buying income may be a good addition to an opportunity model. This measure would be useful in a bank branch evaluation. Another measure that incorporates effective buying income is the Net Trade Flow Index.

3.3.4 Net Trade Flow Index

This measure expresses retail sales as a percent of effective buying income available for retail purchases in a given market area. The main assumption in this measure is that retail purchase is about 50% of effective buying income and therefore a rate of 50% or more indicates a strong market sector. This measure has some weaknesses primarily because it does not take into account differences in non-retail expenditures in the area. For example some areas may have larger housing costs, home mortgage interests and utility costs that will reduce the actual effective buying power that residents have [Brockway98]. The incorporation of non-retail expenditure costs in evaluation has potential application within a branch study. However this method still does not incorporate competition within the region. One method that does is called the Index of Retail Saturation.

3.3.5 Index of Retail Saturation

The Index of Retail Saturation (IRS) incorporates the number of competitors using the number and size of retail locations and the retail expenditures made by the customers in the region. The index measures competition the following way.

$$IRS(i) = \{ Population(i) \times Per\ Capita\ Retail\ Expenditure(i) \} / Retail\ Selling\ Space$$

That is the population in region i multiplied by the retail expenditure per person divided by the total amount of retail space in the region (all competitors measured in square footage) creates the IRS. IRS is the measure of demand relative to supply, a low value indicates saturation of the area, a high value indicates more opportunity. It is only useful when compared with some norm. The norm may be a standard set by the retailer based on past experience. Alternatively relative attractiveness of different markets can be ranked using this index [Brockway98].

3.3.6 Summary of Factors to Include in an Opportunity Index

This concludes the review of potential index models, which could be incorporated into a bank branch opportunity index. Some of the main issues pertaining to bank branch analysis have been identified through this review. First, the inability to collect sales data for numerous financial firms eliminates the possibility of directly incorporating many of these indices. However there are some major factors which should be included in the analysis of bank branches. These factors include population, income and expenditure data from customer areas as well as including the number of competitors within the study region. Now that several issues regarding what to include in opportunity measurement have been addressed the question of how to incorporate them into an effective analysis of retail locations arises. The following section outlines three possible methods. These are the analog method, regression analysis and the multiplicative competitive interaction model.

3.3.7 Analog Method

The analog method was popularized by William Applebaum and is now often referred to as the Applebaum method. The foundation of this method is to use an existing store or set of stores to forecast sales. That is, stores that are similar or analogous to other stores are used as a basis for comparison. This method requires the detailed use of surveys in order to derive trade areas. Also, it only incorporates population and sales data for the analysis of individual stores. Through previous research it has been identified as a good method for determining market penetration and trade area boundaries as well as forecasting sales at new sites and planning advertising and promotion [Ghosh87].

The following are steps to undertake when performing an Analog analysis:

1. Identify retail outlets analogous to the proposed facility as far as store characteristics, customer shopping patterns, socioeconomic environment, demographics and competition.
2. Perform "customer spotting" which uses in-store interviews or information from customers' checks and store credit card use to generate customer data.
3. Determine the trade area through plotting customer residences on a map.
4. The pattern of customer origins and the relationship between market penetration and distance can be seen on the map of plotted customers ("distance decay effect"). The circle containing 75-80% of customers is used to demarcate the spatial extent of the trade area of the specific outlet.

Based on the map of customer origins and information on customer spending patterns, the market share and per capita sales of the analog store in each distance zone can be calculated. An example of this calculation for both a 0.5km and a 1km circle radius is provided in the table 1 below.

Table 1: Calculation of Applebaum's per Capita Sales

Radius (Miles)	Percent of Customers	Minimum Drive Time (Minutes)	Weekly Sales	Population	Per Capita Sales
0.0-0.5	38	38	15,200	3,800	\$4.00
0.5-1.0	24	62	19,440	8,100	\$2.40

It is recommended that more than one analog store be used in the analysis to ensure that the numbers generated are really representative of the expected values. Once determined these analog expected values can be compared to other locations to measure performance and opportunity. Advantages of this method are that by using numerous analog locations the bias of the benchmark can be reduced. In addition, this method of customer spotting using actual customer locations actually incorporates the topography of the region as well as local market conditions. In this way, the trade area definition is the most accurate method available.

One disadvantage of this method is the method reliance on quantified experience and a subjective judgement in selection of analog sites [Ghosh87]. In addition this method requires detailed sales information and does not include the consideration of demographic characteristics. One method which evaluates the effect of numerous demographic and competitive information on retail sales is Regression Analysis.

3.3.8 Regression Analysis

Regression analysis assists in determining the relationship between variables within a model. In the case of retail analysis, the effect certain variables have on sales performance is often a good indication of which factors best measure opportunity [Salvenechi96].

A regression model is used to determine the factors that influence the performance of retail outlets at particular sites. It allows the systematic analysis of trade area characteristics, site variables, store characteristics and the measure of competition in a single framework. Retail variables that might be investigated include, parking spaces within 200 ft of the location, number of competitors within one half mile, or population within one mile. For best results the method requires information for a large number of existing stores.

The regression model is formulated in the following way:

$$Y = b_0 + b_1x_1 + b_2x_2 + \dots + b_nx_n$$

where Y – is sales or profitability

x_i – is the i th measured variables hypothesized to effect store performance

b_i – is the i th regression co-efficient representing the magnitude with which x_i effects profitability

The variable to be included within the model can be ascertained from past studies or represent the analyst's judgement and management considerations. Studies usually begin with a large number of potential explanatory variables and then use "stepwise" regression to identify the other variables most highly related to performance. Conversely an analyst may also start with a small number and work up to include more variables. Caution must be taken to ensure that an equation with too many variables does not result in a mathematically impressive, but unreliable estimate of sales. Numerous variables often present interpretation problems (either too conservative or too optimistic) [Ghosh87].

Some other situations to be aware of when performing regression analysis include multicollinearity, heterogeneity, and problems associated with store image.

Multicollinearity implies that there is a significant inter-correlation among independent variables because variables measure the same underlying phenomenon. Regression theory requires that variables be independent and if too many related variables are included, the model will yield unreliable parameters. Multicollinearity can be detected with correlation analysis, toleration values or split half analysis. Second, heterogeneity in

the types of stores is also a concern. Stores having significantly different locations (ie. urban, suburban, rural) cannot be studied together. In these cases, different models with different variables will better describe different areas. The final problem related to retail analysis is measuring store image. As mentioned before, attractiveness variables often represent the analyst's judgement and may not actually represent customer behaviour [Ghosh87].

Despite these concerns, regression analysis has often been used to identify the factors with the greatest impact for many retail business including; grocery stores, clothing stores, liquor stores, convenience stores, hospitals and banks. In almost all of these studies, population size and demographic composition effect retail industries most. Sales also often have a positive correlation with service factors like promotion and advertising [Salvenchi96]

For some regression studies, it has also been found that competition has a complex influence on performance. Some studies confirm that the farther a store is from its competitor the better its performance. However for other industries performance is better with clustering (because of opportunities for multipurpose and comparison shopping such as the environment that exist in food courts in malls) [Porter98]. This indicates that consideration must be given to whether or not the bank branch networks perform best under cluster or avoidance strategies. One methodology that takes competition into detailed consideration is the spatial interaction model called the Multiplicative Competitive Interaction (MCI) model. This analysis approach is detailed in the following section.

3.3.9 Multiplicative Competitive Interaction Model

The foundation of the Multiplicative Competitive Interaction (MCI) methodology comes from the gravity model suggested by Huff [Ghosh87]. As mentioned in section 3.2.2 of this thesis, Huff derived a utility measure which determines the "use" a given customer would have for frequenting a given retail location. This utility function was based on

how attractive the location was and how far the customer would have to travel to get there. Huff further argued that when consumers have a number of alternative shopping opportunities, they may visit several different stores rather than restrict their patronage to only one outlet. Therefore, trade areas are probabilistic rather than deterministic. It is from the evolution of the Huff model that the MCI model came to be. The MCI model uses Huff's utility measure to derive the probability of a given customer frequenting a given location. The probability is formulated in the following way:

$$P_{ij} = U_{ij} / \sum U_{ik}$$

where: k is the set of competitors and,
 U_{ij} is customer i 's perceived utility of store j

That is, the probability of a consumer at residential zone i patronizing facility j can now be written as:

$$P_{ij} = \frac{(\prod A_{lj}^{\alpha})(D_{ij}^{\beta})}{\sum (\prod A_{lk}^{\alpha})(D_{ik}^{\beta})}$$

where: $\prod A_{lj}$ the product of the l th attractiveness characteristic of retail alternative j
 k is the set of alternatives considered by individuals at origin i
 α is the weight parameter associated with attractiveness factor l , and
 β is the parameter associated with distance (negative value)

The MCI model is very popular in industry because it permits retailers to establish the parameters of an equation that estimates the probability of a household resident at location i patronizing a store at location j . In this conceptual framework, a "probability surface" provides the estimation of the trade area around each store. Based on the probabilities calculated between all neighborhoods and retail locations in the system, trade areas can be defined with a great deal of flexibility. For example, a primary trade area may be set as those neighborhoods that have probability values greater than 0.3 and a secondary trade area set as probabilities less than 0.3 but greater than 0.1. One of the main advantages of creating trade areas in this manner is that the likelihood of overlapping trade areas is implicit within the model. The case of overlapping trade regions makes for a much more realistic analysis.

Once probabilities have been calculated for a given neighborhood they can be incorporated into a regional analysis. The main use for these probabilities is to adjust the demographic characteristics of a neighborhood to better approximate reality. One possible adjustment is to estimate the expected number of customers from a particular neighborhood by multiplying the number of people within that neighborhood by the probability of that neighborhood frequenting a given location. Similarly examining the average expenditures (in the specific retail category) of that neighborhood and combining those numbers with the calculated probability can assess expected sales. In addition to the opportunity available within a region, MCI can also be used to analyze the impact of a new store on a network of existing stores by examining the resultant change in probabilities.

Some further improvements can be made to the MCI model by taking "intervening opportunities" into account. Intervening implies that a particular store is less likely to receive patronage from a given neighborhood if customers have to travel past other stores in the same category. In addition, using shortest path distances through the road network rather than simple straight-line distances can make an improvement to the distance measure [Dudley98].

In general, there are several main advantages of employing MCI for an analysis. First, MCI explains customer behavior probabilistically rather than deterministically which better emulates the actual retail environment. Second, the model can incorporate many different store characteristics to best tailor the model to the industry. Third, the MCI model explicitly incorporates the competitive environment in the evaluation of the store sites. Finally, MCI probability results in great predictive power when analyzing the effect new retail stores will have on an environment [Ghosh87].

The MCI model needs detailed preliminary research to properly define the factors used as a representation of store attractiveness. In addition, after the factors have been identified the α and β parameters must be estimated. Often, the estimation of these values is

extremely difficult and assumptions made yield probabilistic results that are difficult to validate [Jain79].

These advantages and disadvantages provide a clear understanding of the strengths and limitations of the MCI model. Even after taking into consideration all of these factors, the MCI model has been selected as the best tool to employ in the calculation of a bank branch opportunity analysis. There are three main reasons why MCI was chosen as the most effective analysis method.

- I. **Flexibility:** The MCI model is extremely flexible and can be incorporated into virtually any retail study. This flexibility will allow the selection of variables that apply exclusively to the branch banking industry. In addition, the opportunity measures combined with the probabilities derived are equally as flexible. This flexibility will allow investigation of the effect of different variables and will help in interpreting results.
- II. **Competition:** Intuitively, the MCI model is very attractive for analysis. Much of this appeal comes from the fact that virtually no assumptions are made to divide the regions in which competitors operate. The implicit incorporation of overlapping trade areas allows the analyst to consider the possibility that a given customer may not just frequent the closest location. This model formulation better reflects customer behaviour than many of the more restrictive models.
- III. **Consideration of Numerous Locations:** For this study, one of the greatest draws to the use of the MCI model is that individual locations need not be singled out individually for analysis. In this way, a whole system of branches may be analyzed at one time.

The next stage in incorporating MCI into an index measurement is to identify specifically which variables should be included to ensure that the analysis is tailor made to the bank branch application. To identify pertinent variables in bank branch analysis previous branch studies are reviewed, this is done in the following chapter.

4.0 Bank Branch Performance Analysis

Work in Private Industry

This chapter provides a review of previous research done within branch banking. The goal of this exploration is to find common factors, which can be used to measure the opportunity within a bank branches of a region. Before exploring these published works it should be noted that, in general, most of the work highlighted was performed nearly twenty years ago. This does not, by any means, imply that no work has been done in the field of branch banking since these studies. Literature search suggests that the study of branch banking has moved from the academic forum to the private sector. Once practitioners adopted the academic results, numerous studies of branch banking opportunities are now available from consultants or are performed by the banks themselves. Consequently, much of this information is proprietary and not available to the public.

Through consultation with several individuals from the financial services industry a basic understanding of the methods employed for branch analysis were attained. Since banks have, very detailed information on all their customers and their individual profitability, a detailed branch analysis approach can be taken. It is common for banks to plot the actual locations of all their clients. This information is obtained from their existing database. To further augment this measurement clients are often segregated by their profitability. That is, the banks use historical information about their clients including the amount of service required and the income to determine how profitable the individual client is. This type of study often results in large color coded pin maps of study areas surrounding a bank branch. This method of study is similar to that of the analog method mentioned in the review of retail models in chapter 3.

There is an overall impression that most of these studies are done on an individual, branch by branch basis to evaluate a specific branch's performance. In addition, the treatment of competition within these studies is unknown. It is also inferred that

Geographic Information Systems (GIS) for data management within banks is in an introductory stage.

The study of opportunity by these banks has a decided advantage over many studies in that the profitability of the customers are known. What is not known however is the profitability of potential customers within the study region who currently patronize another financial firm. The goal of this research is to develop a measure of opportunity, which allows the consideration of the presence of numerous other financial firms within a region. For this reason, a different measure of profitability and opportunity must be developed. To assist in determining these measures, previously published research is now reviewed.

Some Generally Accepted Principles

Before delving into specific bank research it is useful to examine the generally accepted retail principles that likely drove the variables chosen for bank branch studies. First, it is generally understood that the assumption of fixed demand within a region holds true in nearly every retail environment. That is, retail sales in a market are determined by environmental factors such as population and income. To quantify just how significantly demand was fixed by population characteristics, Ferber performed a study in 1958, investigating the variation of total retail sales within Illinois communities with populations above 10,000. This study showed that the community size and distance could statistically account for about 95% of the variation in sales between neighboring communities [Ferber58]. Others have shown that variations in per capita income consistently accounted for a significant portion of the variation in total retail sales within different geographic areas [Ingiene80].

The use information on per capita sales, population size and expected market share to calculate expected sales is very common in retail evaluation. Often the method of incorporating demographics into the analysis is to modify the per capita expenditure probability for each region based on characteristics such as age, family type, or stage of

life cycle. Each expected per capita sale is then adjusted to reflect these population characteristics [Forbes76].

In addition to outlining major variables thought to affect the opportunity in a general retail environment, it is important to get a general idea of the dollar amount of deposits necessary for a bank branch to operate. A study from the Appraisal Journal in 1994, provided a detailed analysis of a bank branch network's operating environment to determine if it was a viable operation. The study provided some useful guidelines for the branch evaluation. For branch sites contained within high-cost, densely populated, affluent areas (New York City for example), a minimum deposit base of \$40 million was required for continued branch operation. Similarly, for low-cost, less densely populated, less affluent areas (such as upstate New York), a deposit base of \$20 million was necessary for a branch to be considered a viable operation. The study claims that if these parameters are met, the highest and best use of the facility is probably continued bank operation [Schafer94]. In this study of Canadian branches, very different deposit bases may be expected however, these deposit values do provide a measure of the different expectation for branches in different communities (urban or suburban). This evidence further supports an index method for branch analysis which helps to compare a branch's opportunity to that of the region in which it is operating.

Now that these generally accepted principles and variables for forecasting retail demand in regions have been outlined, various bank branch studies will be examined.

Regression Analysis in Branch Opportunity Evaluation

As mentioned in chapter 3, regression analysis is a common method of determining the variables that may effect retail performance. After these variables and their corresponding magnitudes of effect have been determined the regression model can be used to calculate expected performance. Table 2 provides a brief summary of four regression analysis studies performed specifically for branch analysis. It provides information about the author of each study, the date the research was performed as well

as the type of branches studied, the performance variables evaluated and the variables found to be correlated to performance.

Table 2: Summary of Regression Analyses on Bank Branches

Author	Type of Branches Studied	Performance Variable	Correlated Variables
Martin 1967	Savings and loan branches	mean annual savings inflow	<ul style="list-style-type: none"> ▪ the number of competing offices ▪ the proportion of the population more than 65 years old ▪ population growth rate in the area.
Alexanderson 1969	Full service commercial	net earnings	<ul style="list-style-type: none"> ▪ number of other bank offices in the area, ▪ income level of population ▪ percent population over 65
Clawson 1974	Savings and loan branches	net savings	<ul style="list-style-type: none"> ▪ net savings gain by competitors ▪ percent of population aged 45-65 ▪ exterior attractiveness of the branch
Olsen and Lord 1979	Savings and loan branches	Checking and savings account deposits	<ul style="list-style-type: none"> ▪ median house hold income and purchasing power ▪ employment and amount of retail square footage of area ▪ external competition

To provide an example of the types of factors evaluated, a detailed description will be given of both Clawson's and Olsen and Lord's studies.

Clawson performed research in 1974 on several branches within the Northeastern United States. Clawson simplified the conceptual model of variables by segregating them into blocks. The three blocks selected and there associated factors are listed below.

1. Population characteristics

- Number of renter-occupied dwellings
 - Total savings held in all local Savings and Loan facilities, divided by local population
- Income per capita
 - Median value of owner-occupied homes
 - Number of persons age 45-65
 - Number of persons age 65 and over

2. Competition characteristics

- Number of competing Savings and Loan facilities
- Population per Savings and Loan facility
- Number of commercial bank facilities
- Average net savings gain of location competitors over 12 months
- Share of total local savings held by local main and executive offices of the competitors

3. Branch characteristics

- Retail sales per year
- Measure of 1 or 0 if the branch was within a formal shopping center
- Measure of 1 or 0 if the branch was opposite a formal center
- Measure of 1 or 0 if the branch was approaching a formal center
- Measure of 1 or 0 if the branch within the central business district
- Measure of 1 or 0 if the branch was a free-standing building
- Age of branch
- Exterior attractiveness rating
- Interior décor rating
- Parking Adequacy rating
- Branch Advertising and promotion cost

Clawson hypothesized that the variables that fell under each of these categories are likely closely related and should tend to reflect each other's condition. Analysis of these variables was undertaken using stepwise linear regression analysis. The resulting variables with coefficients that effected net savings over a one-year period (sorted according to increasing R^2) are found in Table 3 below.

Table 3: Results of Clawson's Stepwise Regression Analysis

Variable	Block	Regression Coefficient	Intercept	Partial Value
Average net gain by competitors	Competition	0.708	.449	3.59
Age 45-65	Population	147.191	.147	1.39
Exterior attractiveness	Branch	1131.404	.106	3.25
Income per capita	Population	1.142	.053	2.53
Local Promotion	Branch	29.987	.029	2.54
Main and executive offices	Competition	-35.401	.036	-2.99
Population per facility	Competition	0.087	.035	3.16
Retail sales	Branch	20.531	.028	2.30
Renters	Population	-52.925	.019	-2.23
Approaching center	Branch	-2505.012	.013	-1.51
	(Intercept)	-9342.863		

In this study, competition variables as a group explained 52.0% of savings while population characteristics and branch efforts explained 21.9% and 17.6% respectively. These results imply that competition is a major factor in branch opportunity and must not be omitted from analysis. In addition it is very useful to include population and branch characteristics. These results will now be compared with the impact similar variables had on Olsen and Lord's study of savings and loan branches in North Carolina.

For their study, Olsen and Lord chose to measure the average daily checking and savings deposits of 12 branch offices over a one-month period in 1975. Initially seven variables were chosen. These are listed below:

1. Purchasing Power
2. Median household Income
3. Percentage of housing units that are renter occupied
4. Employment level in area
5. Retail square footage (other businesses in the area)
6. Number of competing bank's branches in the area (including internal competition)
7. Trade area overlap with branches of the same bank

Once determined these variables were divided into different categories. The detailed description of the measurement of these variables as well as the category they fell into are:

Demand:

D1: Equated Purchasing power measured as the number of households multiplied by the average household income of the area (1.5 mile trade area radius).

D2: Employment Level in region measured as the number of individuals working at establishments in the vicinity of the branch office (0.5 mile radius*).

D3: Amount of retail square footage in region (0.5 mile radius*).

D4: Household income of individuals in area (1.5 mile trade area radius).

D5: Percentage of housing units renter occupied (1.5 mile trade area radius). Number of renters was suspected to be negatively correlated with deposits based on the hypothesis that renters would be in a different stage of life.

* The smaller area was used both for employment and retail square footage because research (O'Brien 1973) revealed that customers do not travel as far from their place of work or shopping as from their residence when visiting a bank office

Supply Variables:

S1: Number of competing branches (1 mile radius)

S2: Internal competition. This factor was considered due to the fact that the distance between a bank's branch offices can affect the deposit levels (two branches may split the market resulting in lower deposits). This variable was recorded in binary form with the value 1 implying that there was a same firm branch within a 1.5 mile radius.

** Both these Supply variables were expected to be inversely related to deposits.

Performance:

P1: Average daily consumer checking account deposits (\$1,000)

P2: Average daily consumer savings account deposits (\$1,000)

The authors of this study used a stepwise regression procedure to identify the variables that had the greatest impact on the two performance variables. It was found that median household income and total retail ft² accounted for 72% of the variation in daily checking account deposits. Competing branches also had a negative effect but the co-efficient was not as high as expected (0.5 coefficient). This positive coefficient suggested that the subject firm's branch offices had the highest volumes in areas where there were many offices of competing firms. However, when the effects of median household income and

retail square footage were controlled, the expected inverse of negative relationship emerged. The resultant variable coefficients of this model are listed in table 4, below.

Table 4: Results From Market Area Analysis Models

Model	Relevant Variables	Regression Coefficients	Cumulative R ²	Increase in R ²
Checking Account Deposits	Median Household Income	1.2706 (t-value 3.26)	.55	.55
	Retail square footage	0.2365 (t value 3.36)	.72	.17
	External Competition	-8.6889 (t value 1.37)	.77	.05
Savings Account Deposits	Purchasing Power	0.00021 (t value 6.25)	.57	.57
	Employment	0.0375 (t value 3.93)	.77	.20
	Percentage of renters	-1.2973 (t value 2.00)	.81	.04

In both the checking and savings models population and income contributed most to performance. Employment, number of retailers in the region, external competition and number of renters also had an effect on performance in this model.

Although these studies evaluated various population and socioeconomic characteristics it is evident that in all cases the performance measure of deposits was effected primarily by three attributes. These characteristics are number of competitors, income level of population and percentage of population. Now that these characteristics have been identified, model formulation can begin.

5.0 Model Formulation

The above sections have outlined the problem, issues and some possible methodologies for analyzing the environment of bank branches. Using this information and consulting industry specialists, the following methodology for deriving an opportunity index evolved.

5.1 Development of the Utility Function for Financial Institutions

This study will incorporate the Multiplicative Competitive Interaction (MCI) model. The MCI model is very flexible in that many attractiveness factors can be incorporated in order to ensure the model properly reflects actual customer behavior. The model also explicitly incorporates distance as a convenience factor that reflects known bank branch customer behaviour.

The model will parallel customer behaviour because the probability of a customer in a region frequenting a branch will be based on the argument that shopping patronage patterns depends on the consumers' evaluation of the relative utility of each branch. Recall that, the utility function for a retail location can be formulated as a relationship between how attractive a branch is and the distance a customer is away from that branch:

$$\text{Utility Function: } U_{ij} = A_j^\alpha D_{ij}^\beta$$

Where A_j is the attractiveness of the branch j
 D_{ij} is the distance between customer i and branch j
 α and β are parameters that reflect a customer's sensitivity to branch attractiveness and distance respectively

Recall that, β will be negative because the farther a customer is from the branch, the less utility the customer will have for the branch. If the model has a very large negative β then the formula approaches the nearest center hypothesis. In Reilly's formula the values for $\alpha=1$ and $\beta=-2$ are fixed. In practicality actual customer choices could be used by banking firms to determine consumer utility functions (thereby calibrating the model to best fit observed consumer shopping patterns). In the model for this thesis, customer

information is not available for every branch of every financial institution. In addition, little customer behaviour research is available to evaluate the sensitivity financial services clients' have towards distance. For this reason the assumption made in Reilly's formula will be adopted. That is α value will remain 1 and β will have a value of -2.

The idea of a customer randomly frequenting many different financial institutions is unlikely. A customer may, however, choose a few different firms to provide different financial products. Studies have shown that bank branch selection is mostly a function of convenience. Although it was difficult to find rigorous scientific literature, it is generally accepted that convenience is not only inversely proportional to distance but is also affected by the opportunity to perform numerous activities in one outing. Specifically, it is postulated that branches closer to other retailers such as supermarkets, pharmacies and multipurpose locations such as malls will be more attractive to a customer.

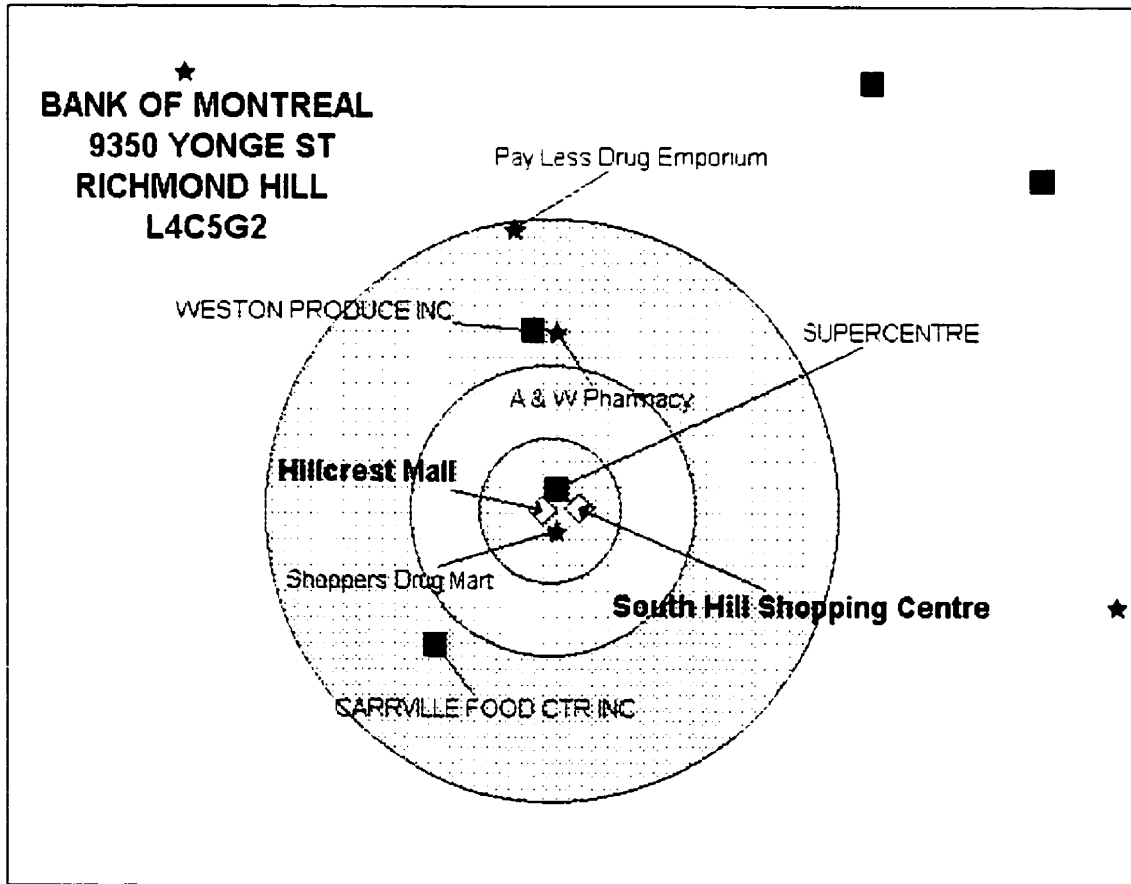
Hence, a method for scoring each branch location was developed to reflect the convenience attraction of a branch location. Numbers were chosen through interpretation of the frequency and the planning of shopping trips to three specific locations (grocers, pharmacies and shopping malls). It must be noted that the numeric values themselves are relative and do not represent any quantitative measurement. For analysis, proximity radii are evaluated for each type of retail location (grocers, pharmacies, and malls) and points are given accordingly to branches. The method is outlined in the following table.

Table 5: Proximity Scoring Method

Radius (r)	Routine Purchase Category	Points	Score (pts/r ²)
0.25 km	Supermarkets	15	240
	Malls	10	160
	Pharmacies	5	80
0.50 km	Supermarkets	15	60
	Malls	10	40
	Pharmacies	5	20
1.00 km	Supermarkets	15	15
	Malls	10	10
	Pharmacies	5	5

For example, the center of the concentric circles below is a Bank of Montreal branch located in Richmond Hill. The rings illustrate the 1km, 0.5km, and 0.25km radii investigated. The blue stars in the diagram represent pharmacies while the green squares represents the location of grocers. The two diamonds are the two malls in the area.

Figure 3: Example of Proximity Scoring



In this situation the proximity score for the branch would be the following:

0.25 km radius:	1 grocer, 2 malls and 1 pharmacy	$1(240) + 2(160) + 1(80) = 640$
0.5 km radius:	No retailers	$0(60) + 0(40) + 0(20) = 0$
1 km radius:	2 grocers and 2 pharmacies	$2(15) + 0(10) + 2(5) = 40$
		<u>Total Proximity Score = 680</u>

This method can be used to determine the attractiveness score for each branch in a data set. Now that a proximity score of this branch has been determined ($A_i^a = 680$ points), suppose a customer located 275m away from the branch is evaluating the utility of

frequenting that branch. Recall that, in this thesis formulation the value parameter α in A_1^α will be one so the utility calculation will be the following:

$$\text{Utility: } U_{ij} = A_j^\alpha D_{ij}^\beta = (680 \text{ pts})^1 \times (275\text{m})^{-2} = 0.009$$

Therefore, the utility this customer has for this Bank of Montreal branch is 0.009.

Another aspect of convenience is the issue of the predominance of a firm in the region. For example, if a number of a consumer's friends, family and business colleagues have all had positive experiences with a certain branch manager then their recommendation is likely to lead that customer to approach that particular branch with their business. The converse situation is probably also true with the quality of service and number of years a branch has been in operation affecting market share. These factors may not have as large of an effect in urban areas however they are illustrated in areas such as the Niagara Peninsula region. In this area the predominant farming industry causes more consumers to gravitate towards the flexibility of the credit union structure over traditional banking restrictions [Gordon99]. Due to this fact another ideal attractiveness factor that could be examined in the model is a measure of market share (a firm's predominance) from CBA data. The CBA collects detailed information from all of its members and publishes summary data for its members with regards to market share in certain regions. This values could be incorporated into the MCI model as a second attractiveness factor, A_2^α , where $\alpha = 1$. Inclusion of this data would make the model more robust, however currently detailed data regarding market share is considered proprietary information and is not available to the public. For this reason it could not be incorporated into this study and proximity score is the only attractiveness factor included in this model.

5.2 Competition Analysis

Now that the utility of a customer frequenting a certain branch can be determined a probability surface can be derived. The Multiplicative Competitive Interaction Model uses the probability of a customer visiting a particular outlet or the probability with which an individual chooses a store and the utility of the other stores from which a customer has to choose.

In this way, the following probabilistic formulation can be made.

$$P_{ij} = U_{ij} / \sum U_{ik}$$

Where k is the set of competitors
and U 's are the customers' perceived utility of each store

This model provides, for each customer, a probability of the customers in that area frequenting a specific branch given the location and attractiveness of competitors in the area. Mathematically, the probability of a consumer at residential zone i patronizing facility j can be written as:

$$P_{ij} = \frac{\left(\prod_l A_{lj}^{\alpha_l} \right) (D_{ij}^{\beta})}{\sum_k \left(\prod_l A_{lk}^{\alpha_l} \right) (D_{ik}^{\beta})}$$

where $\prod A_{ij}$ is the product of the measures of branch j 's l characteristics
 D is the distance between customer and branch
 k is the set of branches considered by customers at origin i

Using this model it is possible to define the probability of customers at a certain origin frequenting a certain branch. This probability measure will be the base from which the subsequent opportunity index is derived. With this base of how a region is going to be studied consideration must be given to which region to study. The following section addresses this issue.

5.3 Consumer Choice Region

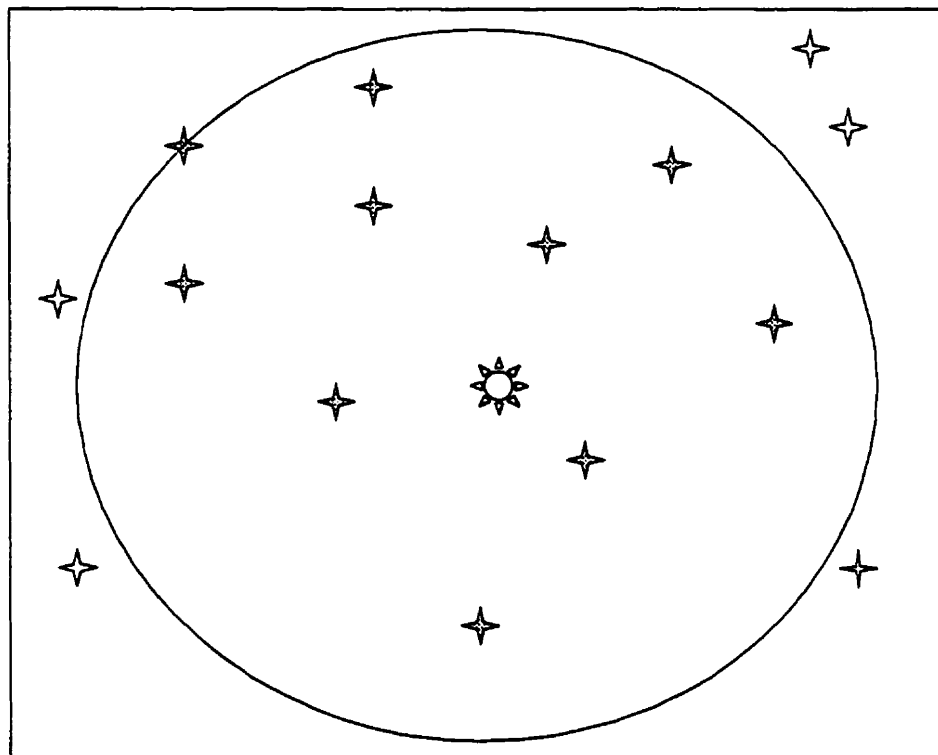
One of the most vital components of branch opportunity measurement is determining the area which to measure. Ideally, it would be best to data mine the location of each branch's clients for each bank from an existing customer database and determine exactly from where residential customers travel to use branch services. In this work, however, the goal is to provide a basic idea of opportunity for any branch given that detailed customer data is not available.




The goal of this study is to analyze an entire region. That is, no segment of the population can be excluded nor can any branch be excluded. For this reason inter-branch competition will be considered. In general, a particular firm may not be concerned about whether a client is using the services of one or another of their branches, however, when examined from an individual branch's perspective, business (in the form of number of transactions performed) is affected if another branch is chosen. That is, branches from the same bank will compete, in essence, for branch transactions. Thus every branch must be considered.

Despite the fact that all customer areas and bank branches must be considered it is not necessary to evaluate each area for each bank branch. That is to say, there is a region outside of which a customer no longer considers banking. This region may be quite small for urban areas and larger for rural areas. To help compensate for this phenomenon this study will avoid the traditional method of defining a branch's trade area using a circle of a given radius to assign the customer areas to each branch. Instead of this method, the trade area will be defined by assigning branches to customer areas. Hence, a set of possible financial institution choices for each client area is created. Using this method (described in the section below), it is hoped that the problems associated with defining a standard trade area radius will be reduced, however, a couple of significant assumptions must be made as a result of this approach.

Thus, instead of making an assumption about the radius of a branch's trade area, an assumption about the number of branches that a customer would consider, is made. That is, a circle containing a chosen number of branches will bind the banking region of each client area. In this study the assumption of a customer considering 10 competing branches of any firm is made. In this way, the probability of customers in a census Enumeration Area (EA) frequenting the ten closest branches will be determined. The diagram in Figure 4 below illustrates the construction of the customer choice region.

Figure 4: Customer Choice Region



- Legend:
-  - Centroid of customer area in question
 -  - Bank branch which falls within 10 branch circle radius
 -  - Bank branch not considered for the Customer Area

In this way, the centroid of each customer area (EA) will be considered the location of a customer and the utility of that group of people frequenting each of the ten closest branches will be calculated. In this study, EAs were chosen to ensure that mathematically, there would be significantly more customers than branches being assigned.

Note should be made of another major assumption this method makes. It is assumed that a client's banking region should be derived based on proximity to that client's residence (home) and not defined by place of work. Little information could be ascertained regarding client banking behavior around the work place. In addition to the lack of customer workplace behavior information, census data provided by Statistics Canada is collected based on residence as opposed to work place. These data constraints caused the assumption to build banking regions around residences.

The assignment of ten branches to a customer residential area has been made to compensate for problems associated with assigning set radii for branch trade areas. This method, hopefully, improves the sensitivity the model has to distance in both concentrated urban areas and spacious rural areas. As mentioned before the utility of each branch to the given customer will be calculated using the distance and attractiveness factors provided for by the MCI model. These probabilities derived from the MCI analysis will then be used to determine the proportion of the business each customer can give to each of the ten branches. The following section describes the practical implementation of these calculated probabilities.

5.4 Opportunity Analysis

In terms of analysis, the trade area determination and probability calculation methods described above will help derive a matrix, which contains each of the customer areas and each of the branches over the entire area of study. Since this study is EAs as customer area the matrix will contain row entries for each EA. Each EA will have 10 probabilities, which sum to one. The columns will contain the probability of that consumer group frequenting that branch location. When examined, the columns, which represent the derived branch's trade area, may sum to much greater than one. Table 6 below provides an example of this matrix.

Table 6: Probability Matrix

EAs	Branches					ΣP
	b1	b2	b3	...	bB	
ea1	P(ea1, b1)	P(ea1, b2)	P(ea1, b3)	...	P(ea1, bB)	1
ea2	P(ea2, b1)	P(ea2, b2)	P(ea2, b3)	...	P(ea2, bB)	1
ea3	P(ea3, b1)	P(ea3, b2)	P(ea3, b3)	...	P(ea3, bB)	1
.
.
.
eaN	P(eaN, b1)	P(eaN, b2)	P(eaN, b3)	...	P(eaN, bB)	1
Total	ΣP_{b1}	ΣP_{b2}	ΣP_{b3}	...	ΣP_{bB}	

* Where N and B are the number of EAs and branches respectively

In this matrix each EA will have ten probabilities relating to the probability of frequenting the ten closest branches, all of the other branch probabilities will have a zero value in that field. Along the EA rows these probabilities will add up to one. Along the columns for this matrix, that is each branch, the probabilities for each EA can be multiplied by that EA's characteristics and be added together to find the opportunity that specific branch has. The following section describes the EA's characteristics, which will be used to measure branch opportunity.

5.6 Opportunity Index Formulation

The method outlined above and the resultant probabilities approximate the proportion of business each branch can obtain from each enumeration area, but, it is important to determine what data will be used to measure the potential amount of business available within a customer area. The measure of opportunity for financial institutions must be derived by considering two factors. The first is industry research, which provides guidelines for which demographic characteristics are most closely related to opportunity. The second, is the availability of this demographic information through Statistics Canada publications.

Previous research has shown that there are three characteristics which are most significant in financial industry business prediction as measured by savings and earnings.

These characteristics are the number of competitors, the income level of population and the population of the area. Competition is accounted for within the MCI model formulation. Income level and population area characteristics can be incorporated using census data.

Various types and levels of income and population data is available within Statistics Canada's census publications. In this study, information was collected using the household definition of Statistics Canada. Details of the decision to choose the household variable are discussed in the data portion of this report.

The resulting opportunity measure will be the Probable Dollar amount available to each branch based on the probability of the people within an EA frequenting a given branch. The Probable Dollar value will be derived in the following way:

$$(Probable\ Dollars)_j = \sum_j P_{ij} (\# HHlds)_i (Avg\ HHld\ Income)_i$$

*where HHlds refers to the households in the region
P_{ij} are the probabilities calculated with the MCI model.*

This dollar amount provides an indication of opportunity for branch *j*, however, it does not provide reference to the overall opportunity in the area. Consequently it is also useful to compare the Probable Dollar amount to the Total Dollar amount available within the area (total dollar amount is calculated by excluding MCI probabilities from EA characteristic summation). This comparison will create a relative score or index with which to measure opportunity. That Opportunity Index can be described by the following formula:

$$Opportunity\ Index\ for\ Branch\ j = \frac{\sum_i P_{ij} (\# HHlds)_i (Avg\ HHld\ Income)_i}{\sum_i (\# HHlds)_i (Avg\ HHld\ Income)_i}$$

*where j is the branch in question
i is the set of EAs assigned to branch j
and P_{ij} is the probability of EA i, frequenting branch j.*

This methodology section outlined a framework for analyzing any data set. The remainder of this study will illustrate the results of this methodology using a data set generated for a selected area within Ontario. The specifics regarding the regions chosen, the data generated and the potential errors within the data set are outlined in the following data section.

6.0 The Data

The primary source for data, information and software for this thesis was the CSCA (Centre for the Study of Commercial Activity) at Ryerson Polytechnic University. This centre, directed by Professor Ken Jones, generates and maintains numerous databases pertaining to virtually every retail industry in Canada. It was in co-operation with the members of this centre that all the data for this study was obtained. This data came from various sources, which are outlined in this chapter.

6.1 Data Requirements

The opportunity analysis method derived for this research on bank branch networks requires various types of data. The following table outlines the data requirements, their sources and which component of the analysis they are required for.

Table 7: Data Requirements

DATA	SOURCE	COMPONENT
List of Competing Financial Firms	CBA and Credit Union Central of Ontario	List of firms for which branch locations could be determined (APPENDIX II)
List of Competing Firm's Branches	ProCD information provided by the CSCA – SPSS files	Comprises Branch Network to be studied
Retailers (grocers, pharmacies, malls)	ProCD information provided by the CSCA – SPSS files	List of retailers to be used in Proximity analysis assessing the attractiveness of a branch location
Locations of Postal Codes	Pccf file - provided by the CSCA	Geocoding both Bank Branch and Retailer locations
Statistics Canada – Enumeration Area Boundary	U of T Data Liberation Site www.chass.utoronto.ca/datalib/cc96/	Assigning branches to EAs
Statistics Canada (population and income)	U of T Data Liberation Site www.chass.utoronto.ca/datalib/cc96/	Calculating Branch Opportunity (APPENDIX IV)

The subsequent sections highlight some of the key points in the data extraction procedures.

6.2 Generation of Financial Firms and Retail Locations

The generation of branches and the retail locations of grocers, pharmacies and malls have been grouped together because the list for this study came from the same source. With the exception of malls, all the retail locations were generated for this study directly from a telephone directory database called "Select Phone" purchased by the CSCA (the malls database had already been generated using the same tool for a previous study done by the CSCA). The Select Phone database is sold by a company called ProCD, a division of infoUSA Inc. The version of this CD used was based on 1998 data.

The ProCD database is separated into data files by area code and for this thesis the files for 416 and 905 area codes were downloaded into a database format. The software program SPSS was used to search and select retailers from this 416/905 area code database. Although the selection of all the retailers was done using this database a couple of different query techniques were used.

6.2.1 Financial Industry Firms:

Extraction of financial competitors was completed by first identifying competitors through information provided by the Canadian Bankers Association (CBA) as well as contacting the Credit Union Central of Ontario. The list provided by these institutions can be viewed in Appendix II. Once defined, several queries were performed on the database to extract first the large banks and then the various Credit Unions and Caisse Populaires. The syntax used for these queries can be viewed in Appendix III.

As with all data there are some possible errors associated with the Select Phone directory. First, the timing and accuracy of the electronic telephone directory limits the database. Telephone directories are usually at least 6 months out of date. This makes the data

essentially from the middle of 1997. Another characteristic of a telephone directory is that one location may have more than one telephone number and consequently more than one listing. In addition, one location of the same firm may be classified differently (ie: a bank branch location, which also provides trust services, may appear twice). For the above reasons the database was examined thoroughly using street addresses and postal codes to ensure that there were no duplicate locations.

In addition to eliminating duplicate entries and inputting missing data fields the list of credit unions were evaluated. It was decided that the members of employee and special interest group based credit unions do not follow the assumed convenience based customer behaviour assumption of the index model. For that reason, only community credit unions were retained in the database to be analyzed. The list of community credit unions was verified using information provided by the Credit Union Central of Ontario.

After a definitive list of financial institutions was generated, an attempt was made to validate the list using the branch locator functions given on the major financial industry web pages. This effort proved futile due to the different search engines each site had and the inability to distinguish whether a branch not found using the branch locator may have just recently been closed but was operational during the time period in question.

The effort to use branch locators was not a complete loss, however, as they did prove helpful in determining nearly all missing postal code and address information. Once all the postal code information had been completed the locations were then geocoded using a postal code file from 1998 (PCCF).

6.2.2 Geocoding using Postal Codes:

There is some spatial accuracy lost when geocoding using postal codes as opposed to exact street address. The main reason why postal codes were chosen over street address is the absence of accurate street files. In a study of retail locations within Montreal, currently being undertaken by a spatial data base analyst with the CSCA, the most

successful run of street file geocoding resulted in only about 50% of the locations being geocoded automatically. The remaining locations were then analyzed case by case, which only raised the proportion of locations geocoded to approximately 70%. Missing, changed and incorrect address records and street files contributed to the inability to code the remaining 30% of street files. In this study, to ensure that all locations were geocoded, six digit postal codes were used. The spatial accuracy lost by using postal code files is best illustrated by examining how postal codes are constructed. .

Six digit postal codes are also referred to as “FSA LDU – Forward Sortation Area Local Delivery Unit”. The first character of a postal code is allocated in alphabetic sequence from East to West across Canada and denotes a province, territory or a major sector found entirely within the boundaries of a province. Rural postal codes can be distinguished for Urban postal codes as their second character is “0” (zero). Error in the spatial postal code files can be incurred in several ways. First, in new suburban areas for example, postal codes are linked to a community mailbox. These boxes can service both odd and even sides of the same street, or different streets, within a 300m radius of the community mailbox. Second, rural postal codes often are placed where the mail is sorted and not the final place of delivery. This may mean that several small rural towns may have the same postal code represented by some central location where the mail is sorted. When considering the location of retail locations such as banks, grocers and pharmacies it is less likely to encounter these types of rural location and shared mail box problems. In this study it is reasonable to assume that all postal codes (since they are the located at the centroid of an area) are several meters away from the exact street entrance of a retail outlet and in rural areas are a maximum of around 300m away [DMTI00].

6.2.3 Generation of Other Retailers

The term "other retailers" refers to the locations of grocers, pharmacies and malls. As mentioned before the database of mall locations had already been generated for previous work done by the CSCA. The generation of grocer and pharmacies however was done similarly to the search for financial firms. The difference in search technique was due to

the querying of the American SIC (Standard Industry Classification) code as opposed to the name of the firm. That is, all the pertinent SIC codes were determined and then the Select Phone database was queried for them (see Appendix III).

After examination it was found that all major grocers fell under the 5411, 5421 and 5431 four digit SIC codes. Queries on these grocers SIC codes also yielded some businesses, which were removed. These food related industries included convenience stores, cigar shops, truck stops, lottery kiosks, doughnut shops, cookie stores and specialty meat stores. All of which were removed from the analysis. Pharmacies on the other hand had little variation in SIC codes and were all identified by querying the database for the 5921 code (see Appendix III for queries).

Upon the conclusion of the data acquisition process the following files were generated. This data is listed in Table 8:

Table 8: Final Database Components

File	Number of Records
Bank of Nova Scotia	265
Bank of Montreal	204
Canadian Imperial Bank of Commerce	273
Canada Trust	106
Laurentian Bank	22
Royal Bank of Canada	231
Toronto Dominion	260
Credit Unions	178
Financial Institution Total	1539
Grocery Stores	2292
Pharmacies	1085
Malls	60
Retail Locations Total	3437

6.3 *Statistics Canada Boundary Files and Census Information*

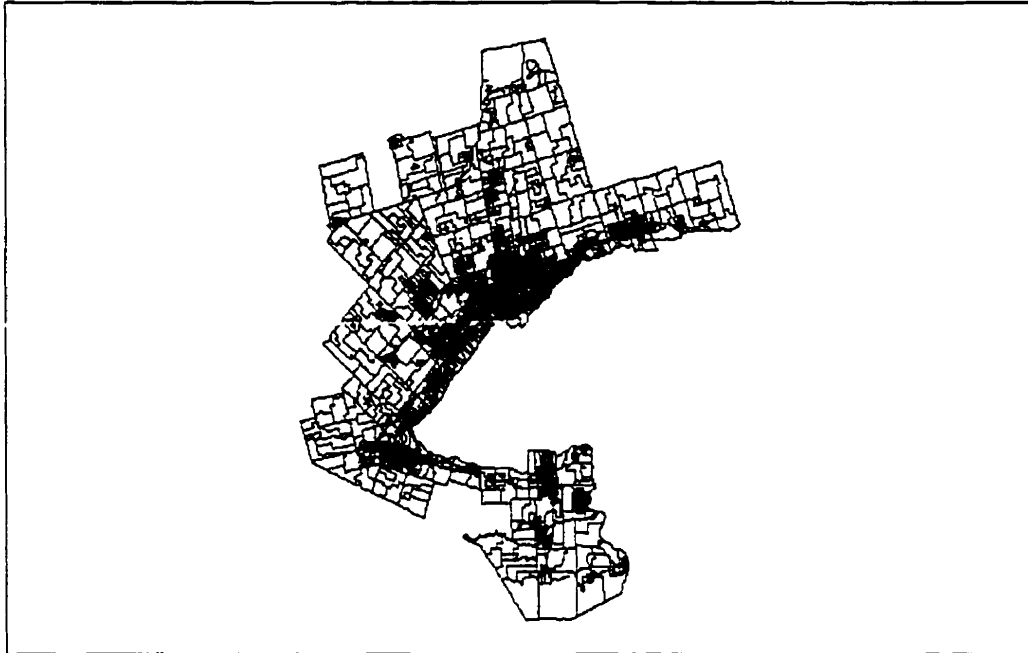
The two types of data required from Statistics Canada are the geographic boundaries of the Enumeration Areas (EAs) as well as the characteristics of each EA collected for the most recent census date (1996).

6.3.1 Enumeration Area Boundary Files

Obtaining EA boundary data files is relatively simple. As part of Statistics Canada's mandate to liberate census data, boundary files are given to educational institutions. In the case of this project, the file containing EA boundaries for all of Ontario was downloaded from the University of Toronto's data liberation website (www.chass.utoronto.ca/datalib/cc96/profile96/). This EA file contains the most recent (1996) definitions of the enumeration areas as well as containing the location of EA centroids based on population gravity. This implies that the geographical center of the area is weighted to represent the center of the population distribution. It is from these population weighted centroids that the analysis of distance between customer location and financial institution branch was done.

Ontario itself contains over 15,000 unique enumeration areas, however, since the retail locations generated are only for the (416) and (905) area codes the EA needed for this study can be reduced. It is within this stage of selecting the EA regions to be investigated that the issue of data management and capacity was considered. The issue of software data capacity is described in detail in the subsequent analysis section, however the resultant set of 7221 EAs were used. Figure 5 illustrates the EAs chosen for analysis.

Figure 5: Illustration of 7221 EAs Chosen for Analysis



These EA boundaries contain an area sufficiently large to perform the analysis of the financial institutions identified for the study. The next step was to obtain the 1996 census data for these regions.

6.3.2 1996 Census Data

The most recent census data available is from 1996. Information in the community profiles is collected either from 100% of the population or from a 20% sample. In the case of income, information is collected from 20% of the population and it is a statement about overall income for 1995. Census data is subject to numerous errors as indicated by Statistics Canada [StatsCan98]. These errors include:

- ♦ Coverage - occurs when dwellings and/or individuals are missed, incorrectly included or double counted
- ♦ Non-response - result when responses cannot be obtained from households or individuals
- ♦ Response - occur when the respondents or census representatives record an incorrect response
- ♦ Processing - data entry errors occurring during coding, data capture and imputation
- ♦ Sampling - apply when the sample taken of 20% of the individuals is not representative of the population.

The estimated error caused by these mistakes in data sampling of a 20% sample of the population is detailed in Table 9 below.

Table 9: Sampling Error in Statistics Canada Data based on a 20% Sample

Cell Value	Approximate Standard Error	Cell Value (con't)	Approximate Standard Error
50 or less	15	5,000	140
100	20	10,000	200
200	30	20,000	280
500	45	50,000	450
1,000	65	100,000	630
2,000	90	500,000	1,400

Statistics Canada asserts that in general, one can be reasonably certain that, for the enumerated population, the true value (discounting all forms of error other than sampling) lies within plus or minus three times the standard error [StatsCan98]. For example, if one is examining household income for an enumeration area (EA) and the cell value is 50,000, the range would be $50,000 \pm (3 \times 450)$, approximately three percent error. This sampling error does not apply to population or universe such as persons, household, dwellings or families only to characteristic such as income. This sampling error is not the only issue to be aware of when using census data. In addition to sampling error several methods are employed to change the data and maintain confidentiality.

6.3.3 Random Rounding and Data Suppression

In order to maintain confidentiality and prevent the possibility of any data being associated directly with an individual, two methods are used. The first method used is called random rounding. Under this method, all figures, including totals and margins, are randomly rounded either up or down to a multiple of "5", and in some cases "10". For example, if the actual cell value is 7 the statistics data will be rounded randomly to 10 or 5. This itself creates a certain amount of error depending on the cell value. That is, rounding 7 down to 5 creates 50% error however rounding 77 to 75 only results in 3%

error. In some cases however random rounding is not viewed to provide enough confidentiality so the second method of area suppression is employed.

Area Suppression is the deletion of all characteristic data for geographic areas with populations below a specified size. In general, the following are the criteria for which data must be suppressed.

1. 100% sample population for an area is less than 40
2. 20% sample if total population or sample population is less than 40
3. income data are suppressed in 20% or 100% if population is less than 250

In all cases data are included at the next appropriate level. For example if information is suppressed at the EA level it may be included at the census tract level if the above criteria are met [StatsCan98]. In both cases of random rounding and data suppression a significant change in actual values is made. These facts must be taken into consideration during any analysis.

In the specific case of this study it was found that out of the 7221 EA's to be evaluated 947 of them contained suppressed data in both the household income and number of households fields. For this reason consideration was given to how to deal appropriately with suppressed data. It was found that there are three possibilities when dealing with suppressed data.

The first possibility is to treat the values as actually being equal to zero in the analysis. Of the three possibilities this is probably the least ideal. These zero values will create holes in the geographic distributions of data and cause difficulty in interpreting the results.

The second possibility is to estimate the actual values using other known values and trends in the existing data set. Methods of estimating data are based primarily on the concept of spatial auto-correlation. That is, it is assumed that adjacent areas tend to display similar characteristics by virtue of proximity. Spatial auto-correlation exists whenever a variable exhibits a regular pattern over space. In the case of average household income values in individual EAs, the spatial autocorrelation will determine the

extent to which values in neighbouring EA s are correlated. A few of the possible methods of data estimation, including techniques of spatial interpolation, statistical investigation, and some ad hoc procedures, are summarized below [Antoniuk97].

- 1- **Distance weighting method** –The principle behind this method is to assign more weight to nearby points than to distant points. Inverse distance weighting (IDW) is based on the notion that values at nearby data points are more significant than distant observations when estimating values of a locationally dependent variable.
- 2- **Kriging** - Kriging refers to the fitting of a representative surface to a set of sample data values using a criterion of minimum variance and covariance. Kriging, often referred to as optimal interpolation, produces estimates for the unknown values of a variable by optimizing the criterion function so that the estimate for a given point is unbiased. This is achieved by ensuring that the estimation variance is less than any other linear combination of the observed values. Kriging answers the question of whether or not better weights can be generated by using a function rather than using just distance.
- 3- **Spline interpolation**- this approach utilizes a spline function, which is fitted to “patches” of data points in two-dimensional space. Spline functions are piecewise polynomial functions which fit a small number of data points exactly while ensuring a continuous curve between intervals of data points. Splines can be used for the three-dimensional situation to interpolate surfaces instead of lines.
- 4- **Interpolating polynomial** – this method expresses the continuous surface mathematically in the form of the lowest order polynomial that passes through all data points. Since the polynomial is only constrained at the data points, the values that are inferred between the points could be very different from the values at nearby data points. To alleviate this problem to a certain extent, lower order polynomials could be fitted to subsets of the data points with the risk of creating discontinuities at the edges and allowing for the existence of other solutions for the same set of data.
- 5- **Residual Method** – as previously mentioned, Statistics Canada includes suppressed data at higher levels (i.e. suppressed population data at the EA level may be included

in Census Tract (CT) values). This ad hoc method subtracts the CT from the known population of EAs and divides this value across the EAs with suppressed data.

Other methods and estimation techniques related to the ones mentioned above include Trend Surfaces, the use of Fourier Series and the application of Least-squares fitting with Spline. In 1997 Antoniuk, investigated several of these techniques in detail and found the most accurate estimates were obtained by using the residual technique. Antoniuk contributed the accuracy to the definition of Census Tracts, claiming that they are designed to be relatively homogeneous in terms of the economic status and social living conditions of their population. Hence, the residual method helps control variability by only using values for CTs in which the EA is found. This method yielded an average income estimation accuracy of about 96% for the Ottawa region.

This previous research provides for an estimation of the potential improvement of the suppressed data if only the household income fields within the EA data had been missing. For this research however, in all cases, the number of households for each EA were also suppressed. The residual technique could also be employed to determine area populations by examining the number of EAs in a CT that have their population suppressed and dividing the missing population amongst the EAs.

The third method of dealing with suppressed data is to consider them as anomalies in the analysis. This approach simply treats the zero values as data, which is unavailable and should therefore be removed from the analysis. In this thesis, the 947 suppressed EAs are missing both population and income data. Despite the fact that the residual method would assist in estimating these values, another issue of data capacity surfaces. The 7221 EAs chosen for the study area exceeds the data capacity of the software, which was used for analysis. The software capacity constraints are described in detail in section 7.1. It should be noted that the decision was made to eliminate the EAs with suppressed data to accommodate the constraints of the software. Leaving out these suppressed EAs, the study region is reduced by 13.1%, and the software capacity constraints are satisfied.

This concludes the discussion of data sources and consequent sources of error. Now that a clear understanding of the foundation of the analysis has been completed the actual process of computing the Opportunity Index is described. The subsequent chapter includes the step by step requirements and outlines the tools necessary for appropriate data extraction.

7.0 Analysis and Results

After all the necessary data was generated, analysis followed. The several stages of analyses utilized a number of different commercial software packages. These software products included MapInfo, MapBasic and Microsoft Excel software applications. MapInfo is a GIS software which can store one unique object location and numerous fields of attribute data for each record in a table. The MapInfo software has some basic database manipulation and query functions capabilities, however, more advanced database queries and calculations are not readily available within MapInfo. To complement the MapInfo software with more functionality, several programs, written in MapBasic were used. Designed by the makers of MapInfo, MapBasic is a software tool that allows custom programming for enhanced computational and editing capabilities. All tables generated using MapInfo and MapBasic can be saved as database files and transferred to a spreadsheet application (like Microsoft Excel) to perform more complex mathematical operations on generated values. Before detailing the analysis procedures the issue of capacity constraints with this software must be discussed.

7.1 *Issues in Software Capacity*

It is within the stage of selecting EAs to be included, that the issue of data management and capacity emerged. The data capacity of software programs used for this study is the main limitation of how large the area of study can be. This problem is best illustrated by returning to the proposed methodology and examining the types of manipulations necessary and the corresponding software available to do analysis.

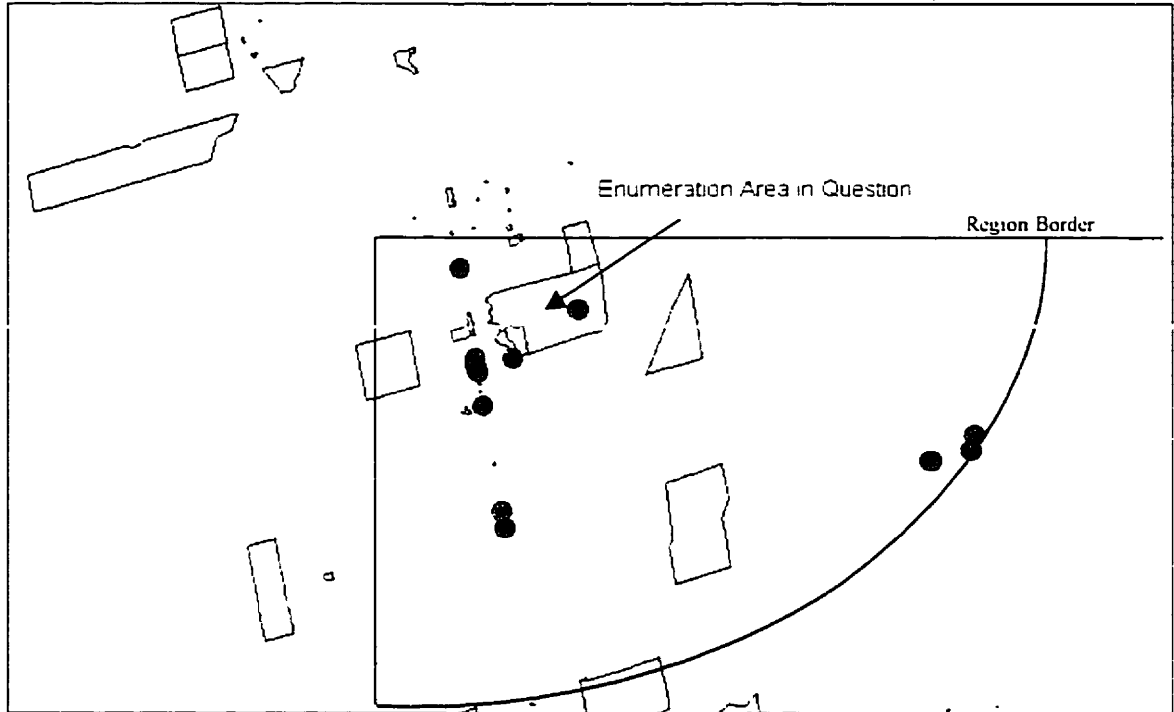
The formulation of this analysis requires that for each EA at least one distance measure must be calculated. Since 1539 financial industry locations have been generated, the enumeration areas selected must cover the area over which these institutions operate. The study also requires that there are significantly more EAs to be allocated than

branches to be analyzed. These computations must be done within the data capacity capabilities of the available software.

The final computations of the index were to be done within Microsoft Excel, which has a data capacity of 64,000 rows and 256 columns. These constraints eliminate the possibility of constructing a large matrix with 1539 columns and 7221 rows. The other possibility was to construct a file that contains a row for each possible combination of EA and branch (1539 x 7221 or over 11 million rows). In order to reduce this file to manageable size the decision was made to include only the 10 closest branches for each EA. The resultant file would contain only 72210 rows. This file is still too large to perform computations in Excel however since several of the EAs in question had suppressed income and population data, treating them as anomalies and removing them from the study would reduce the file into a more manageable size. The resultant file for analysis contained 62740 rows and was small enough to fit the software's constraints.

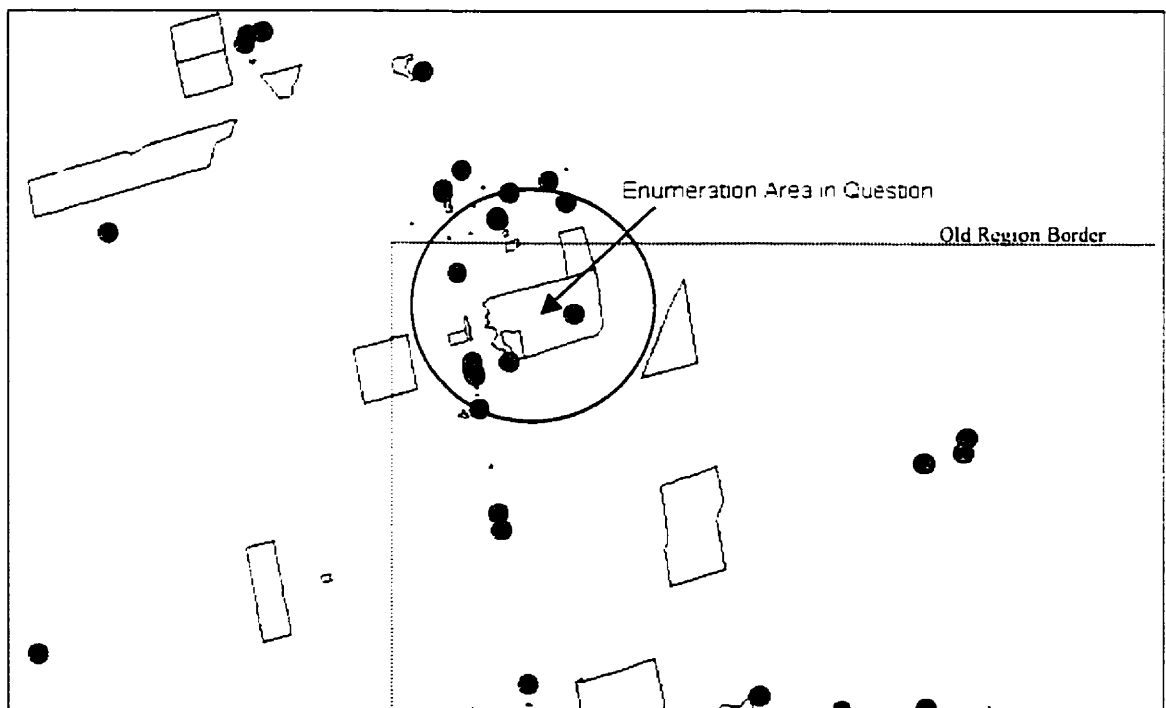
The main drawback of all these assumptions to facilitate record management is that the accuracy of the analysis may suffer. In addition to some model assumptions causing error in analysis there is one common problem that arises in geographic analyses. This problem arises from creating any physical boundaries around a study area. The moment that a boundary is drawn within a larger area one must automatically assume that the analysis for regions near the perimeter will be skewed. That is, when factors beyond a certain boundary are omitted one cannot know their effect on bordering areas. For example, suppose that the location illustrated in Figure 6 below represents an EA near the boarder of the analysis. As the model searches for the 10 closest branches (represented by orange circles) the banking area for that EA grows further into the study region (illustrated by arc).

Figure 6: Branch Choices for EA Located Near Boundary of Study



If more information about the region were included in the study as shown in the next diagram (Figure 7) branch choices would be much different (choice region denoted by circle).

Figure 7: Branch Choices for EA with Boundary Removed



The distortions of analysis caused by setting boundaries on a study are a concern in any geographic analysis. Despite these concerns, meaningful analysis can still be completed provided that the constraints of the model are considered when evaluating the results.

The following sections detail the analysis, which is comprised essentially of six stages:

- 1) Calculating a score for each branch based on proximity to other retailers
- 2) Generating a list of the 10 closest branches to each EA to be converted into a branch trade area (include distance measures)
- 3) Using the scores and distances generated, calculate the utility of each of the 10 branches to each of the EAs
- 4) Utility scores are then used to determine the probability values of each EA frequenting each branch
- 5) Incorporate Statistics Canada data for each EA and determine the final Opportunity Index
- 6) Evaluate results and critique methodology

7.2 *Calculating Branch Score*

The scoring procedure for each branch will involve evaluating a branch's proximity to various other retailers (grocers, pharmacies and malls). The method of determining the number of different retailers within the three radii involved several steps.

First, one of the conditions of the MapInfo software is that only one unique object can be stored for each row. For this reason a MapBasic program was written to convert the branch locations from point objects to circular regions. This program was run three times with different circle radius criteria to generate different files containing all the banks as circular objects with radii of either 250m, 500m or 1000m. These radii correspond to the scoring criteria outlined in the previous methodology section.

For each of these files several queries were run using the “count” function within MapInfo to find the number of grocers, pharmacies and malls that could be found within each radius area. Once generated these files were exported to Excel where the simple mathematical functions were performed to determine each branch's score. The following is an example of this computation for grocery stores.

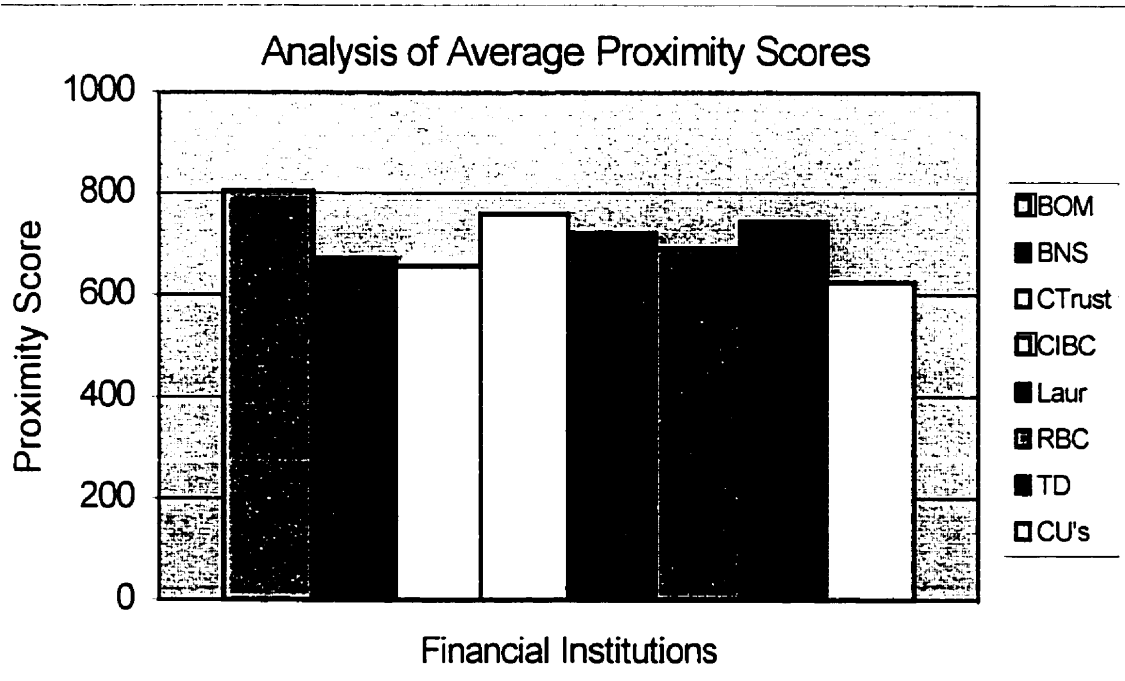
Table 10: Example of Proximity Computation using Grocery Stores

Branch	Count 250m	Count 500m	Count 1000m	Score for 250m	Score for 500m	Score for 1000m	Total Points
B1	5	7	13	= 240pts(5) = 1200pts	= 60pts(7-5) = 120pts	= 15pts(13-7) = 90pts	1410pts

All the scores for each retail type were then added together to yield the final retail attractiveness score for each branch, 1410 in this example. When evaluating the resultant scores for each branch it was noticed that several branches yielded a score of zero. A score of zero in the MCI model implies that the branch is entirely unattractive to a client. By leaving the score as zero the resultant probability of a customer frequenting the branch would also be zero. A probability of zero is not a realistic result when modeling banking behaviour. This is best illustrated with the example of a branch that has a zero attractiveness score but a very small distance. For example, if a customer is only 10m away from the branch in question the resultant utility would still be zero ($0\text{pts}/(10\text{m})^2$) however in actuality the utility of that branch for that client is quite large. To alleviate this problem all of the scores below 100pts were made to equal 100pts. This ensures that zero probabilities will not occur.

It is now useful to take a more detailed look at this scoring system and evaluate the effect it had on differentiating between locations. Figure 8 provides some insight into the possible branch placement policies of the individual firms.

Figure 8: Average Proximity Scores by Financial Institution



This graph illustrates that on average all the proximity scores for the branches are relatively close. It does show however that the Bank of Montreal branch network, on average, scores slightly higher using this proximity score method, followed by CIBC and then the TD. These differences may be due to the characteristics of the data set but may also be due to the branch location policies of the firms. Hence, perhaps on average the BMO sees it as a higher priority to place its branches close to other retailers.

Now that the score for each branch has been determined the next step is to create trade areas for each branch by evaluating their proximity to various EAs.

7.3 Finding the 10 closest branches to each EA

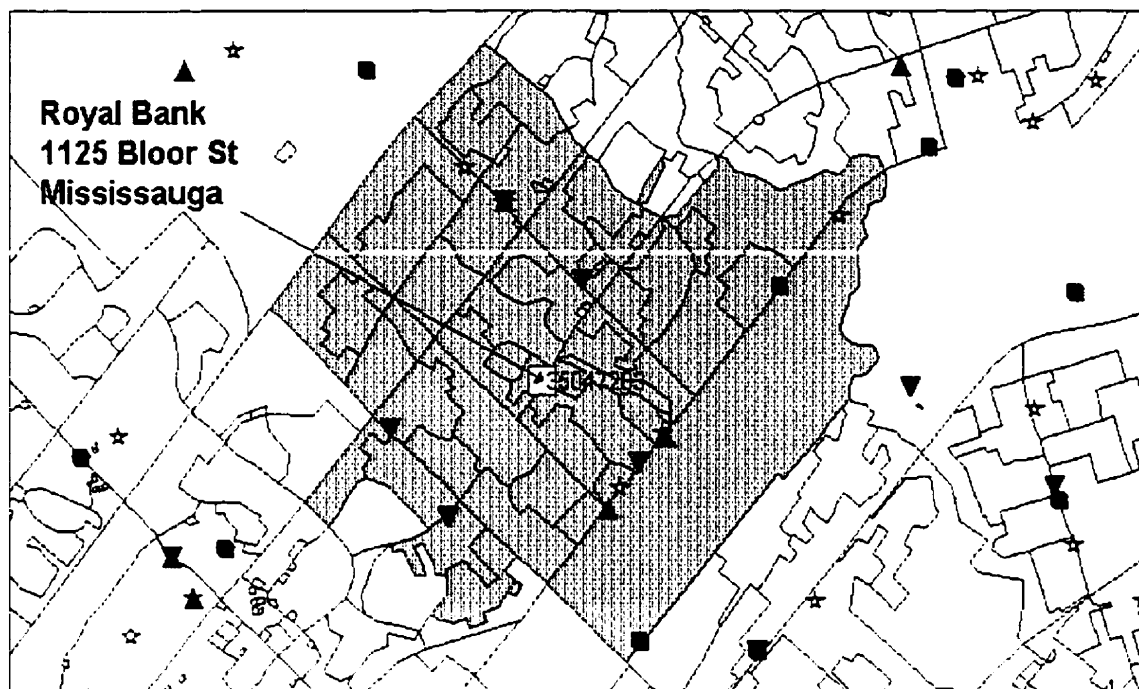
Determining the 10 closest branches to each of the EAs requires several functions, which are not readily available in MapInfo. MapInfo has the capability to compute the distance between two points, however, there is no function available to compute numerous distances between numerous points. For that reason a MapBasic program had to be written to accomplish these computations.

The program to extract the 10 closest branches to each EA was written at the CSCA, specifically for this analysis. The program was written in such a way that for each EA, the distance between branches within a 10km radius would be measured. From this list only the closest 10 branches and their corresponding distances would be written into a MapInfo table. The radius of 10km was used as a preliminary bound on the computational requirements of the program. Despite this computational bound the list of the 10 closest branches still took over 36 hours to generate.

After the first run of computations on the 7221 EAs only 6851 EAs had 10 branches each. For this reason a second run was performed on the EAs with less than 10 branches. The bound of 50km instead of 10km was used. The 50km radius was sufficiently large and succeeded in generating 10 branches for all the remaining 370 EAs.

Once 10 branches had been selected for each EA; this distance and rank file was sorted by branch. For each branch, the number of rows represents the number of EAs within that branch's trade area. The size and shape of the trade area can then be examined by determining the location of the corresponding EA numbers. Figure 9 provides an example of a trade area generated for one of Royal Bank's Mississauga branches (yellow square).

Figure 9: Example of Resultant Trade Area



In this particular case, this trade area is comprised of 54 EAs which have 17,850 households in total. Preliminary analysis of results showed that, 15 of the 1,539 branches were not selected by any of the EAs (i.e. 15 branches had no trade region defined). Further investigation of this problem revealed that all of the branches not selected fell just outside the perimeter of the EA region (the 7,221 EAs did not adequately cover all the branch regions). To facilitate analysis without increasing data requirements these branches were simply eliminated from the study area. The following are the summary statistics for all of the remaining 1,539 branch trade areas in this study.

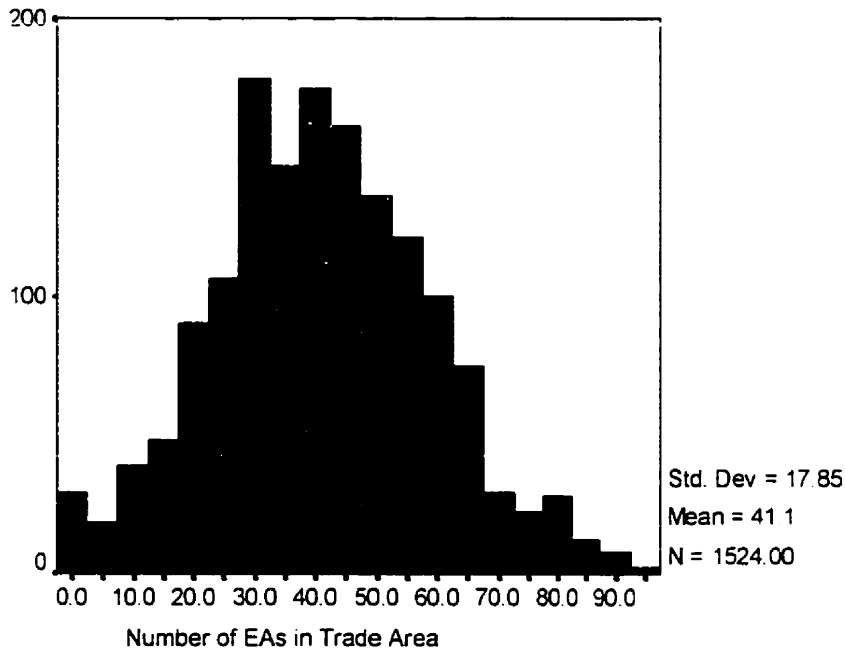
Table 11: Summary Statistics for Trade Area Generation

Summary Statistic	Number of EAs in Trade Area	Number of Households
Min	1	180
Max	96	28,215
Mean	41.05	12,555
Standard Deviation	17.85	5,272

The standard deviation of these values is quite large indicating that there is a great difference in the size and population of the trade areas selected for different branches.

The minimum value of 1 EA causes some concerns with the effectiveness of this trade area determination method. This concern prompted a more detailed evaluation of the resultant trade areas. Figure 10 shows a histogram of the size (number of EAs) of branch trade areas

Figure 10: Distribution of Trade Area Size



This histogram shows that, 73 percent of trade areas contain between 25 and 65 EAs. To investigate the outliers of this analysis, those branches with trade regions containing less than 10 EAs and more that 80 EAs were investigated. The branches with trade areas consisting of more than 80 EAs are evenly dispersed throughout the Greater Toronto Area (GTA) and seem to represent well-placed branches, exposed to numerous EAs.

Conversely, of the 64 branches with trade areas smaller than 10, 22 of them are around the perimeter of the study region (primarily the Niagara Peninsula Region). As previously mentioned, the investigation of objects near the perimeter of any geographic study is always difficult. In addition to branches around the perimeter, a cluster of branches with small trade area regions exists within the North Mississauga/ Brampton region around Dixie Road. This phenomenon can be explained by the fact that the north

Dixie Road region is primarily industrial and consequently the EA region definitions are quite large. Since the trade area definition technique is based on distance, relatively few EAs are assigned to branches in this area.

After the trade areas for the branches were constructed, the next step was to determine the amount of business the branch will get from each of these regions. These probability calculations, using the MCI model formulation are described in the subsequent section.

7.4 *Determining the Utility Value and Probability Score*

After the selection of branches for each EA was complete the utility calculation for each EA took place. It was at this time that the file size was adjusted to contain only the EAs for which Statistics Canada has data (reduce file from 72210 rows to 62740 rows through the elimination of 947 EAs with suppressed data). The utility scores were then used to determine the probability values of each EA frequenting each branch (for sample see Appendix IV).

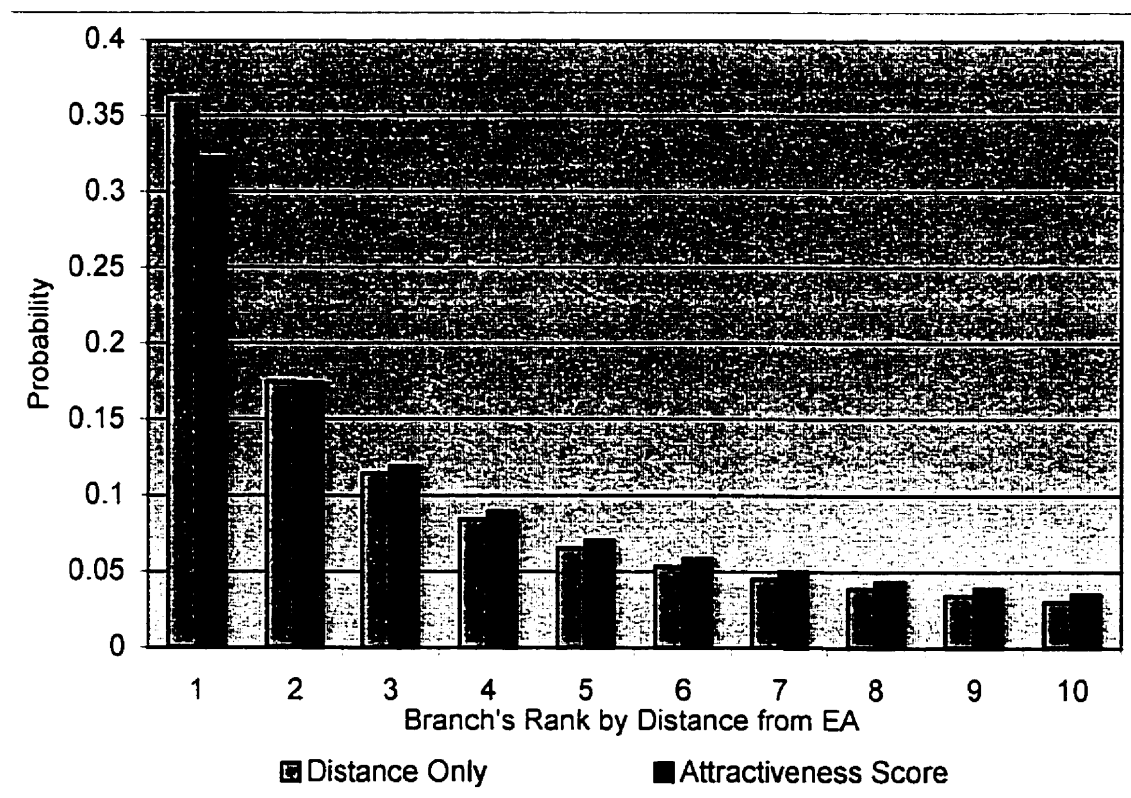
By using a β value of -2 the resultant probability (also see Appendix IV) scores reflected the large emphasis this model places on distance. Table 12 compares the order a branch was picked to the resultant utility score. In other words the closest branch to an EA is ranked 1 the second closest 2 and so on. The calculated probabilities were done for just distance ($1/d^2$) as well as the model using proximity score (pts/d^2).

Table 12: Comparison of Proximity Score vs Distance Only Calculations

Rank	Using Distance				Using Score and Distance			
	Min	Max	Average	Std Dev	Min	Max	Average	Std Dev
1	0.1043	0.9992	0.3611	0.1998	0.01171	0.9992	0.3218	0.2110
2	0.0001	0.4996	0.1746	0.0854	0.00014	0.7499	0.1740	0.1082
3	0.0001	0.3331	0.1144	0.0538	0.00001	0.4381	0.1189	0.0769
4	0.00008	0.2415	0.0840	0.0419	0.00001	0.4206	0.0896	0.0644
5	0.00004	0.1993	0.0652	0.0346	0.00009	0.3836	0.0702	0.0550
6	0.00002	0.1416	0.0530	0.0301	0.00004	0.3579	0.0581	0.0486
7	0.00002	0.1264	0.0448	0.0267	0.00004	0.3612	0.0498	0.0447
8	0.00002	0.1117	0.0384	0.0241	0.000003	0.3149	0.0432	0.0403
9	0.00001	0.1040	0.0340	0.0221	0.000007	0.3704	0.0389	0.0377
10	0.00001	0.0972	0.0299	0.0204	0.000002	0.2948	0.0349	0.0362

The graph in figure 11 below, graphically illustrates how incorporating the attractiveness score into the model effects the resultant probabilities.

Figure 11: Comparison of Probabilities Based on Distance Rank



The blue columns represent a probability measure based only on distance. By comparison to the blue columns it can be seen that although the driving factor behind the probabilities is still distance, the use of the attractiveness factor modifies the model slightly. Using proximity data, the average probability of going to the closest branch declines slightly. Conversely, the probability of frequenting the more distant branches increases slightly. If available, more data regarding customer behavior could be incorporated into this model to make the resultant probabilities better reflect a customer's sensitivity to distance.

Once the probabilities of customers frequenting each of the 10 possible branches have been determined the Statistics Canada data can be incorporated to derive an index value for each branch.

7.5 Opportunity Index Results

The Opportunity Index was constructed using number of households as a measure of population and average household income as a measure of income for each of these households. The formula for computing the Opportunity Index is as follows:

$$OpportunityIndex_j = \frac{\sum_k P_{ij} (\# HHlds)_i (AvgHHldIncome)_i}{\sum_k (\# HHlds)_i (AvgHHldIncome)_i}$$

where: P_{ij} is the probability of the customers in EA i frequenting branch j
 k is the set of EAs that make up branch j 's trade area

This index calculation required a few simple steps within the spreadsheet application chosen. For comparison, two indices were calculated for each branch. One using strictly the distance measure and the other incorporating the proximity score. Table 13 provides some summary statistics for the 1524 branches studied.

Table 13: Summary Statistics for Opportunity Index Values

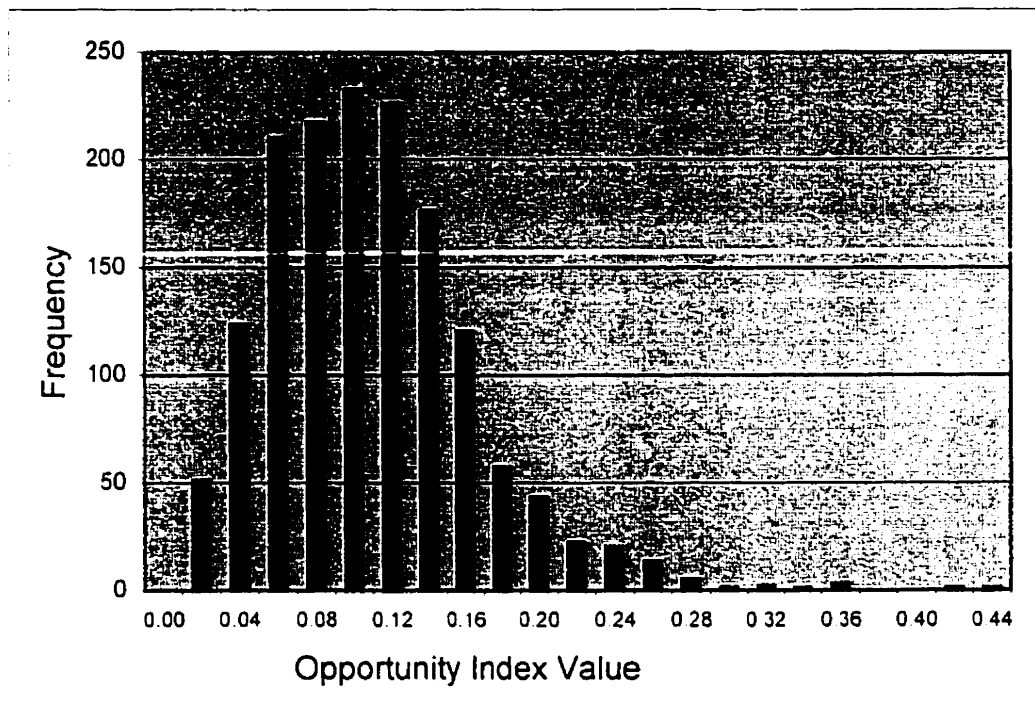
Summary Statistic	Index Value for Distance Measure	Index Value including Proximity Score
Min	0.011825	0.003715
Max	0.521235	0.436549
Range	0.509410	0.432834
Mean	0.099905	0.099122
Std. Dev.	0.039697	0.053835

From these basic statistics one can see that the range of values within the index are quite large. Further investigation of the index values calculated using the proximity score method was done.

7.5.1 Analysis of Opportunity Index Distribution

In order to analyze how effective the formulated opportunity index was at differentiating between areas of small and large opportunity, the distribution of values was analyzed. The histogram in figure 13 below provides a good illustration of the distribution of index results. The resultant skewness of this distribution is 1.103 (skewed to the right) with a standard error of 0.063. The first quartile (0-25%) occurs between 0 and 0.05949, the second (25%-50%) between 0.05949 and 0.09367 and the third (50%-75%) between 0.09367 and 0.127853 which further supports the suggestion that the underlying distribution for these index scores is right skewed. The densities of the gamma, Weibull, and lognormal distributions can all take on shape similar to that of the histogram [Law91].

Figure 12: Distribution of Opportunity Index Values



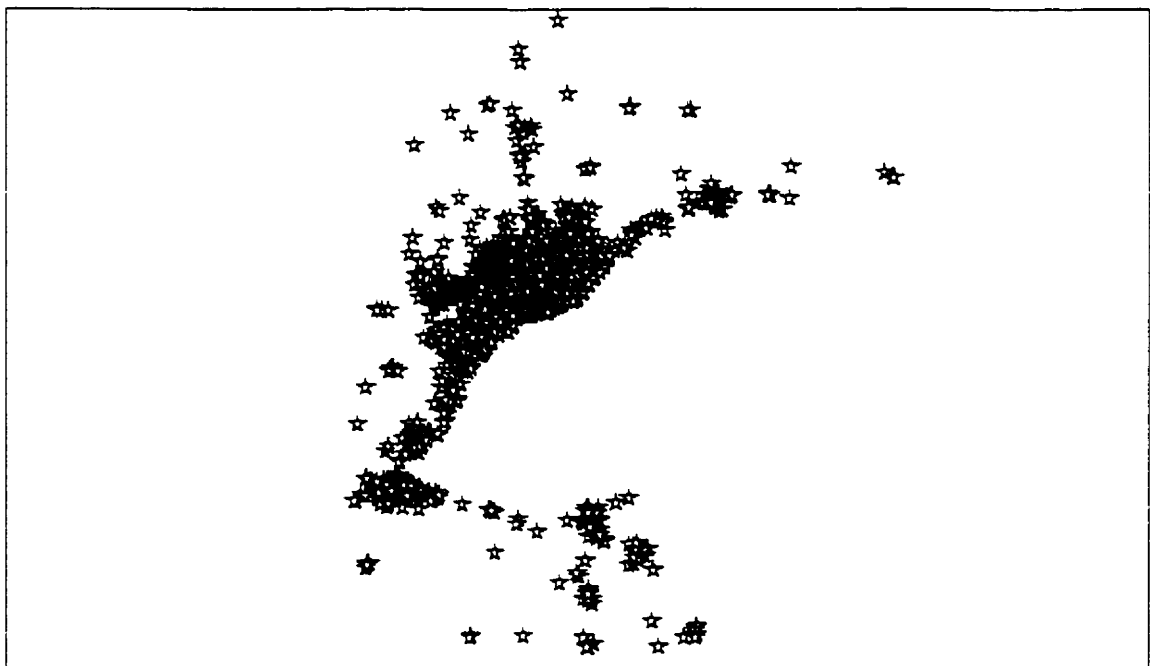
From an application standpoint the fact that the index values are skewed to the right generates some practical questions. Since the distribution of lower scores is fairly concentrated, what is the best method of separating the branches which have little opportunity from the ones that are located in a region of average opportunity. In other words, how should the cut off point be selected to best identify those branches to be investigated.

To further investigate the effectiveness of the index in identifying opportunity some of the extreme points were investigated. That is, the index values that are quite high and those that are quite low were analyzed to see which branches were identified as outliers.

7.5.2.1 Investigation of Small Index Values

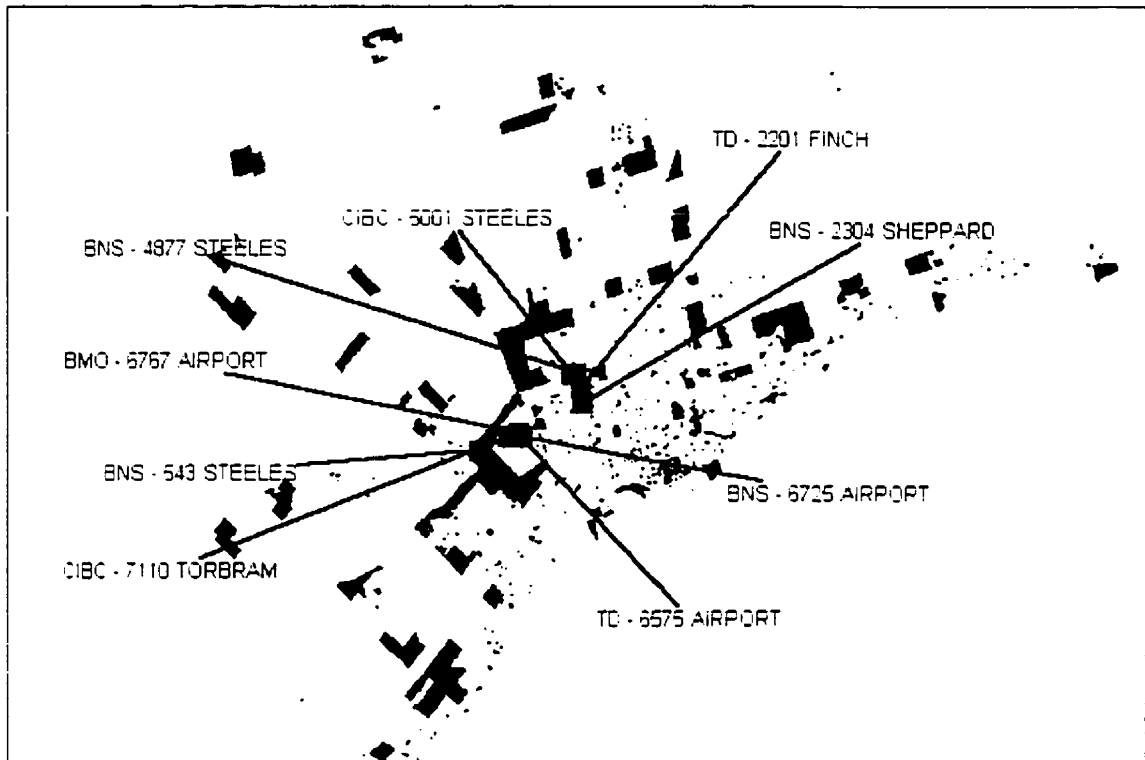
To evaluate the branches which received a remarkably small score all the branches with an index value less than 0.01 were selected. This analysis yielded the following 9 branches. As shown visually in figure 13 below, it does not appear (as originally expected) that the lower scoring branches are on the perimeter of the region. Conversely, they are clustered close together in a region. Only 4 branches appear in this figure, due to the close proximity of the branches.

Figure 13: Location of Branches with Opportunity Index < 0.01



Upon further investigation it was found that these branches were concentrated within two specific regions (illustrated in the following figure 14). These low scoring branches are illustrated along with the set of suppressed EA data in that region. In the airport region several large EAs have had their data suppressed however, this data suppression is likely due to the fact that the region is not highly residential (a manufacturing and warehouse area in addition to a large portion of the area taken up by the airport).

Figure 14: Comparison of Suppressed EA Data & Low Opportunity Index Values

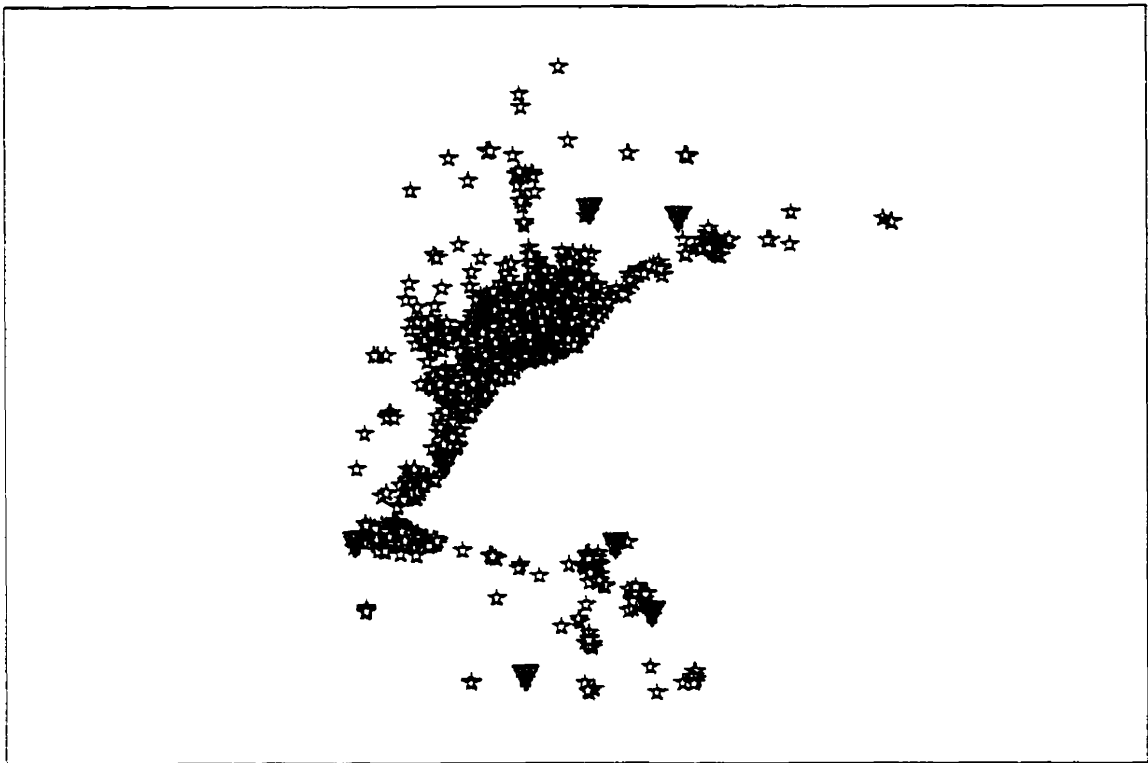


The location of these branches in areas with an index value less than 0.01 illustrates the insensitivity of the model to highly industrial areas. In reality, the influx of working population as well as layover passengers from the airport probably make this region a quite reasonable place for numerous branches. Similarly it was also noted that several branches within the downtown core also received a low opportunity index value. For example a TD branch at 141 Adelaide St received an opportunity index value of 0.008 and a Royal branch at 360 Bay St received a 0.014 index value. A possible area for further investigation would be to evaluate the possibility of balancing the weight of the index between residential areas and those areas where there is a large influx of working population during weekday, daytime hours. If available, information about the employment within enumeration areas would assist in making the model more robust.

7.5.2.2 Investigation of Large Index Values

The second portion of the index value analysis is to examine the largest index values to evaluate their ability to identify regions of great opportunity. For this analysis the index cut off of 0.3 was used. That is, all branches with an index greater than 0.3 were investigated. The following Figure 15 illustrates the locations of these high opportunity regions.

Figure 15: Location of Branches with an Index Value > 0.3



These branches with index scores higher than 0.3 are distributed throughout the study region and some appear to be located on the perimeter of the study area. Data gathered for each of these branches can be seen in table 14 below. Analysis of this data reveals that the branches have a variety of characteristics. Table 14 shows that in general the average household income of the EAs for these branches is not higher than that of the sample (approx. \$50,000 for group rather than the average \$57,000 for the sample). The

average number of household is also significantly smaller than the average of the sample. For this reason the larger index score for these branches can be contributed primarily to the relatively small amount of competition in the area. The trade area assigned to these branches is seemingly small but there are few or no competing branches in the area so the proportion of business is quite large.

Table 14: Characteristics of Branches with Opportunity Index > 0.3

Branch	%Dollars	Total Dollars	Index	Avg Income	HHlds	#EAs
BMO - Niagara On The Lk	91,180,576	263,261,840	346,349	56,910	4,675	16
CIBC - Brooklin	77,295,064	223,908,310	345,209	71,046	3,135	11
NIAGARA CU - Wainfleet	39,350,417	90,139,710	436,549	53,934	1,690	8
RBC - Oakville	207,841,949	686,752,135	302,645	72,981	9,335	26
RBC - Niagara On The Lk	91,180,576	263,261,840	346,349	56,910	4,675	16
RBC - Ancaster	258,693,725	797,463,620	324,396	78,230	10,015	31
RBC - Niagara Falls	57,769,377	143,716,675	401,967	47,502	3,055	10
BNS - Stouffville	158,431,421	497,421,015	318,506	68,452	7,260	25
Sample Average (of 1524)	1,793,409	844,218,044	99,122	57,453	14,707	49

The fact that these branches with higher indices are mostly rural areas indicates that perhaps the β value for these regions should decrease slightly. Currently with a β value equal to -2 the closest branches are being given very large weights because the distances between branches is so large. Also, customer behavior in these regions may differ slightly in that perhaps proximity to other retailers would have a higher impact on which branch a consumer would frequent. The ability to one stop shop may become a more important attribute perhaps the α value of 1 should be increased.

The biggest concern with some of the high scoring branches being in rural areas on the perimeter of the study is that the trade areas generated for these branches may not be realistic. The trade area for branches on the perimeter will grow towards the center of the study area. This may not be realistic because perhaps the closest branches to the EAs on

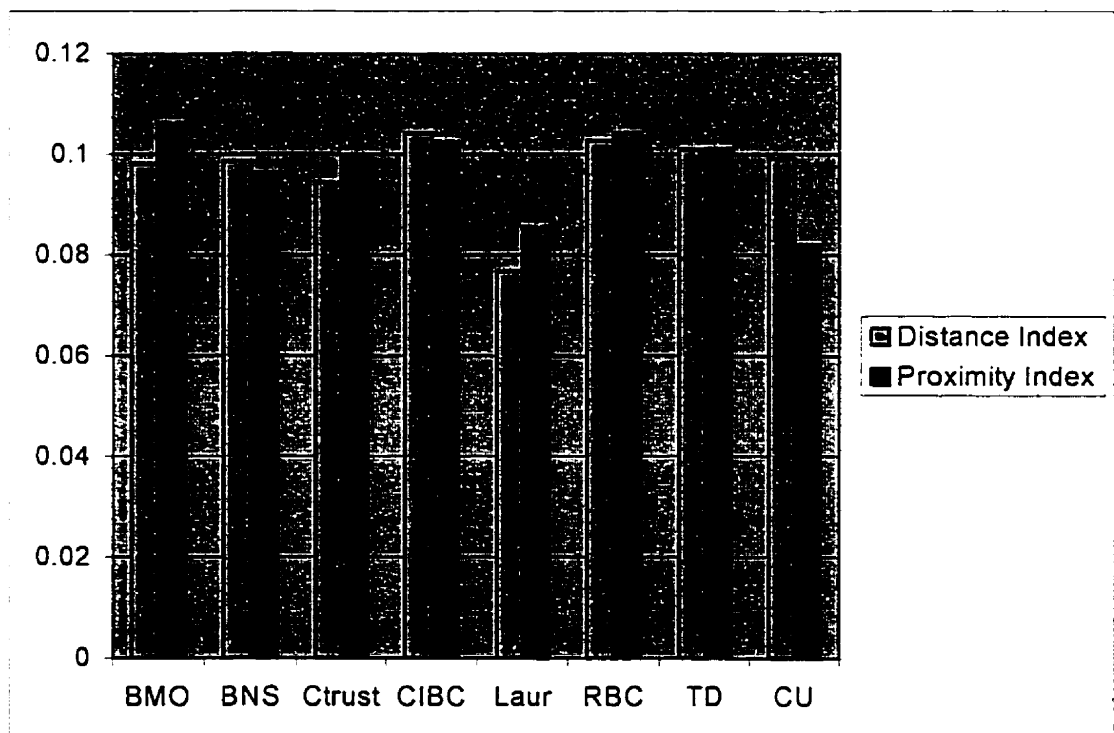
the perimeter are just beyond the study area. The unrealistic shape these trade areas take on may skew the index data for these perimeter areas.

In general, it seems as though higher index values obtained using the method in this study should be evaluated carefully due to potential problems with perimeter branches. Conversely, the lower index values seem to effectively target areas of less opportunity according to the criteria set. The real concern with the lower index values is whether this index model is measuring the proper characteristics.

7.5.3 Branch Network Performance Among Firms

Now that both the tails of the index distribution have been investigated it is may be beneficial to examine the branch networks of each individual firm. The index values obtained for various firm's branches can be found in Appendix V. In this study, credit unions were considered together as one financial institution. The following bar chart in figure 16 illustrates the average performance of each firm's network.

Figure 16: Average Index Values of Financial Institutions



Using the retail proximity index, the Bank of Montreal seems to slightly outperform the others. This result relates back to the fact that on average the branches of the Bank of Montreal yielded higher proximity scores. In contrast the group of Credit Unions seems to perform significantly worse using the proximity model. This is due to the low retailer proximity scores that perhaps reflect the location strategy of credit unions. From a strictly distance to client perspective the Royal Bank of Canada and the Canadian Imperial Bank of Commerce have the best branch networks. The Laurentian Bank seems to have the least effective network. The resulting average index values obtained for both the CIBC and Laurentian banks is interesting because the result seems to be directly correlated with the number of branches of each firm in the study area. That is, CIBC had the highest number of branches in the study (273) while Laurentian had the least (22). This reveals the fact that the index model does not identify the different target clientele of different firms (ie. the Laurentian Bank targets the French Canadian population).

Notwithstanding these "average" findings, it must be remembered that the index developed here is to be used on an individual branch basis, as in a DEA analysis, and therefore the firm averages have little bearing on outcomes.

8.1 Conclusions

This research demonstrates a method, which can be used to assess the theoretical business opportunity available to individual bank branches within a region. The analysis performs Opportunity Index calculations for over 1500 financial institution branches across the GTA and Niagara region.

Technological changes in the Financial Services Industry over the past few years resulted in shifting customer demographics and in new customer behavior. These changes have brought the cost and location of bank branch networks to the forefront of concern. This research addresses the need to evaluate factors such as the number of competitors and socioeconomic characteristics of clients within branch trade areas. A comprehensive overview of pertinent customer behaviour research and literature on possible methodologies for measuring trade area composition are presented.

From this review of possible analysis methodologies the technique called Multiplicative Competitive Interaction (MCI) is chosen to evaluate the data set. Data containing the location of branches and other convenience retailers within the 416 and 905 areacodes within Ontario was generated by performing queries on a telephone directory database provided by Ryerson University's Center for the Study of Commercial Activity (CSCA) (1539 branches and 3437 retail locations). Information necessary for the MCI methodology was generated using two commercial software tools called MapInfo and MapBasic.

In addition to branch spatial information, Statistics Canada census data was employed. Data was obtained for over 7200 Enumeration Areas (EA), which span across the study area. Sampling error within census data can be quite large, however, the data still provides a good general measure of EA regions. In addition, data capacity constraints prompted a decision to treat suppressed census data as anomalies within the study. The resultant number of EAs studied was 6274 (947 EAs removed).

The necessary data components of the MCI method, coupled with Statistics Canada information on the number and average income of households within the enumeration areas used provided a measure of probable dollar opportunity for each branch in the study. This was then converted to an index value by dividing it by the total dollar opportunity in the given branch's trade area.

The Opportunity Index value provided a useful measure of the competitive and socioeconomic environment of a branch's trade area. The index values for the data set ranged from 0.0037 to 0.4365, while the average index value was 0.0991. Investigation of small index values revealed that the methodology was successful in identifying regions of less opportunity. This small index value investigation also revealed that since the model relies on residential information, industrial areas with few residents but a large influx of persons employed in the region generally received a low index value.

Further examination of index values revealed a right skewed distribution. A right skewed distribution implies that the smaller values representing little opportunity are quite concentrated. From a practical standpoint, this presents some interpretive difficulties in determining the cut off point between acceptable opportunity for branch operation and poor opportunity. That is, that the index cut off point selected varies with the criteria of an investigation.

In general, branches with large index values were located near the perimeter of the study. This finding reveals a common problem in spatial analysis where the analysis results of objects near the boundary of the study are often unrealistic. The problem can be resolved by generating an area of study much larger than the specific region of interest. In this way none of the objects of interest will be located on the perimeter of the study and a more realistic result may be obtained.

When the branches of the firms were isolated and analyzed, it was found that in general, firms with numerous branches in the region scored higher than firms with few branches. This was apparent with the comparison of the average branch index values of the

Canadian Imperial Bank of Commerce (CIBC) and Laurentian Bank. CIBC had the highest number of branches in the study and had a high average index value, while the Laurentian bank, with the smallest branch network had the lowest average index value. The index formulation would not account for this phenomenon however it is hypothesized that firms with numerous branches can penetrate areas of low competition while small firms like Laurentian wish to have their presence felt in a region and locate in highly competitive areas.

This research has shown that the Opportunity Index derived is a useful tool to be used in identifying possible branches for investigation. The observations above reaffirm that the index should be used as a starting point for further, in-depth investigation of branch operations. In this way the Opportunity index would be a useful diagnostic tool which could be used in preliminary investigation or coupled with other tools such as Data Envelopment Analysis.

8.1.1 Review of Opportunity Index Methodology

This thesis has provided a methodology with which to calculate the Opportunity Index value of individual bank branches across a region. The calculation of these index values requires three main steps. First, a measure of how convenient it is for a consumer in a given region to frequent each of the ten closest bank branches is employed. This convenience measure (utility), is found by incorporating both an attractiveness characteristic, based on a branch's proximity to other retailers, as well as the distance the branch is away from a given consumer region. The formula for utility calculation is:

$$\text{Utility Function: } U_{ij} = A_j^\alpha D_{ij}^\beta$$

Where A_j is the proximity score of branch j
 D_{ij} is the distance between consumer region i and branch j
 $\alpha=1$ and $\beta= -2$ are parameters that reflect a consumer's sensitivity to branch attractiveness and distance

Once the utility a customer region has for frequenting each of the ten closest bank branches has been calculated, a second probability calculation performed. The probability of customers frequenting the closest 10 branches is:

$$P_{ij} = U_{ij} / \sum U_{ik}$$

Where k is the set of competitors
and U 's are the customers' perceived utility of each store

For example, assume the following table contains information regarding the ten different branches customer region X has to choose from.

Branch Number	Proximity Score of Branch (A_j)	Distance (m) from Consumer Region X to branch (d_{Xj})	Utility ($U_{Xj} = A_j/d_{Xj}^2$)	Probability of Consumer Region X frequenting Branch (P_{Xj})
1	1345	511	0.0051	0.510
2	755	1143	0.0005	0.057
3	755	1143	0.0005	0.057
4	1340	1208	0.0009	0.090
5	1055	1276	0.0006	0.064
6	1055	1276	0.0006	0.064
7	1055	1297	0.0006	0.062
8	1090	1447	0.0005	0.051
9	500	1646	0.0001	0.018
10	1085	2130	0.0002	0.023

Once probabilities for region X frequenting each branch have been determined the third step of incorporating Statistics Canada data on the number of households and average household income is undertaken. For example, suppose region X has a household population of 4,675 and an average household income of \$56,910, then the probable dollars available to branch 1 from region X would be \$135,787,378 ($P_{X1} * 4,675 * 56,910$). The summation of these probable dollars available to specific branch from each customer area (that chose the branch as one of the ten closest branches) provides a measure of the opportunity each branch has. This opportunity is then converted to an index value by dividing it by the total opportunity potentially available to each branch. The resultant Opportunity Index formula is:

$$\text{Opportunity Index for Branch } j = \frac{\sum_i P_{ij} (\# \text{ HHlds})_i (\text{AvgHHldIncome})_i}{\sum_i (\# \text{ HHlds})_i (\text{AvgHHldIncome})_i}$$

where j is the branch in question

i is the set of EAs assigned to branch j

and P_{ij} is the probability of EA i , frequenting branch j .

In this way, the Opportunity Index values are calculated for each branch in a study region. The following section reviews the main findings of the analysis.

8.2 Recommendations for Future Research

This model has made several major assumptions about customer behavior and bank branch opportunity in order to provide a general measure of branch banking opportunity. The following are the major assumptions the made in the model.

- ❖ **Consumer Choice Region:** The method of assigning consumers to the ten closest branches is an intuitive approach. It must be noted however, that the selection of ten branches is not based on specific branch banking customer behaviour and the assumption may not represent exact customer behaviour.
- ❖ **Proximity Score:** In the utility index calculation a score for proximity to other retailers is the attractiveness factor. The values used in calculating the proximity score are relative and do not represent any quantitative measure. For this reason, the numbers may be altered relative to each other and yield different proximity scores.
- ❖ **Sensitivity Parameters α and β :** The parameters used in this model are the same as those used in Reilly's model. To get the full benefit of the utility model it would be better if these parameters were verified so that they reflect the customer's actual sensitivity to the various factors.
- ❖ **Statistics Canada Data:** The Opportunity Index assumes that average household income is an appropriate measure in determining branch opportunity in a region. If available, more detailed financial information may be employed to provide a better monetary measure of opportunity.

All these assumptions have an effect on the outcome of the Opportunity Index measure. The extent of the effect they may have can only be determined through detailed sensitivity analysis. It is recommended as future research that sensitivity analysis be performed. Specifically, the effects of the proximity scores assigned as well the parameters α and β should be investigated. Slight modifications of these values may have a profound effect on the distribution and numerical value of the Opportunity Index scores.

In addition to these assumptions, several other opportunities for future research surfaced during analysis. These issues are outlined below:

- ❖ Investigation of customer behavior in rural vs. urban vs. suburban environments. Further research may find a better method of determining trade areas for regions (as opposed to the 10 closest branch assumption).
- ❖ Estimation of expenditure data for EAs (now currently proprietary) may improve the model by better measuring an individual's propensity to procure bank services instead of using only average income as a measure of opportunity.
- ❖ Incorporating some of the other variables investigated in other studies, such as the percentage of renters in a region or general amount of retail square footage may help make the model more robust.
- ❖ Measures of branch attraction other than just proximity to other retailers could be derived to improve the model.
- ❖ There is a possibility of improving the MCI model to better include the probability that a specific group will require branch services. That is, the information known about common users of branch services such as lower income individuals, women, the less educated segment of the population may be incorporated into the probability formulations. The result could be a formulation that, instead of measuring the probability of the customer being attracted to the location, would also measure the probability of that customer being attracted to branch banking in general.

- ❖ The assumption that being in an area of numerous competitors is detrimental to branch opportunity may not be correct. Branch banking could be further investigated as to how closely the industry follows avoidance theory. That is, perhaps it is good to have numerous branches on a corner for comparison-shopping. In this way, maybe the drawing area of a region with a cluster of branches becomes larger and there is really more opportunity than indicated by the Opportunity Index measure.
- ❖ Instead of using strictly Euclidean distance, street maps (when more accurate files are available) can be incorporated to measure driving time or distance. This will better incorporate geographical boundaries because currently the Opportunity Index formulation may have trade areas spanning over river or highway boundaries.

References

- [ABA99] Anonymous, The branch is still king. American Bankers Association. ABA Banking Journal; New York; June 1999.
- [Amato-McCoy99] Amato-McCoy, Deena. "Summit employs mapping system to pinpoint best branch, ATM sites" Bank Systems & Technology ; New York; April 1999.
- [Banker84] Banker, R.D., Charnes, A. and Cooper, W.W. "Models for estimating technical and scale efficiencies in DEA", Management Science 30(9):1078-1092, 1984.
- [Brockway98] Brockway, Gary and W. Glynn Mangold. The Sales Conversion Index: a method for analyzing small business market opportunities Journal of Small Business Management, April 1998.
- [CBA98] Canadian Bankers Association Bank financial results 1997/98 Fiscal Year: Domestic Banks CBA March, 1998
(www.cba.ca/eng/Statistics/stats/1q98.xls. accessed 04/04/2000)
- [Charnes78] Charnes, A., Cooper, W.W. and Rhodes, E. "Measuring the efficiency of decision making units", European Journal of Operational Research 2(6):429-444, 1978.
- [Charnes95] Charnes A., W. W. Cooper, A. Lewin and L.M.Seiford. Data Envelopment Analysis: Theory, Methodology and Applications. Kluwer Academic Publishers. 1995.

- [Clapp98] Clapp, John and Mauricio Rodriguez. Using a GIS for Real Estate Market Analysis: The problem of spatially aggregated data. Journal of Real Estate Research. Sacramento 1998
- [Clawson74] Clawson, Joseph C. "Fitting Branch Locations, Performance Standards, and Marketing Strategies to Local Conditions" Journal of Marketing 38: 8-14, 1974.
- [CUCC98] Credit Union Central of Canada Credit Union Central of Canada: The National Tier 1998 (<http://www.cucc.ca> accessed 04/04/2000)
- [CTrust98] Canada Trust Financial Statement 1998 (<http://www.canadatrust.com/>. accessed 04/04/2000).
- [Dalton97] Dalton, Patrick. "Identifying and wooing your best customers" Bankers News. Washington; April 22, 1997
- [DMTI00] DMTI (Data Mapping Technologies Inc.) Understanding Postal Code Files: Multiple and Unique Enhanced Postal Code Files x.s. the Six-Digit Postal Code File. DMTI White Paper. www.desktopmapping.com/understandingpostalcodes.pdf (accessed 00-04-04).
- [Dudley98] Dudley, Graham Probability Primer: spatial insights into storebase trading areas FYI, Polk Canada Marketing Services Vol 6, No 1 June 1998.
- [Forbes78] Forbes, J.D. and W.T. Ziemba Estimation of Supermarket Drawing Power: An Extension of Location Theory and Practice in Analysis and Valuation of Retail Locations, edited by Edwin M. Rams, Prentice-Hall, 1976

- [Ghosh87] Ghosh, Avijit and Sara McLafferty Location Strategies for Retail Service Firms Heath and Company, 1987.
- [Gordon99] Gordon, Sheldon More Power to the Credit Unions Canadian Banker, Toronto, Jan/Feb, 1999.
- [Huff63] Huff, David L. "A Probabilistic Analysis of Consumer Spatial Behavior," in William S. Decker, ed., Emerging Concepts in Marketing Chicago: American marketing Association, 443-461, 1963.
- [Jain79] Jain, Arun K. and Vijay Mahajan "Evaluating the Competitive Environment in Retailing Using Multiplicative Competitive Interactive Model" Research in Marketing 2: 217-235, 1979.
- [Jones93] Jones, Ken and Jim Simmons Location, Location, Location: Analyzing the Retail Environment 2nd edition, Nelson Canada, 1993.
- [Klaassen98] Klaassen, Leo H. Exercises in Spatial Thinking Avebury, 1988
- [Law91] Law, Averill M. and W. David Kelton. Simulation Modeling and Analysis McGraw-Hill, 1991.
- [Lea97] Lea, Tony. "An Arsenal of Trade Areas" Business Geographics, August 1997.
- [Oslen79] Olsen, L.M., and Lord, J.D. "Market Area Characteristics and Branch Bank Performance." Journal of Bank Research Summer 10: 102-110, 1979.

- [Porter98] Porter, Michael E. "Clusters and the New Economics of Competition" Harvard Business Review November-December 1998, reprint number 98609.
- [Salvanechi96] Salvanechi, Luigi, Location, Location, Location : How to select the best site for your business Oasis Press, 1996.
- [Schafer94] Schafer, Scott M. "Bank Branch Valuation: An empirical approach" The Appraisal Journal; Chicago; Apr 1994.
- [Schaffnit97] Schaffnit, Claire, Rosen, D. and Paradi, Joseph C. Best Practice Analysis of Bank Branches: An Application of DEA in a Large Canadian Bank. *European Journal of Operational Research* 98 (1997): 269-289.
- [Sherman85] Sherman, H.D. and Gold, F. Bank branch operating efficiency: Evaluation with Data Envelopment Analysis. *Journal of Banking and Finance* 9:297-315.
- [StatsCan98] Statistics Canada. Census-Recensement '96 Statistics Canada <http://ww2.statcan.ca/english/profil/Help/Datahelp.cfm> (accessed 06/21/99) 1998.
- [TDFinancial97] Toronto Dominion Financial Group. 142nd Annual Report 1997. Arthurs-Jones Inc. 1997
- [Thompson92] Thompson, Gerald L. and Thore, Sten. Computational Economics. Boyd and Fraser Publishing Company, 1992

Glossary of Terms and Abbreviations

Analogue: a technique for projecting retail performance that applies the known performance information of an existing and similar store.

Area Suppression: a confidentiality procedure undertaken by Statistics Canada to ensure the confidentiality of census data. This practice requires the deletion of all characteristic data for geographic areas with populations below a specified size.

Attractiveness: the measure of a retail location's power to attract customers.

Average Household Income: Average household income refers to the weighted mean total income of households. Average income is calculated from unrounded data by dividing the aggregate income by the number of households.

Data Envelopment Analysis (DEA): Non-parametric, linear programming approach, which calculates relative efficiencies of Decision Making Units and requires no prior specification of the functional form of the frontier.

Demographics: the age, gender, household and income composition of a market.

Enumeration Area (EA): is the geographic area canvassed by on census representative. It is the smallest standard geographic area for which census data are reported.

Huff Model: an elaboration of the gravity model, in which the attraction of a given shopping centre is described in terms of size and distance, and compared to the attractiveness of competing centres in the same market [Lea97].

Market Share: proportion of total sales in a market obtained by a given retailer or chain of retailers.

Multiplicative Competitive Interaction (MCI): an extension of the Huff model, which was developed to evaluate retail location. MCI incorporates the competitive environment and socioeconomic characteristics of regions in the evaluation of retail sites [Jain79].

Probable Dollars: the estimated dollar value available to a given branch location. Calculated using the Multiplicative Competitive Interaction model.

Random Rounding: a confidentiality procedure undertaken by Statistics Canada to ensure the confidentiality of census data. Under this method, all figures, including totals and margins, are randomly rounded either up or down to a multiple of "5" or in some cases "10".

Socioeconomic: relating to or involving a combination of social and economic factors.

Standard Industrial Classification (SIC): a four-digit code assigned by Statistics Canada to identify different business activities, based on product or service that it provides.

Theissen Polygons: a geometric technique that identifies midpoints between competing facilities to help approximate trade areas.

Trade Area: the geographical region served by a particular retailer.

Utility: the use that a given consumer would have for frequenting a particular retail location, based on attractiveness and distance.

Appendix I: Trade Area Methodologies

The individual characteristics of each of these techniques are outlined below. This information comes from the August 1997 issue of Business Geographics [Lea97]:

Methodology	Description	Advantages / Disadvantages
Circles	<ul style="list-style-type: none"> ◆ circle with center at retail location ◆ radius selected by analyst 	<ul style="list-style-type: none"> ◆ scientifically replicable ◆ widely understood ◆ quick and easily automated ◆ suitable for demographic profiling ◆ can show multiple trade areas on one map ◆ no customer data used ◆ doesn't consider barriers to travel ◆ competitors not considered ◆ no facility attraction into consideration ◆ not realistic when drawn little data required
Trimmed Circles	<ul style="list-style-type: none"> ◆ circle with center at retail location ◆ radius selected by analyst ◆ trimmed to reflect geographic boundaries of region 	<ul style="list-style-type: none"> ◆ little data required ◆ scientifically replicable with algorithm ◆ suitable for demographic profiling ◆ can show multiple trade areas on one map ◆ does not use customer data ◆ doesn't consider barriers to travel ◆ not realistic when drawn ◆ does not consider facility attraction
User drawn polygon over customer dot map	<ul style="list-style-type: none"> ◆ polygon drawn over region in which 75-80% of customer reside 	<ul style="list-style-type: none"> ◆ region is realistic ◆ customer surveying takes into account travel barriers and the effect of competitors ◆ can show multiple trade areas on one map ◆ customer survey time consuming ◆ errors associated with sampling ◆ not scientifically replicable ◆ can not be automated
Drive distance / drive time polygons	<ul style="list-style-type: none"> ◆ polygon drawn based on acceptable drive distance/time selected by analyst 	<ul style="list-style-type: none"> ◆ widely known and understood ◆ Takes barriers to travel into account ◆ suitable for demographic profiling ◆ larger data requirements ◆ does not consider competitors ◆ does not consider facility attraction
Thiessen polygons	<ul style="list-style-type: none"> ◆ trade areas draw based on nearest centre theory ◆ polygon shape based on 	<ul style="list-style-type: none"> ◆ little data required ◆ scientifically replicable ◆ can take competitors into account

	half way point between locations	<ul style="list-style-type: none"> ◆ suitable for demographic profiling ◆ not widely know or understood ◆ does not consider barriers to travel ◆ does not consider facility attraction
Breakpoint theorem polygons	<ul style="list-style-type: none"> ◆ trade area drawn based on Reilly's Law of Retail Gravitation ◆ polygon shape based on population weighted half way point 	<ul style="list-style-type: none"> ◆ can be automated with an algorithm ◆ scientifically replicable ◆ considers facility attraction ◆ takes travel barriers into account ◆ suitable for demographic profiling ◆ not widely know or understood ◆ fairly large data requirements
Applebaum penetration and distance tradeoff	<ul style="list-style-type: none"> ◆ uses customer information to derive trade area 	<ul style="list-style-type: none"> ◆ considers facility attraction ◆ uses customer data ◆ takes travel barriers into account ◆ suitable for demographic profiling ◆ not widely know or understood ◆ not scientifically replicable ◆ fairly large data requirements
Huff probabilistic Trade Area "surfaces"	<ul style="list-style-type: none"> ◆ calculates probabilities for all customer areas ◆ eliminates the need for trade area definition 	<ul style="list-style-type: none"> ◆ can be automated with an algorithm ◆ scientifically replicable ◆ considers facility attraction ◆ takes travel barriers into account ◆ considers competitor interaction ◆ suitable for demographic profiling ◆ not widely know or understood ◆ fairly large data requirements ◆ cannot show multiple trade areas on one map

Appendix II: List of Financial Firms

Schedule 1 Banks

The following is a list of banks that are regulated by OSFI. These banks are registered to do business in Canada under the Bank Act as at January 26, 1999.

1. Bank of Montreal
2. The Bank of Nova Scotia
3. Canadian Imperial Bank of Commerce
4. Canadian Western Bank
5. Laurentian Bank of Canada
6. National Bank of Canada
7. Royal Bank of Canada
8. The Toronto-Dominion Bank

Trust Companies

1. Canada Trust

*Only trust company included in this analysis

Credit Unions included in analysis are listed on the following page.

Credit Unions and Caisse Populaires

Adjala Credit Union Credit Union	Metro Credit Union
All Trans Credit Union	Niagara Credit Union
Amcu Credit Union Inc	North York Community Credit Union
Avestel Credit Union Credit Union	Oshawa Comm Credit Union Ltd
Bread & Ross Credit Union	Our Lady Of Victory Credit Union
Buduchnist Credit Union	Pace Savings & Credit Union
Caisse Populaire Welland Ltd	Parama Lithuanian Credit Union
Camera Heights Credit Union	Polish Parishes Credit Union
Cataract Savings-Credit Union	Polish St Catharines Credit Union
Centennial Credit Union Ltd	Portuguese-Toronto Credit Union
Croatian Toronto Credit Union	Resurrection Parish Credit Union
Croatian Credit Union	Saint Casimer's Credit Union
Cuna Community Credit Union	Saint Lawrence Parish Cu
Customs Credit Union Ltd	Santone Credit Union
Czechoslovak Credit Union Ltd	Sheridan Park Credit Union
Duca Community Credit Union	Slovenia Parishes Credit Union
Family Savings & Credit Union	So-Use Credit Union
Finnish Credit Union Ltd	St Demetrius Parish Credit Union
First Slovak Credit Union Ltd	St Elizabeth Credit Union
Food Family Credit Union	St Josaphat's Parish Cu
Fort Erie Community Credit Union	St Mary's Credit Union
Fort York Community Credit Union	St Stanislaus Credit Union
Ganaraska Credit Union	Starnews Credit Union Ltd
Garden City Credit Union Ltd	Taiwanese Canadian Toronto Credit Union
Hald-Nor Comm Credit Union	Talka Lithuanian Credit Union
Halton Community Credit Union	Thorold Community Credit Union
Hamilton Community Credit Union	Toronto Credit Union
Hepcooe Credit Union	Twin Oak Credit Union
Industrial Family Credit Union	Ujpo Credit Union Credit Union
J E Krek's Slovenian Credit Union	Ukrainian Credit Union Ltd
Jet Power Community Credit Union	Uni-Queen Provincial Civil Credit Union
Korean Catholic Church Credit Union	Universities & Colleges Credit Union
Korean Credit Union	Uxbridge Credit Unionwira Hamilton Credit Union Ltd
Lakeshore Credit Union Ltd	
Latvian Credit Union Ltd	

- Note: Only community credit unions were included in this analysis

Appendix III: Queries for Retail Locations

Bank Searches

select if (index (ln, "ROYAL BANK")>0).
execute

select if (index (ln, "BANK OF MONTREAL")>0).
execute

select if ((index (ln, "BANK OF NOVA SCOTIA")>0) or (index (ln, "BANK NOVA SCOTIA")>0)).
execute

select if ((index (ln, "TORONTO DOMINION")>0) or (index (ln, "TORONTO-DOMINION")>0)).
execute

select if ((index (ln, "CIBC")>0) or (index (ln, "CANADIAN IMPERIAL")>0)).
execute

select if (index (ln, "CANADA TRUST")>0).
execute

select if ((index (ln, "BANK")>0) or (index (ln, "BANQUE")>0) or (index (ln, "BANKQUE")>0)).
execute

select if ((index (ln, "CREDIT UNION")>0) or (index (ln, " C U ")>0) or (index (ln, " CU ")>0)).
execute

select if ((index (ln, "CAISSE")>0) or (index (ln, "POPULAIRES")>0)).
execute

Retail Locations

Grocers

select if ((index (Sic1, "5411")>0) or (index (Sic1, "5421")>0) or (index (Sic1, "5431")>0)).
execute

Pharmacies

select if (index (Sic1, "5921")>0).
execute

Appendix IV: Sample of Utility and Probability Calculations

The following page contains a portion of the database containing Utility and Probability calculations. The calculations are for the first 10 Enumeration Areas in the database (the whole database would be over 400 pages). This table contains the following fields:

EA Number: indicates the enumeration area in question

Branch Name and Location: lists the 10 branches assigned to the corresponding EA

Distance (m): reflects the distance in meters from the branch and the centroid of the EA

Score: indicates the value calculated for the attractiveness attribute of proximity score

Utility: calculated by dividing the proximity score by the distance squared

Probability: calculated by dividing the utility by the Sum of Utility column

Number of Households: the Statistics Canada value for number of household in that EA

Avg. Income per Household: Statistics Canada value reflecting average household income

Sum of Utility: is the sum of utility values by enumeration area

APPENDIX IV: SAMPLE OF UTILITY AND PROBABILITY CALCULATIONS

EA Number	Branch Name and Location	Distance (m)	Rank	Score	Utility	Probability	# of House	Avg. Inco	Sum of U
35002001	BANK OF MONTREAL - 2234 QUEEN ST E - TORONTO - M4E1G2	511	1	1345	0.00615087	0.510375812	385	84450	0.010092
35002001	BANK OF NOVA SCOTIA - 1018 KINGSTON RD - TORONTO - M4E1T2	1143	2	755	0.0005779	0.057261681	385	84450	
35002001	ROYAL BANK - 986 KINGSTON RD - TORONTO - M4E1T2	1143	3	755	0.0005779	0.057261681	385	84450	
35002001	BANK OF NOVA SCOTIA - 2080 QUEEN ST E - TORONTO - M4E1E1	1206	4	1340	0.00081827	0.060087248	385	84450	
35002001	ROYAL BANK - 2175 QUEEN ST E - TORONTO - M4E1E5	1276	5	1055	0.00054796	0.064203797	385	84450	
35002001	ROYAL BANK - 2171 QUEEN ST E - TORONTO - M4E1E5	1276	6	1055	0.00054796	0.064203797	385	84450	
35002001	CANADA TRUST - 2044 QUEEN ST E - TORONTO - M4E1C9	1297	7	1055	0.0002715	0.062141554	385	84450	
35002001	TORONTO-DOMINION BANK - 2189 QUEEN ST E - TORONTO - M4L1J1	1447	8	1080	0.00052058	0.061582102	385	84450	
35002001	BANK OF NOVA SCOTIA - 815 KINGSTON RD - TORONTO - M4E1R3	1648	9	500	0.00184655	0.018280621	385	84450	
35002001	TORONTO-DOMINION BANK - 1448 KINGSTON RD - SCARBOROUGH - M1N1P	2130	10	1085	0.00023915	0.023896278	385	84450	
35002003	BANK OF MONTREAL - 2234 QUEEN ST E - TORONTO - M4E1G2	337	1	1345	0.01184302	0.658853513	375	87458	0.017975
35002003	BANK OF NOVA SCOTIA - 1018 KINGSTON RD - TORONTO - M4E1T2	997	2	755	0.00075955	0.04225478	375	87458	
35002003	ROYAL BANK - 986 KINGSTON RD - TORONTO - M4E1T2	997	3	755	0.00075955	0.04225478	375	87458	
35002003	BANK OF NOVA SCOTIA - 2080 QUEEN ST E - TORONTO - M4E1E1	1078	4	1340	0.0011531	0.064148935	375	87458	
35002003	ROYAL BANK - 2175 QUEEN ST E - TORONTO - M4E1E5	1153	5	1055	0.00079359	0.044148935	375	87458	
35002003	ROYAL BANK - 2171 QUEEN ST E - TORONTO - M4E1E5	1153	6	1055	0.00079359	0.044148935	375	87458	
35002003	CANADA TRUST - 2044 QUEEN ST E - TORONTO - M4E1C9	1170	7	1055	0.00077089	0.042875295	375	87458	
35002003	TORONTO-DOMINION BANK - 2189 QUEEN ST E - TORONTO - M4L1J1	1327	8	1080	0.00081809	0.034435898	375	87458	
35002003	BANK OF NOVA SCOTIA - 815 KINGSTON RD - TORONTO - M4E1R3	1487	9	500	0.00023233	0.012925167	375	87458	
35002003	TORONTO-DOMINION BANK - 1448 KINGSTON RD - SCARBOROUGH - M1N1P	2080	10	1085	0.00025079	0.013951775	375	87458	
35002004	BANK OF MONTREAL - 2234 QUEEN ST E - TORONTO - M4E1G2	230	1	1345	0.02542533	0.737744878	395	70890	0.034484
35002004	BANK OF NOVA SCOTIA - 2080 QUEEN ST E - TORONTO - M4E1E1	799	2	1340	0.00208699	0.068904703	395	70890	
35002004	ROYAL BANK - 2175 QUEEN ST E - TORONTO - M4E1E5	868	3	1055	0.0140027	0.040630541	395	70890	
35002004	ROYAL BANK - 2171 QUEEN ST E - TORONTO - M4E1E5	868	4	1055	0.0140027	0.040630541	395	70890	
35002004	CANADA TRUST - 2044 QUEEN ST E - TORONTO - M4E1C9	888	5	1055	0.0133781	0.038820648	395	70890	
35002004	TORONTO-DOMINION BANK - 2189 QUEEN ST E - TORONTO - M4L1J1	1040	6	1080	0.0100777	0.028241484	395	70890	
35002004	BANK OF NOVA SCOTIA - 1018 KINGSTON RD - TORONTO - M4E1T2	1110	7	755	0.00061277	0.017780381	395	70890	
35002004	ROYAL BANK - 986 KINGSTON RD - TORONTO - M4E1T2	1110	8	755	0.00061277	0.017780381	395	70890	
35002004	BANK OF NOVA SCOTIA - 815 KINGSTON RD - TORONTO - M4E1R3	1305	9	500	0.00029363	0.008518699	395	70890	
35002004	CIBC - 3003 DANFORTH AVE - EAST YORK - M4C1M9	2187	10	1310	0.00027389	0.007947185	395	70890	
35002006	BANK OF NOVA SCOTIA - 2080 QUEEN ST E - TORONTO - M4E1E1	313	1	1340	0.0138778	0.287863368	380	52438	0.046242
35002006	ROYAL BANK - 2175 QUEEN ST E - TORONTO - M4E1E5	361	2	1055	0.0080854	0.175064731	380	52438	
35002006	ROYAL BANK - 2171 QUEEN ST E - TORONTO - M4E1E5	361	3	1055	0.0080854	0.175064731	380	52438	
35002006	CANADA TRUST - 2044 QUEEN ST E - TORONTO - M4E1C9	390	4	1055	0.00893823	0.149997441	380	52438	
35002006	TORONTO-DOMINION BANK - 2189 QUEEN ST E - TORONTO - M4L1J1	527	5	1080	0.0092498	0.05487228	380	52438	
35002006	BANK OF MONTREAL - 2234 QUEEN ST E - TORONTO - M4E1G2	573	6	1345	0.00409851	0.088587744	380	52438	
35002006	BANK OF NOVA SCOTIA - 815 KINGSTON RD - TORONTO - M4E1R3	1067	7	500	0.00043918	0.009487333	380	52438	
35002006	BANK OF NOVA SCOTIA - 1018 KINGSTON RD - TORONTO - M4E1T2	1375	8	755	0.00039934	0.009635792	380	52438	
35002006	ROYAL BANK - 986 KINGSTON RD - TORONTO - M4E1T2	1375	9	755	0.00039934	0.009635792	380	52438	
35002006	BANK OF NOVA SCOTIA - 1943 GERRARD ST E - TORONTO - M4L2C2	1879	10	630	0.00017844	0.003858758	380	52438	
35002008	BANK OF NOVA SCOTIA - 2080 QUEEN ST E - TORONTO - M4E1E1	215	1	1340	0.02888864	0.281874050	385	59011	0.102918
35002008	ROYAL BANK - 2175 QUEEN ST E - TORONTO - M4E1E5	215	2	1055	0.02282315	0.221765784	385	59011	
35002008	ROYAL BANK - 2171 QUEEN ST E - TORONTO - M4E1E5	215	3	1055	0.02282315	0.221765784	385	59011	
35002008	CANADA TRUST - 2044 QUEEN ST E - TORONTO - M4E1C9	256	4	1055	0.01809802	0.158419715	385	59011	
35002008	TORONTO-DOMINION BANK - 2189 QUEEN ST E - TORONTO - M4L1J1	357	5	1080	0.00858244	0.083101531	385	59011	
35002008	BANK OF MONTREAL - 2234 QUEEN ST E - TORONTO - M4E1G2	758	6	1345	0.00234091	0.022745885	385	59011	
35002008	BANK OF NOVA SCOTIA - 815 KINGSTON RD - TORONTO - M4E1R3	1003	7	500	0.00044249	0.004299544	385	59011	
35002008	BANK OF NOVA SCOTIA - 1018 KINGSTON RD - TORONTO - M4E1T2	1524	8	755	0.00032507	0.003158611	385	59011	
35002008	ROYAL BANK - 986 KINGSTON RD - TORONTO - M4E1T2	1524	9	755	0.00032507	0.003158611	385	59011	
35002008	BANK OF NOVA SCOTIA - 1943 GERRARD ST E - TORONTO - M4L2C2	1790	10	630	0.00019882	0.001910528	385	59011	
35002007	TORONTO-DOMINION BANK - 2189 QUEEN ST E - TORONTO - M4L1J1	310	1	1090	0.01134235	0.251077054	325	67888	0.045178
35002007	ROYAL BANK - 2175 QUEEN ST E - TORONTO - M4E1E5	350	2	1055	0.00881224	0.190842748	325	67888	
35002007	ROYAL BANK - 2171 QUEEN ST E - TORONTO - M4E1E5	350	3	1055	0.00881224	0.190842748	325	67888	
35002007	CANADA TRUST - 2044 QUEEN ST E - TORONTO - M4E1C9	388	4	1055	0.00708073	0.156740864	325	67888	
35002007	BANK OF NOVA SCOTIA - 2080 QUEEN ST E - TORONTO - M4E1E1	432	5	1340	0.00718021	0.158842932	325	67888	
35002007	BANK OF MONTREAL - 2234 QUEEN ST E - TORONTO - M4E1G2	1098	6	1345	0.0011197	0.024785823	325	67888	
35002007	BANK OF NOVA SCOTIA - 815 KINGSTON RD - TORONTO - M4E1R3	1242	7	500	0.00032414	0.007175148	325	67888	
35002007	ROYAL BANK - 253 COXWELL AVE - TORONTO - M4L3B4	1685	8	1385	0.00048781	0.010788282	325	67888	
35002007	BANK OF NOVA SCOTIA - 1943 GERRARD ST E - TORONTO - M4L2C2	1792	9	630	0.00019818	0.004347788	325	67888	
35002007	BANK OF NOVA SCOTIA - 1018 KINGSTON RD - TORONTO - M4E1T2	1850	10	755	0.00021917	0.004851211	325	67888	
35002008	TORONTO-DOMINION BANK - 2189 QUEEN ST E - TORONTO - M4L1J1	503	1	1090	0.00430815	0.258488882	320	51315	0.018887
35002008	ROYAL BANK - 2175 QUEEN ST E - TORONTO - M4E1E5	670	2	1055	0.00235018	0.1410103	320	51315	
35002008	ROYAL BANK - 2171 QUEEN ST E - TORONTO - M4E1E5	670	3	1055	0.00235018	0.1410103	320	51315	
35002008	CANADA TRUST - 2044 QUEEN ST E - TORONTO - M4E1C9	673	4	1055	0.00239828	0.139755682	320	51315	
35002008	BANK OF NOVA SCOTIA - 2080 QUEEN ST E - TORONTO - M4E1E1	782	5	1340	0.00230778	0.138485901	320	51315	
35002008	ROYAL BANK - 253 COXWELL AVE - TORONTO - M4L3B4	1210	6	1385	0.0009457	0.056757961	320	51315	
35002008	BANK OF NOVA SCOTIA - 815 KINGSTON RD - TORONTO - M4E1R3	1318	7	500	0.00028783	0.017298794	320	51315	
35002008	TORONTO-DOMINION BANK - 274 COXWELL AVE - TORONTO - M4L3B8	1449	8	2005	0.00095484	0.057280188	320	51315	
35002008	BANK OF MONTREAL - 2234 QUEEN ST E - TORONTO - M4E1G2	1534	9	1345	0.00057157	0.034294111	320	51315	
35002008	BANK OF NOVA SCOTIA - 1943 GERRARD ST E - TORONTO - M4L2C2	1554	10	630	0.00028088	0.015682801	320	51315	
35002011	ROYAL BANK - 253 COXWELL AVE - TORONTO - M4L3B4	134	1	1385	0.07713299	0.794343211	365	35501	0.087103
35002011	TORONTO-DOMINION BANK - 274 COXWELL AVE - TORONTO - M4L3B8	375	2	2005	0.01425778	0.146631709	365	35501	
35002011	CIBC - 1252 GERRARD ST E - TORONTO - M4L1Y8	799	3	1155	0.00180621	0.011863187	365	35501	
35002011	BANK OF MONTREAL - 1220 QUEEN ST E - TORONTO - M4M1L7	1221	4	980	0.00084383	0.006631441	365	35501	
35002011	BANK OF NOVA SCOTIA - 1943 GERRARD ST E - TORONTO - M4L2C2	1288	5	630	0.00038094	0.003923075	365	35501	
35002011	BANK OF NOVA SCOTIA - 1573 DANFORTH AVE - TORONTO - M4J1N8	1439	6	920	0.00044289	0.004575455	365	35501	
35002011	CANADA TRUST - 1884 DANFORTH AVE - TORONTO - M4C1H6	1483	7	890	0.00038581	0.003973289	365	35501	
35002011	ROYAL BANK - 997 GERRARD ST E - TORONTO - M4M1Z4	1581	8	2050	0.00082014	0.008448137	365	35501	
35002011	CIBC - 1000 GERRARD ST E - TORONTO - M4M3G8	1587	9	2050	0.00081385	0.008382383	365	35501	
35002011	TORONTO-DOMINION BANK - 2189 QUEEN ST E - TORONTO - M4L1J1	1623	10	1090	0.00041381	0.004281451	365	35501	
35002012	ROYAL BANK - 253 COXWELL AVE - TORONTO - M4L3B4	327	1	1385	0.01298252	0.426740375	410	42852	0.030352
35002012	TORONTO-DOMINION BANK - 274 COXWELL AVE - TORONTO - M4L3B8	456	2	2005	0.00984239	0.137883134	410	42852	
35002012	CIBC - 1252 GERRARD ST E - TORONTO - M4L1Y8	808	3	1155	0.00314512	0.103820824	410	42852	
35002012	BANK OF MONTREAL - 1220 QUEEN ST E - TORONTO - M4M1L7	1042	4	980	0.00088417	0.02913032	410	42852	
35002012	ROYAL BANK - 997 GERRARD ST E - TORONTO - M4M1Z4	1378	5	2050	0.00108272	0.035871918	410	42852	
35002012	CIBC - 1000 GERRARD ST E - TORONTO - M4M3G8	1383	6	2050	0.00107179	0.035311728	410	42852	
35002012	BANK OF NOVA SCOTIA - 1943 GERRARD ST E - TORONTO - M4L2C2	1442	7	630	0.00030206	0.009882044	410	42852	
35002012	BANK OF NOVA SCOTIA - 1573 DANFORTH AVE - TORONTO - M4J1N8	1451	8	920	0.00043887	0.014388684	410	42852	
35002012	CANADA TRUST - 18								

Appendix V: Index Values by Financial Firm

Bank of Montreal

Branch Name and Location	Probable Dollars	Total Dollars	Opportunity Index
BANK OF MONTREAL - 120 GENEVA - ST CATHARINES - L2R4N3	45784784	476680470	0.096053
BANK OF MONTREAL - 2 KING ST W - TORONTO - M5H1A1	8836089	227718815	0.038803
BANK OF MONTREAL - 475 WESTNEY RD N - AJAX - L1T3H4	285700155	1453938180	0.196501
BANK OF MONTREAL - 7800 KEELE ST - CONCORD - L4K1Y7	25173070	339605385	0.074124
BANK OF MONTREAL - 106 HIGH ST - SUTTON WEST - L0E1R0	109289243	597486685	0.182915
BANK OF MONTREAL - 91 QUEEN ST - NIAGARA ON THE LAKE - L0S1J0	91180578	263261840	0.346349
BANK OF MONTREAL - 2 KING ST W - BOWMANVILLE - L1C1R3	57653878	596346590	0.096678
BANK OF MONTREAL - 1070 SIMCOE ST N - OSHAWA - L1G4W4	104342915	1049386825	0.099432
BANK OF MONTREAL - 600 KING ST E - OSHAWA - L1H1G6	207742155	1371448895	0.151476
BANK OF MONTREAL - 38 SIMCOE ST S - OSHAWA - L1H4G2	54188903	569037695	0.095229
BANK OF MONTREAL - 419 KING ST W - OSHAWA - L1J2K5	111851192	959986090	0.116513
BANK OF MONTREAL - 100 BROCK ST S - WHITBY - L1N4J8	199085915	1353237660	0.147118
BANK OF MONTREAL - 154 HARWOOD AVE S - AJAX - L1S2H6	151889658	1383946370	0.109751
BANK OF MONTREAL - 726 KINGSTON RD - PICKERING - L1V1A8	50528110	1185455460	0.042623
BANK OF MONTREAL - 1298 KINGSTON RD - PICKERING - L1V3M9	118470951	1376254790	0.086082
BANK OF MONTREAL - 61 JARVIS ST - FORT ERIE - L2A2S3	15540361	420083275	0.038994
BANK OF MONTREAL - 6841 MORRISON ST - NIAGARA FALLS - L2E2G5	69454542	764498200	0.09085
BANK OF MONTREAL - 4365 QUEEN ST - NIAGARA FALLS - L2E2K9	12348531	225353050	0.054798
BANK OF MONTREAL - 5836 MAIN ST - NIAGARA FALLS - L2G5Z5	24410097	712605810	0.034255
BANK OF MONTREAL - 7555 MONTROSE RD - NIAGARA FALLS - L2H2E9	37357499	420057275	0.088934
BANK OF MONTREAL - 79 FACER ST - ST CATHARINES - L2M5J4	31969375	721776760	0.044293
BANK OF MONTREAL - 31 KING ST - ST CATHARINES - L2R3H1	56953698	654835760	0.088974
BANK OF MONTREAL - 131 EAST MAIN ST - WELLAND - L3B3W5	55825276	643701930	0.086725
BANK OF MONTREAL - 800 NIAGARA ST - WELLAND - L3C5Z4	75388674	585000360	0.128869
BANK OF MONTREAL - 57 CLARENCE ST W - PORT COLBORNE - L3K3G1	23809601	371216185	0.064139
BANK OF MONTREAL - 63 MAIN ST W - GRIMSBY - L3M4H1	74491225	845682990	0.115368
BANK OF MONTREAL - 86 MAIN ST N - MARKHAM - L3P1X8	178976415	1182800305	0.151318
BANK OF MONTREAL - 5970 16TH AVE - MARKHAM - L3P7R1	79917407	1638414895	0.048777
BANK OF MONTREAL - 28 CHANT CRES - MARKHAM - L3R1Y8	87615863	948224365	0.092595
BANK OF MONTREAL - 100 CARLTON RD - MARKHAM - L3R1Z9	108132232	938798705	0.115181
BANK OF MONTREAL - 2851 JOHN ST - MARKHAM - L3R5R7	38031968	486464340	0.07818
BANK OF MONTREAL - 4392 STEELES AVE E - MARKHAM - L3R9V8	83808059	669007455	0.125272
BANK OF MONTREAL - 8218 BAYVIEW AVE - THORNHILL - L3T2S2	169989124	1054490375	0.161186
BANK OF MONTREAL - 404 TOWN CTR - NEWMARKET - L3Y2R9	29112560	911287690	0.031947
BANK OF MONTREAL - 231 MAIN ST S - NEWMARKET - L3Y3Z4	122892808	1029540440	0.119387
BANK OF MONTREAL - 17600 YONGE ST - NEWMARKET - L3Y4Z1	65742045	704039960	0.093378
BANK OF MONTREAL - 16775 YONGE ST - NEWMARKET - L3Y8J4	76888155	1102940000	0.089712
BANK OF MONTREAL - 18 WEST LAWN CRES - STOUFFVILLE - L4A2S9	79429944	481736490	0.184883
BANK OF MONTREAL - 650 HIGHWAY 7 E - RICHMOND HILL - L4B2N7	91679361	695614260	0.131798
BANK OF MONTREAL - 550 HIGHWAY 7 E - RICHMOND HILL - L4B3Z4	132244352	992023305	0.133308
BANK OF MONTREAL - 10211 YONGE ST - RICHMOND HILL - L4C3B3	75602239	1393435400	0.054256
BANK OF MONTREAL - 9350 YONGE ST - RICHMOND HILL - L4C5G2	172370790	1263952010	0.136374
BANK OF MONTREAL - 15252 YONGE ST - AURORA - L4G1N4	174569899	1244746970	0.140245
BANK OF MONTREAL - 1 PROMENADE CIR - THORNHILL - L4J4P8	103410616	1244363590	0.083103
BANK OF MONTREAL - 7880 KEELE ST - CONCORD - L4K4G7	2983683	124655980	0.023935
BANK OF MONTREAL - 8400 JANE ST - CONCORD - L4K4L8	9045930	255867815	0.035354
BANK OF MONTREAL - 145 WOODBRIDGE AVE - WOODBRIDGE - L4L2S6	69668464	787432895	0.088475
BANK OF MONTREAL - 3700 STEELES AVE W - WOODBRIDGE - L4L8K8	81683311	475685050	0.171724
BANK OF MONTREAL - 7145 GOREWAY DR - MISSISSAUGA - L4T2T5	49290706	650057450	0.075825
BANK OF MONTREAL - 6787 AIRPORT RD - MISSISSAUGA - L4V1E8	3804428	463518570	0.008208
BANK OF MONTREAL - 985 DUNDAS ST E - MISSISSAUGA - L4Y2B9	76284135	650533820	0.117264
BANK OF MONTREAL - 4 ROBERT SPECK PKY - MISSISSAUGA - L4Z1S1	40617653	882063785	0.046048
BANK OF MONTREAL - 40 BRISTOL RD E - MISSISSAUGA - L4Z3K8	84424089	419055940	0.201463
BANK OF MONTREAL - 1 ROBERT SPECK PKY - MISSISSAUGA - L4Z3M3	101359880	962290210	0.105332
BANK OF MONTREAL - 100 CITY CENTRE DR - MISSISSAUGA - L5B2C9	65215208	884484595	0.073732
BANK OF MONTREAL - 1151 DUNDAS ST W - MISSISSAUGA - L5C1C6	227484247	665172420	0.256994
BANK OF MONTREAL - 1250 SOUTH SERVICE RD - MISSISSAUGA - L5E1V4	72526606	587796970	0.123387
BANK OF MONTREAL - 378 LAKESHORE RD E - MISSISSAUGA - L5G1H5	116837206	732638385	0.159475
BANK OF MONTREAL - 2458 DUNDAS ST W - MISSISSAUGA - L5K1R8	163912551	1265572995	0.129518
BANK OF MONTREAL - 2150 BURNHAMTHORPE RD W - MISSISSAUGA - L5L3A2	290888036	1250990170	0.232528
BANK OF MONTREAL - 5100 ERIN MILLS PKY - MISSISSAUGA - L5M4Z5	90477994	912749505	0.099127
BANK OF MONTREAL - 6677 MEADOWVALE T. CENTRE CIR - MISSISSAUGA - L5N2R5	307680427	1249955950	0.246153
BANK OF MONTREAL - 2354 MAJOR MACKENZIE DR - MAPLE - L6A1W2	78043715	507750175	0.153705
BANK OF MONTREAL - 240 LEIGHLAND AVE - OAKVILLE - L6H3H6	157420904	1203901785	0.130759
BANK OF MONTREAL - 159 LAKESHORE RD E - OAKVILLE - L6J5C3	19117114	504060240	0.037928
BANK OF MONTREAL - 364 KERR ST - OAKVILLE - L6K3B8	70697515	497506100	0.142104
BANK OF MONTREAL - 240 NORTH SERVICE RD W - OAKVILLE - L6M2Y5	27492216	867410985	0.031695
BANK OF MONTREAL - 69 BRAMALEA RD - BRAMPTON - L6T2W9	13909274	598128160	0.023216
BANK OF MONTREAL - 25 PEEL CENTRE DR - BRAMPTON - L6T3R5	145170315	1060417470	0.138899
BANK OF MONTREAL - 227 VODDEN ST E - BRAMPTON - L6V1N2	194826474	1858908910	0.104807
BANK OF MONTREAL - 1 MAIN ST S - BRAMPTON - L6Y1M8	77875455	1245927940	0.062504
BANK OF MONTREAL - 499 MAIN ST S - BRAMPTON - L6Y1N7	174266234	1100489215	0.158353
BANK OF MONTREAL - 345 QUEEN ST W - BRAMPTON - L6Y3A9	68856037	1024546685	0.067206
BANK OF MONTREAL - 180 SANDALWOOD PKY E - BRAMPTON - L6Z1Y4	78036379	1269304120	0.06148

APPENDIX V: INDEX VALUES BY FINANCIAL FIRM

BANK OF MONTREAL - 15 ALLEN DR - BOLTON - L7E2B5	152683254	1122041040	0.136076
BANK OF MONTREAL - 280 GUELPH ST - GEORGETOWN - L7G5M8	111470225	961365445	0.11595
BANK OF MONTREAL - 5291 LAKESHORE RD - BURLINGTON - L7L1C7	69570730	753225655	0.092364
BANK OF MONTREAL - 5111 NEW ST - BURLINGTON - L7L1V2	122829170	802238585	0.153108
BANK OF MONTREAL - 3505 UPPER MIDDLE RD - BURLINGTON - L7M4C6	105809306	859304415	0.123134
BANK OF MONTREAL - 1505 GUELPH LINE - BURLINGTON - L7P3B6	155550779	1211057035	0.128442
BANK OF MONTREAL - 519 BRANT ST - BURLINGTON - L7R2G6	64939662	850255305	0.076377
BANK OF MONTREAL - 777 GUELPH LINE - BURLINGTON - L7R3N2	65172808	571548085	0.114029
BANK OF MONTREAL - 900 MAPLE AVE - BURLINGTON - L7S2J8	83794187	759795425	0.110285
BANK OF MONTREAL - 822 QUEENSTON RD - STONEY CREEK - L8G1A9	175365850	1359454110	0.128997
BANK OF MONTREAL - 102 HIGHWAY 8 - STONEY CREEK - L8G4H3	181019843	1057999585	0.171096
BANK OF MONTREAL - 281 BARTON ST E - HAMILTON - L8L2X4	45232170	340952295	0.132664
BANK OF MONTREAL - 837 KING ST E - HAMILTON - L8M1B3	27587707	433719800	0.063607
BANK OF MONTREAL - 50 BAY ST S - HAMILTON - L8P4V9	66466666	667322470	0.102676
BANK OF MONTREAL - 303 JAMES ST N - HAMILTON - L8R2L4	55662070	320978290	0.173414
BANK OF MONTREAL - 1544 MAIN ST W - HAMILTON - L8S1E4	30428036	972841355	0.031277
BANK OF MONTREAL - 1128 FENNEL AVE E - HAMILTON - L8T1S5	52720147	1078298715	0.048983
BANK OF MONTREAL - 1588 UPPER JAMES ST - HAMILTON - L9B1K3	107411753	853012365	0.125921
BANK OF MONTREAL - 81 KING ST W - DUNDAS - L9H1T5	159333959	1098236075	0.145082
BANK OF MONTREAL - 1894 SCUGOG ST - PORT PERRY - L9L1H7	4693723	270154495	0.017374
BANK OF MONTREAL - 55 ONTARIO ST S - MILTON - L9T2M3	109560241	717556760	0.152685
BANK OF MONTREAL - 1371 NEILSON RD - SCARBOROUGH - M1B4Z8	102343621	662739405	0.154425
BANK OF MONTREAL - 91 RYLANDER BLVD - SCARBOROUGH - M1B5M5	223209651	1121366230	0.199052
BANK OF MONTREAL - 5540 LAWRENCE AVE E - SCARBOROUGH - M1C3B2	48632978	665437380	0.072084
BANK OF MONTREAL - 71 LIVINGSTON RD - SCARBOROUGH - M1E1K7	80363567	683430480	0.117589
BANK OF MONTREAL - 4500 KINGSTON RD - SCARBOROUGH - M1E2N9	27441693	739097530	0.037129
BANK OF MONTREAL - 3601 LAWRENCE AVE E - SCARBOROUGH - M1G1P5	152365755	951180785	0.160166
BANK OF MONTREAL - 2100 ELLESMERE RD - SCARBOROUGH - M1H3B7	72225958	588364135	0.122757
BANK OF MONTREAL - 682 KENNEDY RD - SCARBOROUGH - M1K2B5	54427385	801808080	0.067881
BANK OF MONTREAL - 2739 EGLINTON AVE E - SCARBOROUGH - M1K2S2	189549310	968038090	0.195808
BANK OF MONTREAL - 827 PHARMACY AVE - SCARBOROUGH - M1L3H3	12961714	777196140	0.016678
BANK OF MONTREAL - 725 WARDEN AVE - SCARBOROUGH - M1L4R7	8639331	502157155	0.017204
BANK OF MONTREAL - 1350 ELLESMERE RD - SCARBOROUGH - M1P2X9	12487149	387937160	0.032189
BANK OF MONTREAL - 2131 LAWRENCE AVE E - SCARBOROUGH - M1R5G4	31535188	638116170	0.049419
BANK OF MONTREAL - 25 GLEN WATFORD DR - SCARBOROUGH - M1S2B7	61202394	444382085	0.137725
BANK OF MONTREAL - 4271 SHEPPARD AVE E - SCARBOROUGH - M1S4G4	61598501	426013945	0.144593
BANK OF MONTREAL - 2301 BRIMLEY RD - SCARBOROUGH - M1S5B6	45177830	518035855	0.087721
BANK OF MONTREAL - 2350 KENNEDY RD - SCARBOROUGH - M1T3H1	48103125	747646260	0.064339
BANK OF MONTREAL - 1571 SANDHURST CIR - SCARBOROUGH - M1V1V2	118007438	702796905	0.167911
BANK OF MONTREAL - 2122 BRIDLE TOWNE CIR - SCARBOROUGH - M1W2L1	182553944	907702910	0.201116
BANK OF MONTREAL - 2045 SHEPPARD AVE E - NORTH YORK - M2J1W6	37419721	1116652245	0.033511
BANK OF MONTREAL - 4797 LESLIE ST - NORTH YORK - M2J2K8	211861264	1230759950	0.172139
BANK OF MONTREAL - 2752 VICTORIA PARK AVE - NORTH YORK - M2J4A8	100052352	1119778730	0.089935
BANK OF MONTREAL - 5925 YONGE ST - NORTH YORK - M2M3V7	37971247	1026622090	0.036987
BANK OF MONTREAL - 6240 YONGE ST - NORTH YORK - M2M3X4	221322841	1066603940	0.207502
BANK OF MONTREAL - 40 SHEPPARD AVE W - NORTH YORK - M2N6K9	75649990	818839200	0.092387
BANK OF MONTREAL - 5140 YONGE ST - NORTH YORK - M2N6L7	40791427	738351285	0.055247
BANK OF MONTREAL - 6172 BATHURST ST - NORTH YORK - M2R2A2	125461978	1233310715	0.101728
BANK OF MONTREAL - 648 SHEPPARD AVE W - NORTH YORK - M3H2S1	83782140	773481105	0.108318
BANK OF MONTREAL - 4800 DUFFERIN ST - NORTH YORK - M3H5S8	34086847	843519455	0.04041
BANK OF MONTREAL - 3930 KEELE ST - NORTH YORK - M3J1N8	103535908	766487590	0.135078
BANK OF MONTREAL - 4700 KEELE ST - NORTH YORK - M3J1P3	3640568	319572680	0.011392
BANK OF MONTREAL - 1700 WILSON AVE - NORTH YORK - M3L1B2	72543303	576031315	0.125936
BANK OF MONTREAL - 1951 SHEPPARD AVE W - NORTH YORK - M3L1Y8	129056846	928742785	0.138959
BANK OF MONTREAL - 1115 WILSON AVE - NORTH YORK - M3M1H2	51503909	782569080	0.065814
BANK OF MONTREAL - 1 YORK GATE BLVD - NORTH YORK - M3N3A1	131521461	529568780	0.248356
BANK OF MONTREAL - 1121 O'CONNOR DR - EAST YORK - M4B2T5	34168058	688693000	0.051097
BANK OF MONTREAL - 2810 DANFORTH AVE - TORONTO - M4C1M1	106619833	1012696435	0.105283
BANK OF MONTREAL - 2234 QUEEN ST E - TORONTO - M4E1G2	152142533	750753965	0.202653
BANK OF MONTREAL - 1670 BAYVIEW AVE - TORONTO - M4G3C2	108500343	948992855	0.114332
BANK OF MONTREAL - 45 OVERLEA BLVD - TORONTO - M4H1C3	83544832	503608295	0.165892
BANK OF MONTREAL - 518 DANFORTH AVE - TORONTO - M4K1P6	38516585	778616355	0.049468
BANK OF MONTREAL - 711 QUEEN ST E - TORONTO - M4M1H1	45180104	448483740	0.10074
BANK OF MONTREAL - 1220 QUEEN ST E - TORONTO - M4M1L7	55037084	504127950	0.109173
BANK OF MONTREAL - 3156 YONGE ST - TORONTO - M4N2K6	107123089	969956375	0.110441
BANK OF MONTREAL - 2444 YONGE ST - TORONTO - M4P2H4	108799511	979326120	0.111096
BANK OF MONTREAL - 2210 YONGE ST - TORONTO - M4S2B8	44051166	682156225	0.064576
BANK OF MONTREAL - 1881 YONGE ST - TORONTO - M4S3C4	115541212	723609010	0.159674
BANK OF MONTREAL - 1431 YONGE ST - TORONTO - M4T1Y9	146828513	1149918975	0.127686
BANK OF MONTREAL - 153 ST CLAIR AVE W - TORONTO - M4V1P7	40017289	1010396720	0.039606
BANK OF MONTREAL - 55 BLOOR ST W - TORONTO - M4W1A5	72391057	374436900	0.193333
BANK OF MONTREAL - 175 BLOOR ST E - TORONTO - M4W3T5	59016871	876314050	0.067347
BANK OF MONTREAL - 498 YONGE ST - TORONTO - M4Y1Y1	61001195	489751965	0.124555
BANK OF MONTREAL - 173 YONGE ST - TORONTO - M5B1M5	6277722	62034275	0.101198
BANK OF MONTREAL - 6 KING ST E - TORONTO - M5C1C4	17518743	255139625	0.068663

APPENDIX V: INDEX VALUES BY FINANCIAL FIRM

BANK OF MONTREAL - 400 UNIVERSITY AVE - TORONTO - M5G1S5	7481429	86810675	0.086181
BANK OF MONTREAL - 700 UNIVERSITY AVE - TORONTO - M5G1Z5	2099460	78979910	0.026582
BANK OF MONTREAL - 180 DUNDAS ST W - TORONTO - M5G1Z8	13123457	151117210	0.086843
BANK OF MONTREAL - 65 QUEEN ST W - TORONTO - M5H2M5	652215	13225900	0.049313
BANK OF MONTREAL - 200 KING ST W - TORONTO - M5H3T4	6407132	82524090	0.07764
BANK OF MONTREAL - 72 FRONT ST W - TORONTO - M5J1C9	38215607	305168785	0.125228
BANK OF MONTREAL - 2015 AVENUE RD - NORTH YORK - M5M4A5	74016500	664573170	0.111374
BANK OF MONTREAL - 262 BLOOR ST W - TORONTO - M5S1V9	33367455	457532030	0.072929
BANK OF MONTREAL - 880 BAY ST - TORONTO - M5S1Z8	18370170	247866980	0.074113
BANK OF MONTREAL - 205 COLLEGE ST - TORONTO - M5T1P9	4400683	97668055	0.045058
BANK OF MONTREAL - 291 SPADINA AVE - TORONTO - M5T2E6	16575892	123093490	0.134681
BANK OF MONTREAL - 665 KING ST W - TORONTO - M5V1M5	13902677	211171350	0.065836
BANK OF MONTREAL - 112 SPADINA AVE - TORONTO - M5V2K5	6060256	170909470	0.047278
BANK OF MONTREAL - 200 WELLINGTON ST W - TORONTO - M5V3C7	9513060	169930465	0.055982
BANK OF MONTREAL - 100 KING ST W - TORONTO - M5X1A1	4420419	18592740	0.23775
BANK OF MONTREAL - 877 LAWRENCE AVE W - NORTH YORK - M6A1C3	29321202	302070625	0.097087
BANK OF MONTREAL - 3169 DUFFERIN ST - NORTH YORK - M6A2S9	22119182	348929810	0.063757
BANK OF MONTREAL - 2953 BATHURST ST - NORTH YORK - M6B3B2	82744427	558714105	0.148098
BANK OF MONTREAL - 898 EGLINTON AVE W - TORONTO - M6C2B6	109929714	746767070	0.147208
BANK OF MONTREAL - 1226 ST CLAIR AVE W - TORONTO - M6E1B4	71440405	560198540	0.127527
BANK OF MONTREAL - 1901 EGLINTON AVE W - YORK - M6E2J5	41193284	447444710	0.092083
BANK OF MONTREAL - 568 COLLEGE ST - TORONTO - M6G1B3	38605382	395091115	0.097713
BANK OF MONTREAL - 640 BLOOR ST W - TORONTO - M6G1K9	44356770	490038520	0.090517
BANK OF MONTREAL - 659 DUPONT ST - TORONTO - M6G1Z5	47864036	502539135	0.095244
BANK OF MONTREAL - 1293 BLOOR ST W - TORONTO - M6H1P1	47775099	525471310	0.090919
BANK OF MONTREAL - 1211 KING ST W - TORONTO - M6K1G3	101829763	502847385	0.202506
BANK OF MONTREAL - 1743 ST CLAIR AVE W - TORONTO - M6N1J4	58689697	415288210	0.141323
BANK OF MONTREAL - 885 JANE ST - YORK - M6N4C4	47497964	743799140	0.063859
BANK OF MONTREAL - 2859 DUNDAS ST W - TORONTO - M6P1Y9	32251672	729357985	0.044219
BANK OF MONTREAL - 1504 DUPONT ST - TORONTO - M6P3S1	43654485	476392265	0.091836
BANK OF MONTREAL - 2201 DUNDAS ST W - TORONTO - M6R1X5	62132571	668144385	0.092993
BANK OF MONTREAL - 2330 BLOOR ST W - TORONTO - M6S1P3	81663135	820074030	0.09958
BANK OF MONTREAL - 2194 LAKE SHORE BLVD W - ETOBICOKE - M8V1A2	15456962	498852415	0.030985
BANK OF MONTREAL - 2448 LAKE SHORE BLVD W - ETOBICOKE - M8V1C8	55597408	540385515	0.102885
BANK OF MONTREAL - 3001 LAKE SHORE BLVD W - ETOBICOKE - M8V1J8	36726488	392834485	0.093491
BANK OF MONTREAL - 863 BROWNS LINE - ETOBICOKE - M8W3V7	93994158	411825115	0.228349
BANK OF MONTREAL - 3022 BLOOR ST W - ETOBICOKE - M8X1C4	48284136	726005700	0.086507
BANK OF MONTREAL - 165 THE QUEENSWAY - ETOBICOKE - M8Y1H8	96312532	552214380	0.174411
BANK OF MONTREAL - 150 BERRY RD - ETOBICOKE - M8Y1W3	68821375	655265325	0.105028
BANK OF MONTREAL - 1230 THE QUEENSWAY - ETOBICOKE - M8Z1R8	26552487	187868820	0.141335
BANK OF MONTREAL - 5555 DUNDAS ST W - ETOBICOKE - M9B6C1	21388683	249018830	0.085892
BANK OF MONTREAL - 5343 DUNDAS ST W - ETOBICOKE - M9B6K5	16543173	282021570	0.058659
BANK OF MONTREAL - 141 SATURN RD - ETOBICOKE - M9C2S8	160723994	1122815600	0.143144
BANK OF MONTREAL - 120 ERINGATE DR - ETOBICOKE - M9C3Z8	124347921	645642115	0.192596
BANK OF MONTREAL - 2546 FINCH AVE W - NORTH YORK - M9M2G3	59971378	757925950	0.079126
BANK OF MONTREAL - 1939 WESTON RD - YORK - M9N1W8	58812583	584448055	0.100629
BANK OF MONTREAL - 1500 ROYAL YORK RD - ETOBICOKE - M9P3B6	76406540	867112950	0.088116
BANK OF MONTREAL - 222 DIXON RD - ETOBICOKE - M9P3S5	95657287	894649800	0.108921
BANK OF MONTREAL - 5 LAVINGTON DR - ETOBICOKE - M9R2H1	81337435	838145040	0.097045
BANK OF MONTREAL - 1530 ALBION RD - ETOBICOKE - M9V1B4	72254649	472973950	0.152767
BANK OF MONTREAL - 2428 ISLINGTON AVE - ETOBICOKE - M9W3X8	27526066	607308900	0.045325
BANK OF MONTREAL - 155 REXDALE BLVD - ETOBICOKE - M9W5Z8	13037052	331330895	0.039348
BANK OF MONTREAL - 207 BROAD ST E - DUNNVILLE - N1A1G1	2461391	26600470	0.092532
BANK OF MONTREAL - 322 ARGYLE ST S - CALEDONIA - N3W1K8	9125571	58869945	0.155012
Average	77582353	707857001	0.106062831
Min	652215	13225900	0.008208
Max	307680427	1858908910	0.348349
Std Dev	60910445	361209946	0.057080541

Canadian Imperial Bank of Commerce

Branch Name and Location	Probable Dollars	Total Dollars	Opportunity Index
CIBC - 50 BALDWIN ST - BROOKLIN - L0B1C0	77295064	223908310	0.345209
CIBC - 5284 MAIN ST - ORONO - L0B1M0	65594954	292549170	0.224219
CIBC - HWY 27 - NOBLETON - L0G1N0	43183776	935874505	0.046143
CIBC - 184 MAIN ST - SCHOMBERG - L0G1T0	57123902	895914205	0.063376
CIBC - 55 QUEEN ST S - TOTTENHAM - L0G1W0	211755474	1264667195	0.167444
CIBC - 15968 AIRPORT RD RR 5 - CALEDON EAST - L0N1E0	180934868	1289840700	0.140277
CIBC - 2 KING ST - BOLTON - L0P1A0	7244695	540756450	0.013397
CIBC - 124 GRIFFIN ST N - SMITHVILLE - L0R2A0	6982069	92828655	0.075215
CIBC - 9 HAMILTON ST N - WATERDOWN - L0R2H0	101135908	635884775	0.159048
CIBC - 1461 PELHAM ST - FONTHILL - L0S1E0	65548448	426514395	0.153684
CIBC - 310 RIDGE N - RIDGEWAY - L0S1N0	90662561	412552000	0.21978
CIBC - 185 TORONTO RD - PORT HOPE - L1A3V5	4595094	28811840	0.159486
CIBC - 2 KING ST W - BOWMANVILLE - L1C3K8	78982445	773119765	0.099574
CIBC - 936 SIMCOE ST N - OSHAWA - L1G4W2	84581495	1169189685	0.072342
CIBC - 350 WENTWORTH ST E - OSHAWA - L1H7R7	31313895	806426530	0.038883
CIBC - 2 SIMCOE ST S - OSHAWA - L1H8C1	73744499	804694325	0.091643
CIBC - 419 KING ST W - OSHAWA - L1J2K5	113712718	992365160	0.114588
CIBC - 500 ROSSLAND RD W - OSHAWA - L1J3H2	109533564	1218705095	0.089877
CIBC - 555 ROSSLAND RD E - OSHAWA - L1K1K8	136434299	1490404195	0.091542
CIBC - 101 BROCK ST N - WHITBY - L1N4H3	167685746	1405126690	0.119339
CIBC - 80 THICKSON RD S - WHITBY - L1N7T2	250565872	1812931555	0.13821
CIBC - 3050 GARDEN ST - WHITBY - L1R2G7	138037450	1371440235	0.100651
CIBC - 85 NIAGARA BLVD - FORT ERIE - L2A3G2	30610809	375157585	0.081595
CIBC - 4514 QUEEN ST - NIAGARA FALLS - L2E2L5	20264470	242296900	0.083635
CIBC - 6345 LUNDY'S LANE - NIAGARA FALLS - L2G1T8	63352230	674295475	0.093953
CIBC - 7555 MONTROSE RD - NIAGARA FALLS - L2H2E9	37357499	420057275	0.088934
CIBC - 6225 HUGGINS ST - NIAGARA FALLS - L2J1H2	84059347	570290735	0.147387
CIBC - 442 NIAGARA ST - ST CATHARINES - L2M4W3	123598322	1028297950	0.120197
CIBC - 33 LAKESHORE RD - ST CATHARINES - L2N7B3	101693412	797171215	0.127568
CIBC - 55 KING ST - ST CATHARINES - L2R3H5	55265957	660005185	0.083736
CIBC - 22 KING ST - WELLAND - L3B3H9	31731040	665801580	0.047658
CIBC - 200 FITCH ST - WELLAND - L3C4V9	86393606	796299205	0.083378
CIBC - 800 NIAGARA ST - WELLAND - L3C5Z4	77377334	605039755	0.127888
CIBC - 56 CLARENCE ST W - PORT COLBORNE - L3K3E9	24042211	382256780	0.062895
CIBC - 287 WEST SIDE RD - PORT COLBORNE - L3K5L2	51241727	415954335	0.123191
CIBC - 27 MAIN ST W - GRIMSBY - L3M1R3	108726493	680779825	0.159709
CIBC - 7125 WOODBINE AVE - MARKHAM - L3R1A3	32979939	732510600	0.045023
CIBC - 4360 HIGHWAY 7 - MARKHAM - L3R1L9	48193268	1004781645	0.047964
CIBC - 1320 DENISON ST - MARKHAM - L3R4K6	7164983	358723940	0.019974
CIBC - 5000 HIGHWAY 7 - MARKHAM - L3R4M9	285461092	1549113910	0.184274
CIBC - 7220 KENNEDY RD - MARKHAM - L3R7P2	58068775	568148980	0.102207
CIBC - 49 HOLLAND ST W - BRADFORD - L3Z2B4	39425755	1307271905	0.030158
CIBC - 324 HIGHWAY 7 E - RICHMOND HILL - L4B1A6	40095227	1019033770	0.039346
CIBC - 300 WEST BEAVER CREEK RD - RICHMOND HILL - L4B3B1	95213697	930829280	0.102311
CIBC - 15195 YONGE ST - AURORA - L4G1L8	179846711	1258869500	0.142864
CIBC - 8401 WESTON RD - WOODBRIDGE - L4L1A6	59057801	367620020	0.160849
CIBC - 25 BENJAMIN DR - WOODBRIDGE - L4L1H8	99875244	977080090	0.102218
CIBC - 3800 STEELES AVE W - WOODBRIDGE - L4L4G9	40597956	962491050	0.04218
CIBC - 3700 STEELES AVE W - WOODBRIDGE - L4L8K8	89908675	649355355	0.138458
CIBC - 24 THE QUEENSWAY S - KESWICK - L4P1Y9	168799382	707175355	0.238695
CIBC - 7205 GOREWAY DR - MISSISSAUGA - L4T2T9	126156841	674293720	0.187095
CIBC - 7110 TORBRAM RD - MISSISSAUGA - L4T4B5	2039125	211448535	0.009644
CIBC - 6543 AIRPORT RD - MISSISSAUGA - L4V1E4	1201261	9552140	0.125758
CIBC - 5330 DIXIE RD - MISSISSAUGA - L4W1E3	4702409	141315260	0.033276
CIBC - 4141 DIXIE RD - MISSISSAUGA - L4W1V5	143996695	875106180	0.164548
CIBC - 2800 SKYMARK AVE - MISSISSAUGA - L4W5A6	9123897	164979295	0.055303
CIBC - 1161 DUNDAS ST E - MISSISSAUGA - L4Y2C5	30401305	745981245	0.040753
CIBC - 30 BRISTOL RD E - MISSISSAUGA - L4Z3K8	88184478	467669120	0.188562
CIBC - 5 DUNDAS ST E - MISSISSAUGA - L5A2Z2	128124473	934272025	0.137138
CIBC - 33 QUEENSWAY W - MISSISSAUGA - L5B1B5	103475516	1295228665	0.07989
CIBC - 1 CITY CENTRE DR - MISSISSAUGA - L5B1M2	45149640	1109182615	0.040705
CIBC - 4040 CREDITVIEW RD - MISSISSAUGA - L5C3Y8	144294049	1074559120	0.134282
CIBC ASIAN BANKING CTR - 1170 BURNHAMTHORPE RD W - MISSISSAUGA - L5C4E6	70029992	1193661280	0.058668
CIBC - 1250 SOUTH SERVICE RD - MISSISSAUGA - L5E1V4	74967433	699868165	0.107117
CIBC - 35 LAKESHORE RD E - PORT CREDIT - L5G1C9	59436998	715871640	0.083027
CIBC - 1150 LORNE PARK RD - MISSISSAUGA - L5H3A5	184376066	988342750	0.186551
CIBC - 1745 LAKESHORE RD W - MISSISSAUGA - L5J1J4	42579016	1133099050	0.037577
CIBC - 1375 SOUTHDOWN RD - MISSISSAUGA - L5J2Z1	134343640	1452234070	0.092508
CIBC - 4099 ERIN MILLS PKY - MISSISSAUGA - L5L3P9	206835497	1321295980	0.15654
CIBC - 3125 DUNDAS ST W - MISSISSAUGA - L5L3R8	48735131	1423867105	0.034227
CIBC - 5100 ERIN MILLS PKY - MISSISSAUGA - L5M4Z5	101871060	1210100850	0.084184
CIBC - 6677 MEADOWVALE T. CENTRE CIR - MISSISSAUGA - L5N2R5	307680427	1249955950	0.246153
CIBC - 6711 MISSISSAUGA RD N - MISSISSAUGA - L5N2W3	36511042	1309644165	0.027879
CIBC - 6266 DIXIE RD - MISSISSAUGA - L5T1A7	266915	9552140	0.027943
CIBC - 10037 KEELE ST - MAPLE - L6A1R7	12098189	479709775	0.02522

APPENDIX V: INDEX VALUES BY FINANCIAL FIRM

CIBC - 1011 UPPER MIDDLE RD E - OAKVILLE - L6H4L2	155699489	889009155	0.175138
CIBC - 197 LAKESHORE RD E - OAKVILLE - L6J1H5	32332177	532351095	0.060735
CIBC - 511 MAPLE GROVE DR - OAKVILLE - L6J6X8	213788383	802109435	0.266533
CIBC - 600 SPEERS RD - OAKVILLE - L6K2G3	79648999	1239506810	0.064259
CIBC - 1515 REBECCA ST - OAKVILLE - L6L5G8	41877968	679198675	0.061658
CIBC - 1500 UPPER MIDDLE RD W - OAKVILLE - L6M3G3	109595208	676190160	0.162077
CIBC - 9025 TORBRAM RD - BRAMPTON - L6S3L2	97584159	641353890	0.152153
CIBC - 930 NORTH PARK DR - BRAMPTON - L6S3Y5	319746319	1867014610	0.171261
CIBC - 60 BRAMALEA RD - BRAMPTON - L6T2W8	8555330	227359615	0.037829
CIBC - 25 PEEL CENTRE DR - BRAMPTON - L6T3R5	183644890	1699300230	0.108071
CIBC - 380 BOVAIRD DR - BRAMPTON - L6T3S1	117716750	1092038420	0.107795
CIBC - 248 QUEEN ST E - BRAMPTON - L6V1B9	104108209	1489562050	0.069892
CIBC - 2 MAIN ST N - BRAMPTON - L6V1N6	83463332	1333775590	0.062577
CIBC - 499 MAIN ST S - BRAMPTON - L6Y1N7	178967098	1160093010	0.15427
CIBC - 499 RAY LAWSON BLVD - BRAMPTON - L6Y4E6	14022080	374324335	0.03746
CIBC - 82 MAIN ST S - GEORGETOWN - L7G3E4	129275128	1067916405	0.121054
CIBC - 280 GUELPH ST - GEORGETOWN - L7G5M8	111470225	961365445	0.11595
CIBC - 4490 FAIRVIEW ST - BURLINGTON - L7L5P9	21606151	812077885	0.026606
CIBC - 1222 WALKERS LINE - BURLINGTON - L7M1Y7	17317217	719202995	0.024078
CIBC - 3500 DUNDAS ST - BURLINGTON - L7M4B8	48003942	833995330	0.057559
CIBC - 2017 MOUNT FOREST DR - BURLINGTON - L7P1H4	84766489	1015150040	0.083501
CIBC - 2400 FAIRVIEW ST - BURLINGTON - L7R2E4	33151977	774837665	0.042786
CIBC - 575 BRANT ST - BURLINGTON - L7R2G6	65325137	870814680	0.075016
CIBC - 162 PLAINS RD W - BURLINGTON - L7T1E9	45513989	608308045	0.074821
CIBC - 75 CENTENNIAL PKY N - HAMILTON - L8E2P2	149017441	1024167625	0.145501
CIBC - 1227 BARTON ST E - HAMILTON - L8H2V4	36352755	297557885	0.12217
CIBC - 251 PARKDALE AVE N - HAMILTON - L8H5X6	21959319	379607845	0.057847
CIBC - 1407 MAIN ST E - HAMILTON - L8K1C2	76264909	617262460	0.123553
CIBC - 281 QUEENSTON RD - HAMILTON - L8K1G9	41328702	731042030	0.056534
CIBC - 1882 KING ST E - HAMILTON - L8K1V7	42397980	885542405	0.047878
CIBC - 399 GREENHILL AVE - HAMILTON - L8K6N5	187269413	905660600	0.206777
CIBC - 879 BARTON ST E - HAMILTON - L8L3B4	27731284	277047060	0.100096
CIBC - 335 KING ST E - HAMILTON - L8N3M7	31239943	325565965	0.09595
CIBC - 1 KING ST W - HAMILTON - L8P1A4	30279558	397398010	0.076195
CIBC - 281 HERKIMER ST - HAMILTON - L8P2H8	83985772	770544205	0.108995
CIBC - 177 JAMES ST S - HAMILTON - L8P3A3	53806510	519064570	0.103661
CIBC - 275 YORK BLVD - HAMILTON - L8R1Y7	25780422	479841550	0.053727
CIBC - 305 JAMES ST N - HAMILTON - L8R2L4	56412037	332851165	0.169481
CIBC - 1015 KING ST W - HAMILTON - L8S4R5	72566025	772815945	0.093923
CIBC - 997 FENNEL AVE E - HAMILTON - L8T1R1	185044315	1062399390	0.174178
CIBC - 868 MOHAWK RD E - HAMILTON - L8T2R5	72923852	1206771435	0.060429
CIBC - 574 CONCESSION ST - HAMILTON - L8V1B1	71604058	670123300	0.108852
CIBC - 1550 UPPER JAMES - HAMILTON - L9B2L6	117041184	1037627870	0.112797
CIBC - 930 UPPER PARADISE RD - HAMILTON - L9B2N1	104818781	1073176975	0.097671
CIBC - 630 MOHAWK RD W - HAMILTON - L9C1X6	54584967	954477985	0.057188
CIBC - 673 UPPER JAMES ST - HAMILTON - L9C5R9	70730716	724044615	0.097688
CIBC - 83 KING ST W - DUNDAS - L9H1V1	156770458	1141980430	0.137279
CIBC - 145 QUEEN ST - PORT PERRY - L9L1B8	2809934	270154495	0.010401
CIBC - 49 BROCK ST W - UXBRIDGE - L9P1P5	83161877	494583295	0.168145
CIBC - 147 MAIN ST E - MILTON - L9T1N7	56411414	851977370	0.066212
CIBC - 400 MAIN ST E - MILTON - L9T4X5	123949946	849511285	0.145907
CIBC - 31 TAPSCOTT RD - SCARBOROUGH - M1B4Y7	175466485	768671895	0.228272
CIBC - 1265 MILITARY TRAIL - SCARBOROUGH - M1C1A4	25668394	1298465110	0.019768
CIBC - 371 OLD KINGSTON RD - SCARBOROUGH - M1C1B7	108647268	1099839770	0.098785
CIBC - 95 GUILDWOOD PKY - SCARBOROUGH - M1E1P1	115080346	753598800	0.152708
CIBC - 255 MORNINGSIDE AVE - SCARBOROUGH - M1E3E6	120588513	749644320	0.160861
CIBC - 2870 ELLESMERE RD - SCARBOROUGH - M1E4B8	89508643	779528730	0.114824
CIBC - 3453 LAWRENCE AVE E - SCARBOROUGH - M1H1B2	96003037	935259145	0.102649
CIBC - 200 CONSILIUM PL - SCARBOROUGH - M1H3E4	11214388	695021405	0.016135
CIBC - 819 BRIMLEY RD - SCARBOROUGH - M1J1C9	98703456	652198695	0.15134
CIBC - 450 DANFORTH RD - SCARBOROUGH - M1K1C6	70548307	647935880	0.108882
CIBC - 2705 EGLINTON AVE E - SCARBOROUGH - M1K2S2	194903437	1061362825	0.183835
CIBC - 55 SQ EGLINTON - SCARBOROUGH - M1L2K4	41365258	548178585	0.075459
CIBC - 1995 EGLINTON AVE E - SCARBOROUGH - M1L2M9	5921740	502914055	0.011775
CIBC - 2973 KINGSTON RD - SCARBOROUGH - M1M1P1	33677017	757124255	0.04448
CIBC - 1660 KINGSTON RD - SCARBOROUGH - M1N1S5	25089287	527512920	0.047561
CIBC - 2472 KINGSTON RD - SCARBOROUGH - M1N1V3	70161062	687022825	0.102123
CIBC - 2300 LAWRENCE AVE E - SCARBOROUGH - M1P2R2	87899275	651321180	0.134955
CIBC - 1100 ELLESMERE RD - SCARBOROUGH - M1P2X3	11762571	386983450	0.030396
CIBC - 1575 ELLESMERE RD - SCARBOROUGH - M1P2Y3	13818793	325228620	0.042489
CIBC - 2062 LAWRENCE AVE E - SCARBOROUGH - M1R2Z5	36909927	680820685	0.054214
CIBC - 85 ELLESMERE RD - SCARBOROUGH - M1R4B7	166008680	836594040	0.198434
CIBC - 4256 SHEPPARD AVE E - SCARBOROUGH - M1S1T5	57901088	459618170	0.125978
CIBC - 2359 BRIMLEY RD - SCARBOROUGH - M1S3L6	47091025	571544185	0.082393
CIBC - 5074 SHEPPARD AVE E - SCARBOROUGH - M1S4N3	31395236	726002115	0.043244
CIBC - 2361 WARDEN AVE - SCARBOROUGH - M1T1V7	54519733	898523040	0.060677

APPENDIX V: INDEX VALUES BY FINANCIAL FIRM

CIBC - 2770 KENNEDY RD - SCARBOROUGH - M1T3J2	38982778	693123290	0.056242
CIBC - 3599 SHEPPARD AVE E - SCARBOROUGH - M1T3K8	77542533	787834950	0.098425
CIBC - 141 MONTEZUMA TRAIL - SCARBOROUGH - M1V1K4	82970960	687691655	0.120651
CIBC - 250 ALTON TOWERS CIR - SCARBOROUGH - M1V3Z4	70584197	802349340	0.087972
CIBC - 3420 FINCH AVE E - SCARBOROUGH - M1W2R6	104450518	822320500	0.127019
CIBC - 143 RAVEL RD - NORTH YORK - M2H1T1	322491082	1323305315	0.243701
CIBC - 2 SHEPPARD AVE E - NORTH YORK - M2N5Y7	115010622	878945605	0.130851
CIBC - 1865 LESLIE ST - NORTH YORK - M3B2M3	74089866	1156839775	0.064045
CIBC - 939 LAWRENCE AVE E - NORTH YORK - M3C1P8	106673403	684607090	0.155817
CIBC - 1448 LAWRENCE AVE E - NORTH YORK - M4A2V6	112147405	847434605	0.132338
CIBC - 1118 VICTORIA PARK AVE - EAST YORK - M4B2K3	107733390	686648440	0.156897
CIBC - 788 O'CONNOR DR - EAST YORK - M4B2S8	82443434	681021845	0.121058
CIBC - 2083 DANFORTH AVE - TORONTO - M4C1K1	63165810	824088890	0.076649
CIBC - 3003 DANFORTH AVE - EAST YORK - M4C1M9	87042303	1185943260	0.073395
CIBC - 660 EGLINTON AVE E - EAST YORK - M4G2K2	61828354	907988125	0.068094
CIBC - 1529 BAYVIEW AVE - EAST YORK - M4G3B5	97784525	841668570	0.116179
CIBC - 180 LAIRD DR - EAST YORK - M4G3V7	33656024	701504485	0.047977
CIBC - 840 DANFORTH AVE - TORONTO - M4J1L7	52530213	711664820	0.073813
CIBC - 478 COSBURN AVE - EAST YORK - M4J2N5	39817131	764522320	0.052081
CIBC - 90 DANFORTH AVE - TORONTO - M4K1N1	101581985	688728980	0.147492
CIBC - 557 DANFORTH AVE - TORONTO - M4K1P7	57846739	769547790	0.07517
CIBC - 1037 PAPE AVE - EAST YORK - M4K3W1	93301781	714311120	0.130618
CIBC - 1252 GERRARD ST E - TORONTO - M4L1Y6	76030138	694720585	0.10944
CIBC - 943 QUEEN ST E - TORONTO - M4M1J6	29510766	501790090	0.058811
CIBC - 1000 GERRARD ST E - TORONTO - M4M3G6	94598805	819723110	0.115403
CIBC - 3256 YONGE ST - TORONTO - M4N2L6	136970730	1151795035	0.118919
CIBC - 2576 YONGE ST - TORONTO - M4P2J3	119238475	1032714000	0.115461
CIBC - 623 MOUNT PLEASANT RD - TORONTO - M4S2M9	65046389	735028255	0.088495
CIBC - 1 ST CLAIR AVE W - TORONTO - M4V1K6	77868442	1106680925	0.070363
CIBC - 135 ST CLAIR AVE W - TORONTO - M4V1P4	62552645	545825985	0.114602
CIBC - 250 BLOOR ST E - TORONTO - M4W1E6	91669713	918096655	0.099848
CIBC - 2 BLOOR ST W - TORONTO - M4W3E2	56038592	757518120	0.073977
CIBC - 345 BLOOR ST E - TORONTO - M4W3J6	136724491	994679370	0.137456
CIBC - 226 KING ST E - TORONTO - M5A1K1	58500876	271080995	0.215806
CIBC - 245 CARLTON ST - TORONTO - M5A2L2	115533076	837920840	0.181109
CIBC - 436 CHURCH ST - TORONTO - M5B2A4	108915567	706114850	0.151414
CIBC - 1 TORONTO ST - TORONTO - M5C2V6	17951848	266343340	0.067401
CIBC - 1 QUEEN ST E - TORONTO - M5C2W5	18880775	302688405	0.062381
CIBC - 1 YONGE ST - TORONTO - M5E1E5	75034516	329732050	0.227562
CIBC TRUST CORP - 55 YONGE ST - TORONTO - M5E1J4	30788493	438143630	0.07027
CIBC - 790 BAY ST - TORONTO - M5G1N8	12009942	305535270	0.039308
CIBC - 460 UNIVERSITY AVE - TORONTO - M5G1V1	14639851	82790505	0.17683
CIBC - 595 BAY ST - TORONTO - M5G2C2	18220619	181780250	0.112826
CIBC - 365 BAY ST - TORONTO - M5H2V1	671279	14227205	0.047183
CIBC - 375 BAY ST - TORONTO - M5H2V5	671279	14227205	0.047183
CIBC - 181 UNIVERSITY AVE - TORONTO - M5H3M7	315520	18340960	0.017203
CIBC - 100 UNIVERSITY AVE - TORONTO - M5J1V6	17951823	277803180	0.084821
CIBC - COMMERCE CT W - TORONTO - M5L1A2	4136972	18592740	0.222505
CIBC - 1703 AVENUE RD - NORTH YORK - M5M3Y3	37431279	732626430	0.051092
CIBC - 2040 AVENUE RD - NORTH YORK - M5M4A6	78954011	710280445	0.111159
CIBC - 462 SPADINA RD - TORONTO - M5P2W4	43490522	876517320	0.049617
CIBC - 175 AVENUE RD - TORONTO - M5R2J2	118259968	776944980	0.152212
CIBC - 151 BLOOR ST W - TORONTO - M5S1S4	16989295	507886720	0.033451
CIBC - 334 BLOOR ST W - TORONTO - M5S1W9	66699391	534358250	0.124821
CIBC - 532 BLOOR ST W - TORONTO - M5S1Y3	54287600	546718925	0.098297
CIBC - 956 BAY ST - TORONTO - M5S3A8	26429487	335567985	0.07876
CIBC - 483 DUNDAS ST W - TORONTO - M5T1H1	16738350	128050175	0.130717
CIBC - 288 COLLEGE ST - TORONTO - M5T1S1	21780647	187029245	0.116349
CIBC - 171 SPADINA AVE - TORONTO - M5T2C3	9221177	95186030	0.096875
CIBC - 205 QUEEN ST W - TORONTO - M5V1Z5	4998565	46173040	0.108257
CIBC - 378 QUEEN ST W - TORONTO - M5V2A2	9186216	85712125	0.107175
CIBC - 901 KING ST W - TORONTO - M5V3H5	18110046	361382475	0.050113
CIBC - 504 LAWRENCE AVE W - NORTH YORK - M6A1A1	63446977	551456035	0.115054
CIBC - 145 MARLEE AVE - YORK - M6B3H3	65430466	841963020	0.101922
CIBC - 2866 DUFFERIN ST - NORTH YORK - M6B3S6	38110895	298189840	0.127816
CIBC - 535 ST CLAIR AVE W - TORONTO - M6C1A3	93779540	799092905	0.117357
CIBC - 782 ST CLAIR AVE W - TORONTO - M6C1B6	70372803	854412930	0.107536
CIBC - 1150 EGLINTON AVE W - TORONTO - M6C2E2	71528862	732109940	0.0977
CIBC - 1164 ST CLAIR AVE W - TORONTO - M6E1B3	70992861	576389745	0.123188
CIBC - 1601 EGLINTON AVE W - YORK - M6E2H1	60670236	554428225	0.109429
CIBC - 364 OAKWOOD AVE - YORK - M6E2W2	89861284	631103570	0.142388
CIBC - 2402 DUFFERIN ST - YORK - M6E3S8	32800357	428270450	0.076588
CIBC - 641 COLLEGE ST - TORONTO - M6G1B5	38491563	381776615	0.100822
CIBC - 892 BLOOR ST W - TORONTO - M6H1L1	54053529	441997840	0.122294
CIBC - 1129 BLOOR ST W - TORONTO - M6H1M7	46823011	529500850	0.088429
CIBC - 235 OSSINGTON AVE - TORONTO - M6J2Z8	54989399	534779665	0.102826

APPENDIX V: INDEX VALUES BY FINANCIAL FIRM

CIBC - 1400 LAWRENCE AVE W - NORTH YORK - M6L1A7	30122348	479282230	0.062849
CIBC - 2400 EGLINTON AVE W - YORK - M6M1S6	66664788	443531285	0.150305
CIBC - 2659 EGLINTON AVE W - YORK - M6M1T8	45595226	534842735	0.08525
CIBC - 2318 KEELE ST - NORTH YORK - M6M3Z8	38093612	448242810	0.084984
CIBC - 1174 WESTON RD - YORK - M6M4P4	64843290	619818295	0.104294
CIBC - 1758 ST CLAIR AVE W - TORONTO - M6N1J3	61963330	429919520	0.144128
CIBC - 341 SILVERTHORN AVE - YORK - M6N3K5	46831739	438783730	0.106736
CIBC - 2896 DUNDAS ST W - TORONTO - M6P1Y8	38744117	592101320	0.065435
CIBC - 3351 DUNDAS ST W - TORONTO - M6P2A6	42972568	607924020	0.070687
CIBC - 2340 DUNDAS ST W - TORONTO - M6P4A9	108494371	712827510	0.152203
CIBC - 209 RONCESVALLES AVE - TORONTO - M6R2L5	58346102	683074835	0.087993
CIBC - 787 ANNETTE ST - TORONTO - M6S2E4	90180941	638556525	0.141226
CIBC - 48 SOUTHPORT ST - TORONTO - M6S3N3	75141877	402780245	0.186558
CIBC - 2935 LAKE SHORE BLVD W - ETOBICOKE - M8V1J5	39886180	395526445	0.100843
CIBC - 3657 LAKE SHORE BLVD W - ETOBICOKE - M8W1P7	71490476	536478965	0.133259
CIBC - 2990 BLOOR ST W - ETOBICOKE - M8X1B9	58942188	533310705	0.110521
CIBC - 172 THE QUEENSWAY - ETOBICOKE - M8Y1J3	15356713	617527435	0.024868
CIBC - 986 THE QUEENSWAY - ETOBICOKE - M8Z1P6	9637076	311182790	0.030968
CIBC - 1278 THE QUEENSWAY - ETOBICOKE - M8Z1S3	11991083	192124490	0.062413
CIBC - 4914 DUNDAS ST W - ETOBICOKE - M9A1B5	116868667	657108665	0.177853
CIBC - 1500 ISLINGTON AVE - ETOBICOKE - M9A3L8	50473987	807911640	0.062475
CIBC - 25 FONTENAY CRT - ETOBICOKE - M9A4W7	102434082	814386890	0.125781
CIBC - 3835 BLOOR ST W - ETOBICOKE - M9B1K9	93051176	456392040	0.203684
CIBC - 250 THE EAST MALL ST - ETOBICOKE - M9B3Y8	61132915	481060905	0.127079
CIBC - 201 LLOYD MANOR RD - ETOBICOKE - M9B6H6	200344189	1024451620	0.195582
CIBC - 666 BURNHAMTHORPE RD - ETOBICOKE - M9C2Z4	161701173	1016148615	0.159132
CIBC - 2973 ISLINGTON AVE - NORTH YORK - M9L2K7	63869266	701000580	0.091112
CIBC - 5001 STEELES AVE W - NORTH YORK - M9L2X1	2087711	265105090	0.007875
CIBC - 2340 FINCH AVE W - NORTH YORK - M9M2C7	40619616	425916180	0.09537
CIBC - 3226 WESTON RD - NORTH YORK - M9M2T7	43506573	571215400	0.078165
CIBC - 1940 WESTON RD - YORK - M9N1W2	57771764	645280130	0.08953
CIBC - 1500 ROYAL YORK RD - ETOBICOKE - M9P3B6	86035777	1049366230	0.081988
CIBC - 1530 ALBION RD - ETOBICOKE - M9V1B4	78298499	526732510	0.148648
CIBC - 89 HUMBER COLLEGE BLVD - ETOBICOKE - M9V4B8	85598295	829171220	0.103234
CIBC - 136 REXDALE BLVD - ETOBICOKE - M9W1P6	8582045	389792145	0.022017
CIBC - 291 REXDALE BLVD - ETOBICOKE - M9W1R8	7345919	286872950	0.025607
CIBC - 2291 KIPLING AVE - ETOBICOKE - M9W4L6	28107781	707402055	0.039734
CIBC - 220 HUMBERLINE DR - ETOBICOKE - M9W5Y4	27243834	772552275	0.035265
CIBC - 185 LOCK ST E - DUNNVILLE - N1A1J6	2378200	26800470	0.089404
CIBC - 31 ARGYLE ST N - CALEDONIA - N3W1B6	3383028	58869945	0.057466
Average	73171893.69	700221804.4	0.102417127
Min	266915	9552140	0.007875
Max	322491082	1867014610	0.345209
Std Dev	56750537.68	353051658.1	0.053980952

Canada Trust

Branch Name and Location	Probable Dollars	Total Dollars	Opportunity Index
CANADA TRUST - 1 SIMCOE ST N - OSHAWA - L1G4R7	35923061	391866735	0.091672
CANADA TRUST - 10 ST CLAIR AVE W - TORONTO - M4V1L4	128566516	1176981090	0.109234
CANADA TRUST - 100 CITY CENTRE DR - MISSISSAUGA - L5B2C9	69570162	1137921195	0.061138
CANADA TRUST - 100 STEELES AVE W - THORNHILL - L4J7Y1	170381011	1417601770	0.12019
CANADA TRUST - 1052 SOUTHOWN RD - MISSISSAUGA - L5J2Y8	50649307	1252578680	0.040436
CANADA TRUST - 1054 CENTRE ST - THORNHILL - L4J8E5	152818042	1145721840	0.133381
CANADA TRUST - 110 YONGE ST - TORONTO - M5C1T4	5490185	48803345	0.112496
CANADA TRUST - 113 WALTON ST - PORT HOPE - L1A1N4	2442586	28811840	0.084777
CANADA TRUST - 1155 DAVIS DR RR 5 - NEWMARKET - L3Y7V1	100544625	918808760	0.109429
CANADA TRUST - 1227 BARTON ST E - HAMILTON - L8H2V4	40100559	356006580	0.11264
CANADA TRUST - 1347 ST CLAIR AVE W - TORONTO - M6E1C3	38211444	546343445	0.06994
CANADA TRUST - 136 CLARENCE ST W - PORT COLBORNE - L3K3G5	96385524	376245605	0.256177
CANADA TRUST - 14845 YONGE ST - AURORA - L4G6H8	73629377	1307391535	0.056318
CANADA TRUST - 1498 ISLINGTON AVE - ETOBICOKE - M9A3L7	51300567	865256570	0.059289
CANADA TRUST - 15 WESTNEY RD N - AJAX - L1T1P4	53492287	1429035565	0.037432
CANADA TRUST - 1505 GUELPH LINE - BURLINGTON - L7P3B6	158885382	1250443330	0.127063
CANADA TRUST - 1511 BAYVIEW AVE - EAST YORK - M4G4E2	52535647	661899690	0.079371
CANADA TRUST - 1585 MISSISSAUGA VALLEY BLVD - MISSISSAUGA - L5A3W9	169630007	926221140	0.183142
CANADA TRUST - 163 LOCK ST E - DUNNVILLE - N1A1J6	2378200	26600470	0.089404
CANADA TRUST - 1677 AVENUE RD - NORTH YORK - M5M3Y3	38400771	799962335	0.048003
CANADA TRUST - 168 QUEEN ST S - STREETSVILLE - L5M1K8	107814901	949950525	0.113495
CANADA TRUST - 1684 DANFORTH AVE - TORONTO - M4C1H6	70131538	836865210	0.083803
CANADA TRUST - 1794 LIVERPOOL RD - PICKERING - L1V4G7	119849660	1391502230	0.08613
CANADA TRUST - 1800 SHEPPARD AVE E - TORONTO - M2J5A7	176884831	1149945440	0.15382
CANADA TRUST - 1846 LAWRENCE AVE E - SCARBOROUGH - M1R2Y4	98143962	851263765	0.115292
CANADA TRUST - 1881 STEELES AVE W - NORTH YORK - M3H5Y4	81262719	1012119110	0.060529
CANADA TRUST - 1900 KING ST E - HAMILTON - L8K1W1	104382763	846395980	0.123326
CANADA TRUST - 1955 YONGE ST - TORONTO - M4S1Z6	92326334	524417985	0.176055
CANADA TRUST - 1960 DUNDAS ST W - MISSISSAUGA - L5K2R9	31186737	1596601000	0.019533
CANADA TRUST - 1979 WESTON RD - YORK - M9N1W8	62784789	673894425	0.093167
CANADA TRUST - 2 KING ST W - HAMILTON - L8P1A1	16981320	305574610	0.055572
CANADA TRUST - 20 EGLINTON AVE W - TORONTO - M4R1K8	61258187	921800535	0.066455
CANADA TRUST - 2044 QUEEN ST E - TORONTO - M4E1C9	81011254	915281720	0.08851
CANADA TRUST - 2201 BRANT ST - BURLINGTON - L7P3N8	109080783	1155497685	0.094402
CANADA TRUST - 2300 KENNEDY RD - SCARBOROUGH - M1T3H1	48103125	747646260	0.064339
CANADA TRUST - 2322 BLOOR ST W - TORONTO - M6S1P2	81954828	733799380	0.111886
CANADA TRUST - 240 GLENDALE AVE - ST CATHARINES - L2T2L2	137927925	759379215	0.181632
CANADA TRUST - 240 LEIGHLAND AVE - OAKVILLE - L6H3H6	157420904	1203901785	0.130759
CANADA TRUST - 2453 YONGE ST - TORONTO - M4P2E8	125826046	1018625195	0.123525
CANADA TRUST - 2472 LAKE SHORE BLVD W - ETOBICOKE - M8V1C9	65171893	517187725	0.126017
CANADA TRUST - 25 PEEL CENTRE DR - BRAMPTON - L6T3R5	178700217	1610405915	0.110966
CANADA TRUST - 250 WINCOTT DR - ETOBICOKE - M9R2R5	107443519	1222104800	0.087917
CANADA TRUST - 2518 BAYVIEW AVE - NORTH YORK - M2L1A9	193345692	1053818055	0.183472
CANADA TRUST - 252 MAIN ST E - MILTON - L9T1N8	57484939	809405895	0.071021
CANADA TRUST - 2580 HURONTARIO ST - MISSISSAUGA - L5B1N5	112367040	1158358375	0.097005
CANADA TRUST - 267 HIGHWAY 8 - STONEY CREEK - L8G1E4	52245566	852111225	0.061313
CANADA TRUST - 282 LAKESHORE RD E - OAKVILLE - L8J1J2	76823172	544011925	0.140848
CANADA TRUST - 285 LAWSON RD - SCARBOROUGH - M1C2J6	108001451	1071967615	0.100751
CANADA TRUST - 29 MAIN ST S - GEORGETOWN - L7G3G2	66721255	1046773985	0.06374
CANADA TRUST - 29 THE LINKS RD - NORTH YORK - M2P1T7	31257948	803855340	0.038885
CANADA TRUST - 2900 STEELES AVE E - THORNHILL - L3T4X1	138549880	923377465	0.150047
CANADA TRUST - 2941 LAWRENCE AVE E - SCARBOROUGH - M1P2V6	105523149	755779070	0.139622
CANADA TRUST - 2972 BLOOR ST W - ETOBICOKE - M8X1B9	63373380	589642570	0.107478
CANADA TRUST - 3057 DUFFERIN ST - NORTH YORK - M6B3T8	25580628	271746080	0.094134
CANADA TRUST - 3060 DANFORTH AVE - EAST YORK - M4C1N2	93544290	1057061540	0.088495
CANADA TRUST - 3114 BATHURST ST - NORTH YORK - M6A2A1	68238396	589418045	0.115772
CANADA TRUST - 3115 KINGSTON RD - SCARBOROUGH - M1M1P3	13895882	769846875	0.018005
CANADA TRUST - 320 BAY ST - TORONTO - M5H2P6	390714	18592740	0.021014
CANADA TRUST - 3300 BLOOR ST - ETOBICOKE - M8X2W8	25639253	491846940	0.052129
CANADA TRUST - 3335 YONGE ST - TORONTO - M4N2M1	128225740	1012080295	0.126695
CANADA TRUST - 3401 DUFFERIN ST - NORTH YORK - M6A2T9	19883937	395234615	0.050309
CANADA TRUST - 3467 WESTON RD - NORTH YORK - M9M2V9	50421668	732039510	0.068878
CANADA TRUST - 3471 SHEPPARD AVE E - SCARBOROUGH - M1T3K5	121458605	898908875	0.135118
CANADA TRUST - 350 SCOTT ST - ST CATHARINES - L2N6T4	101619949	1137574320	0.08933
CANADA TRUST - 37 LAKESHORE RD - ST CATHARINES - L2N2T2	66075567	835111200	0.079122
CANADA TRUST - 370 MAIN ST N - BRAMPTON - L6V4A4	346433715	1791888300	0.193334
CANADA TRUST - 382 RONCESVALLES AVE - TORONTO - M6R2M9	78533549	600171130	0.130852
CANADA TRUST - 408 DUNDAS ST W - WHITBY - L1N2M7	97453837	1292073740	0.075424
CANADA TRUST - 413 DUNDAS - TORONTO - M5A2A9	50461521	494600295	0.102025
CANADA TRUST - 4335 BLOOR ST W - ETOBICOKE - M9C2A5	47583252	976603370	0.048703
CANADA TRUST - 4411 KINGSTON RD - SCARBOROUGH - M1E2N3	41229682	746603715	0.055223
CANADA TRUST - 443 SPADINA RD - TORONTO - M5P2W3	43517721	881267965	0.049381
CANADA TRUST - 4463 QUEEN ST - NIAGARA FALLS - L2E2L2	15102438	219048840	0.068946
CANADA TRUST - 46 KING ST E - HAMILTON - L8N1A6	55581039	453013860	0.122692
CANADA TRUST - 4681 HIGHWAY 7 - MARKHAM - L3R1M6	58642801	1126023235	0.05208

APPENDIX V: INDEX VALUES BY FINANCIAL FIRM

CANADA TRUST - 472 EGLINTON AVE W - TORONTO - M5N1A6	93924125	805746825	0.116568	
CANADA TRUST - 50 BLOOR ST W - TORONTO - M4W3L8	39283473	651321725	0.060283	
CANADA TRUST - 500 GLENCAIRN AVE - NORTH YORK - M6B1Z1	71714919	725540600	0.098843	
CANADA TRUST - 500 GUELPH LINE - BURLINGTON - L7R3M4	33213525	660821580	0.048784	
CANADA TRUST - 500 REXDALE BLVD - ETOBICOKE - M9W6K5	54869004	461237845	0.11896	
CANADA TRUST - 5000 NEW ST - BURLINGTON - L7L1V1	139992334	826073935	0.169467	
CANADA TRUST - 5400 YONGE ST - NORTH YORK - M2N5R5	110195355	747760420	0.147367	
CANADA TRUST - 550 FENNELL AVE E - HAMILTON - L8V4S9	175648343	966141545	0.181804	
CANADA TRUST - 574 BLOOR ST W - TORONTO - M6G1K1	61365742	451806805	0.135823	
CANADA TRUST - 5900 DORCHESTER RD - NIAGARA FALLS - L2G5S9	59722354	577465465	0.103422	
CANADA TRUST - 596 PLAINS RD E - BURLINGTON - L7T2E7	136984179	897829865	0.152573	
CANADA TRUST - 60 JAMES ST - ST CATHARINES - L2R7E7	33740483	589533920	0.057232	
CANADA TRUST - 64 MAIN ST W - GRIMSBY - L3M1R6	74733235	633169520	0.116027	
CANADA TRUST - 666 BURNHAMTHORPE RD - ETOBICOKE - M9C2Z4	171756946	1114557975	0.154103	
CANADA TRUST - 6760 MEADOWVALE T. CENTRE CIR - MISSISSAUGA - L5N4B7	135445257	1280733310	0.105758	
CANADA TRUST - 680 MARKHAM RD - SCARBOROUGH - M1H2A7	111763548	860010645	0.129956	
CANADA TRUST - 70 JARVIS ST - FORT ERIE - L2A2S4	15632277	316816735	0.049342	
CANADA TRUST - 70 SQ EGLINTON - SCARBOROUGH - M1L2K1	44922399	564303485	0.079607	
CANADA TRUST - 7077 KENNEDY RD - MARKHAM - L3R0N8	80487303	592141375	0.10215	
CANADA TRUST - 725 WARDEN AVE - SCARBOROUGH - M1L4R7	8913221	610304265	0.014605	
CANADA TRUST - 75 BAYLY ST W - AJAX - L1S7K7	173689824	1264528710	0.137355	
CANADA TRUST - 750 OKLAHOMA DR - PICKERING - L1W3G9	114973338	1009506390	0.113891	
CANADA TRUST - 7967 YONGE ST - THORNHILL - L3T2C4	51523648	1216750520	0.042345	
CANADA TRUST - 800 QUEENSTON RD - STONEY CREEK - L8G1A7	136751077	1089378140	0.125532	
CANADA TRUST - 830 UPPER JAMES ST - HAMILTON - L9C3A4	117496371	1235666560	0.095087	
CANADA TRUST - 8545 MCCOWAN RD - MARKHAM - L3P1W9	47304426	838362675	0.056425	
CANADA TRUST - 87 EAST MAIN ST - WELLAND - L3B3W5	56031250	671854890	0.083398	
CANADA TRUST - 938 KING ST W - HAMILTON - L8S1K8	66182735	531580045	0.124502	
CANADA TRUST - 939 LAWRENCE AVE E - NORTH YORK - M3C1P8	126372298	855755335	0.147873	
CANADA TRUST - 98 WILSON ST W - ANCASTER - L9G1N3	66057131	610747750	0.108158	
CANADA TRUST - 991 PAPE AVE - EAST YORK - M4K3V6	89763462	746134090	0.120305	
	Average	83230232	828604717	0.099431066
	Min	390714	18592740	0.014605
	Max	346433715	1791888300	0.256177
	Std Dev	53434739.48	349039694.4	0.043206661

Laurentian Bank

Branch Name and Location	Probable Dollars	Total Dollars	Opportunity Index
LAURENTIAN BANK - 1070 WILSON AVE - NORTH YORK - M3K1G6	61400691	578853450	0.106073
LAURENTIAN BANK - 4218 LAWRENCE AVE E - SCARBOROUGH - M1E4X9	131349941	1053213505	0.124713
LAURENTIAN BANK CANADA - 503 ST CLAIR AVE W - TORONTO - M6C1A1	100425152	858665090	0.116955
LAURENTIAN BANK OF CANADA - 3082 BLOOR ST W - ETOBICOKE - M8X1C8	34835120	750588630	0.04841
LAURENTIAN BANK OF CANADA - 5775 YONGE ST - NORTH YORK - M2M4J1	50725950	880246740	0.057627
LAURENTIAN BANK OF CANADA - 130 ADELAIDE ST W - TORONTO - M5H3P5	301491	18592740	0.016216
LAURENTIAN BANK-CANADA - 2323 YONGE ST - TORONTO - M4P2C9	77847939	889127570	0.087555
LAURENTIAN BANK - 502 BRANT ST - BURLINGTON - L7R2G4	87791647	726453250	0.12085
LAURENTIAN BANK - 231 MAIN ST N - MARKHAM - L3P1Y6	88061086	1218714960	0.072257
LAURENTIAN BANK - 2515 HURONTARIO ST - MISSISSAUGA - L5A4C8	144907551	1065269745	0.136029
LAURENTIAN BANK - 615 DAVIS DR - NEWMARKET - L3Y2R2	129455749	1189447060	0.108837
LAURENTIAN BANK - 210 NORTH SERVICE RD W - OAKVILLE - L6M2Y2	29611791	1027110935	0.02883
LAURENTIAN BANK - 165 QUEEN ST - PORT PERRY - L9L1B8	3486128	313313105	0.011127
LAURENTIAN BANK CANADA - 2 KING ST W - HAMILTON - L8P1A1	20543241	356131790	0.057684
LAURENTIAN BANK OF CANADA - 15208 YONGE ST - AURORA - L4G1L9	171789533	1240073160	0.138532
LAURENTIAN BANK OF CANADA - 4979 KING ST - BEAMSVILLE - L0R1B0	88859789	658280950	0.134988
LAURENTIAN BANK OF CANADA - 18 MAIN ST N - BRAMPTON - L6V1N6	86300348	1393287170	0.06194
LAURENTIAN BANK OF CANADA - 499 MAIN ST S - BRAMPTON - L6Y1N7	178274070	1148251440	0.155257
LAURENTIAN BANK OF CANADA - 39 MAIN ST N - MARKHAM - L3P1X3	47506726	944153270	0.050317
LAURENTIAN BANK OF CANADA - 4665 CENTRAL PKY E - MISSISSAUGA - L4Z2V4	117793077	925459555	0.127281
LAURENTIAN BANK OF CANADA - 214 QUEEN ST S - STREETSVILLE - L5M1L5	86488978	979234295	0.088323
LAURENTIAN BANK-CANADA - 1672 LAKESHORE RD W - MISSISSAUGA - L5J1J5	35164135	1148724365	0.030611
Average	80587279	880145126	0.085382364
Min	301491	18592740	0.011127
Max	178274070	1393287170	0.155257
Std Dev	50754528.35	335805881.5	0.044070096

Royal Bank of Canada

Branch Name and Location	Probable Dollars	Total Dollars	Opportunity Index
ROYAL BANK - 1 JAMES ST S - HAMILTON - L8P4R5	2996474	344075065	0.087088
ROYAL BANK - 1 MAIN ST N - BRAMPTON - L6X1M8	79102876	1163585985	0.067982
ROYAL BANK - 1 WHEELHOUSE DR - NEWCASTLE - L1B1B9	23325039	650477440	0.035858
ROYAL BANK - 1001 LAKESHORE RD E - MISSISSAUGA - L5E1E6	28765700	583239200	0.049321
ROYAL BANK - 1005 SPEERS RD - OAKVILLE - L6L2X5	40126807	1151645945	0.034843
ROYAL BANK - 1015 MATHESON BLVD E - MISSISSAUGA - L4W3A4	2901422	157643360	0.018405
ROYAL BANK - 1027 SPEERS RD - OAKVILLE - L6L2X5	40515426	1180918945	0.034308
ROYAL BANK - 10350 YONGE ST - RICHMOND HILL - L4C5K9	137195216	1211827180	0.113214
ROYAL BANK - 1043 COXWELL AVE - EAST YORK - M4C3G4	71797226	723482120	0.099237
ROYAL BANK - 1050 PARAMOUNT DR - STONEY CREEK - L8J1P8	118312519	676946030	0.174774
ROYAL BANK - 1050 SIMCOE ST N - OSHAWA - L1G4W5	106168848	1082483515	0.098079
ROYAL BANK - 108 HARTZELL RD - ST CATHARINES - L2P1N4	30230745	358305600	0.031727
ROYAL BANK - 1100 BURLOAK DR - BURLINGTON - L7L6B2	26042117	369328630	0.070512
ROYAL BANK - 1100 ISLINGTON AVE - ETOBICOKE - M8Z4S2	22899008	399155680	0.057369
ROYAL BANK - 1102 CENTRE ST - THORNHILL - L4J3M8	56327238	974820270	0.057782
ROYAL BANK - 1105 ALBION RD - ETOBICOKE - M9V1A9	220944002	888423110	0.248692
ROYAL BANK - 1107 MAIN ST E - HAMILTON - L8M1N7	52656777	510983960	0.10305
ROYAL BANK - 1125 BLOOR ST - MISSISSAUGA - L4Y2N6	110841707	1038526905	0.10673
ROYAL BANK - 1181 DAVIS DR - NEWMARKET - L3Y7V1	110558155	1057343050	0.104562
ROYAL BANK - 12 MAIN - BEETON - LOG1A0	65765319	671361455	0.097958
ROYAL BANK - 1227 BARTON ST E - HAMILTON - L8H2V4	38680771	343581160	0.112581
ROYAL BANK - 1240 EGLINTON AVE W - MISSISSAUGA - L5V1N3	95548500	948535880	0.100733
ROYAL BANK - 1282 HIGHWAY 8 - STONEY CREEK - L8E5K3	49061582	557501365	0.088003
ROYAL BANK - 129 REXDALE BLVD - ETOBICOKE - M9W1P4	10362236	536621600	0.01931
ROYAL BANK - 1340 KINGSTON RD - PICKERING - L1V3M9	125105588	1428928940	0.087552
ROYAL BANK - 1370 DUNDAS ST E - MISSISSAUGA - L4Y4G4	25420172	728943365	0.034873
ROYAL BANK - 140 LA ROSE AVE - ETOBICOKE - M9P1B2	107079611	811660665	0.131927
ROYAL BANK - 1405 HIGHWAY 2 - COURTICE - L1E2J6	41933739	897783120	0.046708
ROYAL BANK - 1421 DUNDAS ST W - TORONTO - M6J1Y4	74025967	600963255	0.123179
ROYAL BANK - 1421 KENNEDY RD - SCARBOROUGH - M1P2L6	26437497	437288675	0.080458
ROYAL BANK - 15 PLAINS RD E - BURLINGTON - L7T2B8	79043003	674795565	0.117136
ROYAL BANK - 15408 YONGE ST - AURORA - L4G1N9	49186231	1261046270	0.039004
ROYAL BANK - 1545 STEELES AVE E - NORTH YORK - M2M3Y7	69842335	1207575865	0.057837
ROYAL BANK - 1554 BAYVIEW AVE - TORONTO - M4G3B6	96289855	735171135	0.130976
ROYAL BANK - 1571 SANDHURST CIR - SCARBOROUGH - M1V1V2	122051740	770500590	0.158406
ROYAL BANK - 158 GRAY RD - STONEY CREEK - L8G3V2	129478630	1019105695	0.127051
ROYAL BANK - 16 YORK MILLS RD - NORTH YORK - M2P2E5	76486772	880804950	0.086837
ROYAL BANK - 160 MAIN ST S - BRAMPTON - L6W2E1	90429787	1381551615	0.065455
ROYAL BANK - 163 CENTENNIAL PKY N - HAMILTON - L8E1H8	64429548	641634725	0.100415
ROYAL BANK - 163 QUEEN ST - DUNNVILLE - N1A1H6	2378200	26600470	0.089404
ROYAL BANK - 164 SANDALWOOD PKY E - BRAMPTON - L6Z3S4	115688538	1183885310	0.097728
ROYAL BANK - 1642 UPPER JAMES ST - HAMILTON - L9B1K4	24161638	663013970	0.036442
ROYAL BANK - 16775 YONGE ST - NEWMARKET - L3Y8J4	78230299	1141215135	0.06855
ROYAL BANK - 1714 EGLINTON AVE W - YORK - M6E2H5	46356667	491435875	0.094329
ROYAL BANK - 1730 QUEEN ST W - TORONTO - M6R1B3	33639754	598296475	0.056226
ROYAL BANK - 1732 JANE ST - YORK - M9N2S4	88633520	615686210	0.143959
ROYAL BANK - 174 WOODBRIDGE AVE - WOODBRIDGE - L4L2S8	68124432	651671355	0.104538
ROYAL BANK - 17600 YONGE ST - NEWMARKET - L3Y4Z1	75426946	949944225	0.079401
ROYAL BANK - 1785 LAKESHORE RD W - MISSISSAUGA - L5J1J6	50801654	1156916975	0.043911
ROYAL BANK - 180 WELLINGTON ST W - TORONTO - M5J1J1	9513060	169930465	0.055982
ROYAL BANK - 1820 BAYVIEW AVE - TORONTO - M4G4G7	68901300	750605190	0.091794
ROYAL BANK - 1820 EGLINTON AVE W - YORK - M6E2H6	48815969	536232595	0.091035
ROYAL BANK - 1840 ARGENTIA RD - MISSISSAUGA - L5N1P9	14512279	1066150955	0.013612
ROYAL BANK - 1845 MAIN ST W - HAMILTON - L8S1J2	52972152	1618884855	0.032762
ROYAL BANK - 185 GRIFFIN ST N - SMITHVILLE - L0R2A0	8881155	142583665	0.062287
ROYAL BANK - 189 QUEEN ST S - STREETSVILLE - L5M1L4	84434380	901586735	0.093651
ROYAL BANK - 1906 WESTON RD - YORK - M9N1W2	62197348	719128935	0.08649
ROYAL BANK - 19415 YONGE ST - HOLLAND LANDING - L9N1L8	109798159	1432528445	0.076646
ROYAL BANK - 2 DUNDAS ST W - MISSISSAUGA - L5B1H3	127306547	1073758845	0.118562
ROYAL BANK - 2 HARWOOD AVE S - AJAX - L1S7L8	71877999	1482413980	0.048487
ROYAL BANK - 2 QUEEN ST S - TOTTENHAM - LOG1W0	213880453	1297597025	0.164828
ROYAL BANK - 200 BAY ST - TORONTO - M5J2J5	4138972	18592740	0.222505
ROYAL BANK - 2003 LAKESHORE RD - BURLINGTON - L7R1A1	20983659	512586410	0.040937
ROYAL BANK - 2005 AVENUE RD - NORTH YORK - M5M4A5	76719209	742034055	0.10339
ROYAL BANK - 2025 WILLIAM O'CONNELL BLVD - BURLINGTON - L7M4E4	49002520	645703695	0.07589
ROYAL BANK - 2035 CORNWALL RD - OAKVILLE - L6J7S2	224325017	837917845	0.267717
ROYAL BANK - 2043 EGLINTON AVE E - SCARBOROUGH - M1L2M9	6001107	536587380	0.011184
ROYAL BANK - 2076 DANFORTH AVE - TORONTO - M4C1J6	42688426	940347770	0.045396
ROYAL BANK - 209 COUNTY COURT BLVD - BRAMPTON - L6W4P5	30067859	586292865	0.051285
ROYAL BANK - 210 QUEEN ST - PORT PERRY - L9L1B9	2729935	270154495	0.010105
ROYAL BANK - 211 MARTINDALE RD - ST CATHARINES - L2S3V7	35485937	585112145	0.060648
ROYAL BANK - 211 MARYCROFT AVE - WOODBRIDGE - L4L5X8	40765054	600996860	0.067829
ROYAL BANK - 2132 KING ST E - HAMILTON - L8K1W6	49026812	903546670	0.05426
ROYAL BANK - 2163 SIXTH LINE - OAKVILLE - L6H3N7	156435746	718248655	0.217802
ROYAL BANK - 2171 QUEEN ST E - TORONTO - M4E1E5	72901286	770265195	0.094644
ROYAL BANK - 2175 QUEEN ST E - TORONTO - M4E1E5	72901286	770265195	0.094644
ROYAL BANK - 220 LAKESHORE RD W - MISSISSAUGA - L5H1G6	126826921	863973750	0.146795

APPENDIX V: INDEX VALUES BY FINANCIAL FIRM

ROYAL BANK - 220 NORTH SERVICE RD W - OAKVILLE - L6M2Y3	115052653	1103955410	0.104219
ROYAL BANK - 2201 BRANT ST - BURLINGTON - L7P3N8	113915432	1231851115	0.092475
ROYAL BANK - 2275 LAKE SHORE BLVD W - ETOBICOKE - M8V3Y3	121812881	519139170	0.234644
ROYAL BANK - 2277 KEELE ST - NORTH YORK - M6M3Z6	36941569	472756545	0.078141
ROYAL BANK - 232 GUELPH ST - GEORGETOWN - L7G4B1	108132779	933181225	0.115875
ROYAL BANK - 2329 LAKESHORE RD W - OAKVILLE - L6L1H2	207841949	686752135	0.302845
ROYAL BANK - 2331 KINGSTON RD - SCARBOROUGH - M1N1V1	105906569	590022495	0.179496
ROYAL BANK - 234 MARY ST - NIAGARA ON THE LAKE - L0S1J0	91180576	263261840	0.346349
ROYAL BANK - 2346 YONGE ST - TORONTO - M4P2E6	95890857	949862015	0.100952
ROYAL BANK - 235 DIXON RD - ETOBICOKE - M9P2M5	97227921	896784305	0.108418
ROYAL BANK - 235 QUEEN ST E - BRAMPTON - L6W2B5	98049399	1274293260	0.076944
ROYAL BANK - 235 RONCESVALLES AVE - TORONTO - M6R2L6	41480728	649231570	0.063892
ROYAL BANK - 2361 BRISTOL CIR - OAKVILLE - L6H5S9	36709350	689551695	0.041267
ROYAL BANK - 24 LIVINGSTON AVE - GRIMSBY - L3M1K7	37754028	478659610	0.078874
ROYAL BANK - 2414 MAJOR MACKENZIE DR - MAPLE - L6A1R8	78043715	507750175	0.153705
ROYAL BANK - 2460 WINSTON CHURCHILL BLVD - OAKVILLE - L6J4Z2	10853620	393200495	0.027803
ROYAL BANK - 2483 BLOOR ST W - TORONTO - M6S1P7	45047174	821668280	0.054824
ROYAL BANK - 25 MILVERTON DR - MISSISSAUGA - L5R3G2	17286069	333078955	0.051898
ROYAL BANK - 25 PEEL CENTRE DR - BRAMPTON - L6T3R5	176431668	1585816375	0.111256
ROYAL BANK - 2514 BAYVIEW AVE - NORTH YORK - M2L1A9	200383164	1192536325	0.188031
ROYAL BANK - 253 COXWELL AVE - TORONTO - M4L3B4	117386795	765891270	0.153268
ROYAL BANK - 2559 YONGE ST - TORONTO - M4P2J1	105602074	935445240	0.11289
ROYAL BANK - 26 HOLLAND ST E - BRADFORD - L3Z2A9	161704875	1319045415	0.122592
ROYAL BANK - 26 ST CLAIR AVE E - TORONTO - M4T1L7	133887487	1160193160	0.115401
ROYAL BANK - 260 SPADINA AVE - TORONTO - M5T2E4	19158766	122971025	0.155799
ROYAL BANK - 2655 LIRUMA RD - MISSISSAUGA - L5K1Y8	139434245	1368454265	0.102041
ROYAL BANK - 27 SIMCOE ST N - OSHAWA - L1G4R7	57039834	949499815	0.060074
ROYAL BANK - 274 WILSON AVE - NORTH YORK - M3H1S8	128625821	706724440	0.182003
ROYAL BANK - 2765 DUFFERIN ST - NORTH YORK - M6B3R6	18898143	371460135	0.050875
ROYAL BANK - 2768 KEELE ST - NORTH YORK - M3M2G2	81968889	735142405	0.111501
ROYAL BANK - 277 LAKESHORE RD E - OAKVILLE - L6J6J3	41729878	533847335	0.078168
ROYAL BANK - 2786 VICTORIA PARK AVE - NORTH YORK - M2J4A8	102276951	1245551760	0.082114
ROYAL BANK - 2788 BATHURST ST - NORTH YORK - M6B3A3	76321011	771478795	0.098928
ROYAL BANK - 279 LAKESHORE RD E - OAKVILLE - L6J1H9	45658572	643988140	0.070897
ROYAL BANK - 28 JAMES ST S - HAMILTON - L8P2X8	31836176	398153610	0.079457
ROYAL BANK - 2880 ELLESMERE RD - SCARBOROUGH - M1E4B8	91987248	873444125	0.105316
ROYAL BANK - 290 THE WEST MALL - ETOBICOKE - M9C1C6	73012525	815051935	0.08958
ROYAL BANK - 2947 BLOOR ST W - ETOBICOKE - M8X1B8	72001234	652162150	0.110404
ROYAL BANK - 2978 ISLINGTON AVE - NORTH YORK - M9L2K6	99273087	754724020	0.131536
ROYAL BANK - 3030 MAINWAY DR - BURLINGTON - L7M1A3	24049182	918915310	0.026171
ROYAL BANK - 304 DUNDAS E - WATERDOWN - L0R2H0	101135908	635884775	0.159048
ROYAL BANK - 307 BROCK ST S - WHITBY - L1N4K3	128359075	1283452515	0.101594
ROYAL BANK - 3083 BATHURST ST - NORTH YORK - M6A2A3	64827177	583706810	0.111061
ROYAL BANK - 3091 LAWRENCE AVE E - SCARBOROUGH - M1H1A1	69823537	791042650	0.088268
ROYAL BANK - 33-35 HWY 20 - Fonthill - L0S1E6	31777441	281975970	0.121299
ROYAL BANK - 33 CITY CENTRE DR - MISSISSAUGA - L5B2N5	44362838	1061732520	0.041783
ROYAL BANK - 3300 HIGHWAY 7 - CONCORD - L4K4M3	32834208	438640130	0.074855
ROYAL BANK - 3334 DANFORTH AVE - SCARBOROUGH - M1L1C6	68326126	852109195	0.080185
ROYAL BANK - 3336 KEELE ST - NORTH YORK - M3J1L5	132145738	720380840	0.183439
ROYAL BANK - 335 KERR ST - OAKVILLE - L6K3B7	62988115	420645545	0.149742
ROYAL BANK - 34 WYNFORD HTS. CRES - NORTH YORK - M3C1K7	214807248	815113720	0.26353
ROYAL BANK - 3405 HARVESTER RD - BURLINGTON - L7N3N1	11539012	646145560	0.017858
ROYAL BANK - 3492 WESTON RD - NORTH YORK - M9M2W1	43559503	535109050	0.081403
ROYAL BANK - 3499 PORTAGE RD - NIAGARA FALLS - L2J2K5	111177821	816858200	0.180232
ROYAL BANK - 3550 SCHMON PKY SS 11 - THOROLD - L2V4Y6	36047509	511553930	0.070467
ROYAL BANK - 3555 LAKE SHORE BLVD W - ETOBICOKE - M8W1P4	65438031	581116180	0.116621
ROYAL BANK - 360 BAY ST - TORONTO - M5H2V6	476980	31818640	0.014991
ROYAL BANK - 380 SCOTT ST - ST CATHARINES - L2M3W4	139089943	1111501265	0.125137
ROYAL BANK - 385 RIDGE RD - RIDGEWAY - L0S1N0	95338762	467177500	0.204074
ROYAL BANK - 393 RYMAL RD W - HAMILTON - L9B1V2	37641715	896529575	0.041986
ROYAL BANK - 40 KING ST W - OSHAWA - L1H1A4	65826589	722907830	0.090781
ROYAL BANK - 400 PACIFIC AVE - TORONTO - M6P2R1	71209039	699723045	0.101767
ROYAL BANK - 401 THE WEST MALL 8TH FLR - ETOBICOKE - M9C5J5	33485277	1093614475	0.030619
ROYAL BANK - 4011 NEW ST - BURLINGTON - L7L1S8	141536566	938671275	0.150784
ROYAL BANK - 4022 SHEPPARD AVE E - SCARBOROUGH - M1S1S6	39345262	657989125	0.059798
ROYAL BANK - 4056 DORCHESTER RD - NIAGARA FALLS - L2E6M9	24756204	619199265	0.039981
ROYAL BANK - 41 EAST MAIN ST - WELLAND - L3B3W4	43990477	731330155	0.060151
ROYAL BANK - 4141 DIXIE RD - MISSISSAUGA - L4W1V5	150928324	1026180520	0.147081
ROYAL BANK - 415 THE WESTWAY - ETOBICOKE - M9R1H5	115611990	850553190	0.135926
ROYAL BANK - 42 KING ST E - STONEY CREEK - L8G1K1	50230298	1147233495	0.043784
ROYAL BANK - 423 GUELPH LINE - BURLINGTON - L7R3L7	94819555	607882780	0.155983
ROYAL BANK - 4261 HIGHWAY 7 - MARKHAM - L3R9W6	130042681	923008195	0.14089
ROYAL BANK - 4310 ONTARIO ST - BEAMSVILLE - L0R1B0	89792948	697655595	0.128707
ROYAL BANK - 436 SUMMERHILL AVE - TORONTO - M4W2E4	162891904	801453470	0.203246
ROYAL BANK - 442 MCNICOLL AVE - NORTH YORK - M2H2E1	80106859	1110456585	0.072139
ROYAL BANK - 4430 BATHURST ST - NORTH YORK - M3H3S3	96811178	891141000	0.108637
ROYAL BANK - 4491 QUEEN ST - NIAGARA FALLS - L2E2L4	17722232	219810540	0.080625
ROYAL BANK - 4557 HURONTARIO ST - MISSISSAUGA - L4Z3M2	82818613	1235093220	0.067055

APPENDIX V: INDEX VALUES BY FINANCIAL FIRM

ROYAL BANK - 47 MAIN ST N - MARKHAM - L3P1X3	48459109	1142076105	0.042431
ROYAL BANK - 4720 JANE ST - NORTH YORK - M3N2L2	134234674	617195460	0.217491
ROYAL BANK - 4860 DUNDAS ST W - ETOBICOKE - M9A1B5	117774031	682423325	0.172582
ROYAL BANK - 4949 BATHURST ST - NORTH YORK - M2R1Y1	121626039	981819500	0.123878
ROYAL BANK - 5 FAIRVIEW MALL DR - NORTH YORK - M2J2Z1	116622030	1352206015	0.086246
ROYAL BANK - 5 HILLCROFT DR - MARKHAM - L3S1R6	118950813	929177345	0.128017
ROYAL BANK - 50 BRAMALEA RD - BRAMPTON - L6T2W8	9915425	487684835	0.020332
ROYAL BANK - 500 DUNDAS ST W - TORONTO - M5T1G9	20605253	137321920	0.150051
ROYAL BANK - 5001 YONGE ST - NORTH YORK - M2N6P6	75494060	826507625	0.091341
ROYAL BANK - 5080 SHEPPARD AVE E - SCARBOROUGH - M1S4N3	31395236	726002115	0.043244
ROYAL BANK - 52 FRONT ST N - THOROLO - L2V1X5	38778732	479049390	0.080949
ROYAL BANK - 549 KING ST E - OSHAWA - L1H1G3	215355099	1289760025	0.166973
ROYAL BANK - 55 KING ST E - BOWMANVILLE - L1C1N4	39934069	773113765	0.116326
ROYAL BANK - 55 ONTARIO ST S - MILTON - L9T2M3	109560241	717556760	0.152685
ROYAL BANK - 55 UNIVERSITY AVE - TORONTO - M5J2H7	19063199	193388235	0.098575
ROYAL BANK - 555 CONCESSION ST - HAMILTON - L8V1A8	51660324	494204485	0.104532
ROYAL BANK - 5640 YONGE ST - NORTH YORK - M2N6K7	117060655	627576220	0.186528
ROYAL BANK - 571 NIAGARA ST - WELLAND - L3C1L7	44076583	845300980	0.052143
ROYAL BANK - 5733 VICTORIA AVE - NIAGARA FALLS - L2G3L5	43900130	482680385	0.090951
ROYAL BANK - 59 CLARENCE ST W - PORT COLBORNE - L3K3G1	24042211	382256780	0.082895
ROYAL BANK - 59 WILSON ST W - ANCASTER - L9G1N1	258693725	797463620	0.324396
ROYAL BANK - 5968 BATHURST ST - NORTH YORK - M2R1Z1	256461593	1107191590	0.231633
ROYAL BANK - 6 SQ LANSING - NORTH YORK - M2J1T5	111991718	1063494130	0.105305
ROYAL BANK - 640 GLEN ERIN DR - MISSISSAUGA - L5N3M4	143781266	1539273505	0.093409
ROYAL BANK - 6205 AIRPORT RD - MISSISSAUGA - L4V1E1	1155417	26621840	0.043401
ROYAL BANK - 65 LOCKE ST S - HAMILTON - L8P4A3	64240545	621624085	0.103343
ROYAL BANK - 65 OVERLEA BLVD - TORONTO - M4H1P1	92003025	538987755	0.170696
ROYAL BANK - 650 DANFORTH AVE - TORONTO - M4K1R3	81001879	938106025	0.086346
ROYAL BANK - 6518 LUNDY'S LANE - NIAGARA FALLS - L2G1T6	65143355	666623425	0.097721
ROYAL BANK - 66 VAUGHAN RD - TORONTO - M6G2N4	94225240	814099505	0.115742
ROYAL BANK - 67 JARVIS ST - FORT ERIE - L2A2S3	15704139	434487775	0.036144
ROYAL BANK - 675 APPLEBY LINE - BURLINGTON - L7L2Y5	37629763	848815685	0.044332
ROYAL BANK - 6983 YONGE ST - NORTH YORK - M2M3X9	250280250	1138688845	0.219797
ROYAL BANK - 7 SUNNY MEADOW BLVD - BRAMPTON - L6R1W7	116100447	850428670	0.136552
ROYAL BANK - 70 KING ST W - DUNDAS - L9H1T8	157595338	1218476670	0.129338
ROYAL BANK - 700 MOUNT PLEASANT RD - TORONTO - M4S2N7	73635105	814594845	0.090395
ROYAL BANK - 700 UNIVERSITY AVE - TORONTO - M5G1Z5	2231796	83797550	0.026633
ROYAL BANK - 705 KINGSTON RD - PICKERING - L1V6K3	62122078	998069470	0.062242
ROYAL BANK - 7205 GOREWAY DR - MISSISSAUGA - L4T2T9	126970419	685692125	0.185171
ROYAL BANK - 730 MAIN ST E - HAMILTON - L8M1K9	41108130	513421385	0.080067
ROYAL BANK - 739 BROADVIEW AVE - TORONTO - M4K2P6	101022609	755465175	0.133722
ROYAL BANK - 7481 WOODBINE AVE - MARKHAM - L3R2W1	4345531	242101805	0.017949
ROYAL BANK - 75 RYLANDER BLVD - SCARBOROUGH - M1B5M5	227421461	1177973160	0.193062
ROYAL BANK - 752 UPPER JAMES ST - HAMILTON - L9C3A2	149588206	1087150150	0.137578
ROYAL BANK - 7733 KEELE ST - CONCORD - L4K1Y5	8597370	211656275	0.040619
ROYAL BANK - 7750 KENNEDY RD - MARKHAM - L3R0A7	55153947	588599835	0.093704
ROYAL BANK - 8 NASHVILLE RD - KLEINBURG - L0J1C0	24293887	607762590	0.039973
ROYAL BANK - 8 QUEEN ST N - BOLTON - L7E1C8	101757124	1683417135	0.061174
ROYAL BANK - 801 MOHAWK RD W - HAMILTON - L9C6C2	278823386	1139250115	0.244742
ROYAL BANK - 803 O'CONNOR DR - EAST YORK - M4B2S7	68835841	698490820	0.098832
ROYAL BANK - 810 UPPER GAGE AVE - HAMILTON - L8V4K4	62242446	1125619500	0.055296
ROYAL BANK - 8165 YONGE ST - THORNHILL - L3T2C6	73350164	1052508890	0.089691
ROYAL BANK - 8170 SQ CUMMINGTON W - NIAGARA FALLS - L2G6V9	57789377	143718675	0.401967
ROYAL BANK - 8177 TORBRAM RD - BRAMPTON - L6T5C5	85773734	658530640	0.130225
ROYAL BANK - 83 MAIN ST S - GEORGETOWN - L7G3E5	123420188	1008258250	0.122409
ROYAL BANK - 833 COLLEGE ST - TORONTO - M6H1A1	42823520	453984070	0.094328
ROYAL BANK - 85 WALTON ST - PORT HOPE - L1A1N4	2442586	28811840	0.084777
ROYAL BANK - 87 AVENUE RD - TORONTO - M5R3R9	81701915	642965825	0.12707
ROYAL BANK - 880 EGLINTON AVE W - TORONTO - M6C2B6	122534227	949314440	0.129077
ROYAL BANK - 885 SHEPPARD AVE W - NORTH YORK - M3H2T4	155436472	703861340	0.220834
ROYAL BANK - 89 ST. PAUL ST - ST CATHARINES - L2R3M3	61969810	689569300	0.089867
ROYAL BANK - 901 JANE ST - YORK - M6N4C6	57868276	742846245	0.077901
ROYAL BANK - 907 ALNESS ST - NORTH YORK - M3J2J1	24389269	438101450	0.05567
ROYAL BANK - 91 ST. PAUL ST - ST CATHARINES - L2R3M3	62514395	709541820	0.088105
ROYAL BANK - 918 DUNDAS ST E - MISSISSAUGA - L4Y4H9	79478815	814598290	0.129318
ROYAL BANK - 935 ST CLAIR AVE W - TORONTO - M6C1C7	44705156	628496795	0.07113
ROYAL BANK - 9555 YONGE ST - RICHMOND HILL - L4C9M5	173445261	1705534185	0.101696
ROYAL BANK - 959 WESTNEY RD S - AJAX - L1S3K7	114644238	883472855	0.129765
ROYAL BANK - 972 BLOOR ST W - TORONTO - M6H1L6	48783477	442453570	0.110257
ROYAL BANK - 996 KINGSTON RD - TORONTO - M4E1T2	93148302	901311435	0.103348
ROYAL BANK - 997 GERRARD ST E - TORONTO - M4M1Z4	95566818	754317730	0.126693
ROYAL BANK - CAMBORO RD - FENWICK - L0S1C0	54548226	353416920	0.154345
Average	79395675	766544017	0.104130339
Min	476980	18592740	0.010105
Max	278823386	1705534185	0.401967
Std Dev	54385443.81	336514697.8	0.061063187

Toronto Dominion Bank

Branch Name and Location	Probable Dollars	Total Dollars	Opportunity Index
TORONTO-DOMINION BANK - 1 BARTLEY BULL PKY - BRAMPTON - L6W3T7	161143579	1019475750	0.158065
TORONTO-DOMINION BANK - 1 BROCK ST W - UXBRIDGE - L9P1P6	92772987	475296815	0.19519
TORONTO-DOMINION BANK - 1 KING ST W - TORONTO - M5H1A1	9315408	239276875	0.038932
TORONTO-DOMINION BANK - 1 MASSEYFIELD GATE - MARKHAM - L3R3M8	27959611	517322205	0.054046
TORONTO-DOMINION BANK - 1 QUEEN ST E - BRAMPTON - L6W2A7	84481163	1329641385	0.063537
TORONTO-DOMINION BANK - 100 CONSILIUM PL - SCARBOROUGH - M1H3E3	11896738	764970005	0.015552
TORONTO-DOMINION BANK - 100 KING ST W - HAMILTON - L8P4W9	25858229	419199815	0.061685
TORONTO DOMINION GENERAL INS - 100 WELLINGTON ST FL 6 - TORONTO - M5K1A-	4136972	18592740	0.222505
TORONTO-DOMINION BANK - 1005 KING ST W - HAMILTON - L8S1L3	91002535	789632115	0.115247
TORONTO-DOMINION BANK - 1011 UPPER MIDDLE RD E - OAKVILLE - L6H4L2	161018331	979967080	0.16431
TORONTO-DOMINION BANK - 10198 YONGE ST - RICHMOND HILL - L4C3B6	78648656	1494110425	0.052639
TORONTO-DOMINION BANK - 10451 BRAMALEA RD - BRAMPTON - L6T3S1	121476469	1192264715	0.101887
TORONTO-DOMINION BANK - 105 BAYLY ST W - AJAX - L1S7K7	178422251	1344916595	0.132664
TORONTO-DOMINION BANK - 1050 COXWELL AVE - EAST YORK - M4C3G5	65543523	743090020	0.088204
TORONTO-DOMINION BANK - 1050 WILSON AVE - NORTH YORK - M3K1G6	64733953	655150360	0.098808
TORONTO-DOMINION BANK - 1053 SIMCOE ST S - OSHAWA - L1H4L4	49714469	575890230	0.086326
TORONTO-DOMINION BANK - 1068 PAPE AVE - EAST YORK - M4K3W5	88636414	718441665	0.123373
TORONTO-DOMINION BANK - 1077 NORTH SERVICE RD - MISSISSAUGA - L4Y1A6	55499311	564562530	0.098305
TORONTO-DOMINION BANK - 10909 YONGE ST - RICHMOND HILL - L4C3E3	147616761	809679125	0.182315
TORONTO-DOMINION BANK - 1111 DAVIS DR - NEWMARKET - L3Y7V1	109061787	1033537150	0.105523
TORONTO-DOMINION BANK - 1140 DUNDAS ST W - TORONTO - M6J1X2	42602892	554368520	0.076849
TORONTO-DOMINION BANK - 1145 DUNDAS ST E - MISSISSAUGA - L4Y2C3	53844518	782117130	0.068845
TORONTO-DOMINION BANK - 1148 YONGE ST - TORONTO - M4W2M1	88063892	1123555580	0.07838
TORONTO-DOMINION BANK - 1151 DUNDAS ST W - MISSISSAUGA - L5C1C6	261265935	1173440305	0.22285
TORONTO-DOMINION BANK - 1169 ST CLAIR AVE W - TORONTO - M6E1B2	69958509	529806315	0.132045
TORONTO-DOMINION BANK - 119 OSLER DR - DUNDAS - L9H6X4	180917168	1084937945	0.166753
TORONTO-DOMINION BANK - 120 BLOOR ST E - TORONTO - M4W1B7	55105997	790299980	0.069728
TORONTO-DOMINION BANK - 120 ELLESMERE RD - SCARBOROUGH - M1R4C4	120604347	889280745	0.13562
TORONTO-DOMINION BANK - 1235 FAIRVIEW ST - BURLINGTON - L7S1Y3	79889690	901149145	0.088653
TORONTO-DOMINION BANK - 124 WOODBRIDGE AVE - WOODBRIDGE - L4L2S7	68993478	686749515	0.100464
TORONTO-DOMINION BANK - 1245 DUPONT ST - TORONTO - M6H2A6	37240968	476251240	0.078196
TORONTO-DOMINION BANK - 1277 YORK MILLS RD - NORTH YORK - M3A1Z5	143882485	947393645	0.151872
TORONTO-DOMINION BANK - 1300 KING ST E - OSHAWA - L1H8J4	124491700	927811050	0.134178
TORONTO-DOMINION BANK - 13075 YONGE ST - RICHMOND HILL - L4E1A8	181026176	759883925	0.238235
TORONTO-DOMINION BANK - 1315 THE QUEENSWAY - ETOBICOKE - M8Z1S8	12748398	280811450	0.045398
TORONTO-DOMINION BANK - 13305 HIGHWAY 27 N - NOBLETON - LOG1N0	44026038	1095431500	0.040191
TORONTO-DOMINION BANK - 135 QUEEN ST N - STREETSVILLE - L5N1A5	16818475	1483216235	0.011339
TORONTO-DOMINION BANK - 1355 KINGSTON RD - PICKERING - L1V1B8	134563794	1035083090	0.130005
TORONTO-DOMINION BANK - 141 ADELAIDE ST W 5TH FLR - TORONTO - M5H3L5	274532	32913530	0.089341
TORONTO-DOMINION BANK - 1415 LAWRENCE AVE W - NORTH YORK - M6L1A9	45645470	567409265	0.080445
TORONTO-DOMINION BANK - 1435 QUEEN ST W - TORONTO - M6R1A1	103879163	623172490	0.166694
TORONTO-DOMINION BANK - 1439 PELHAM ST - FORTHILL - L0S1E5	50601977	360553435	0.140345
TORONTO-DOMINION BANK - 144 EAST MAIN ST - WELLAND - L3B3W6	48268448	740375265	0.065195
TORONTO-DOMINION BANK - 1448 KINGSTON RD - SCARBOROUGH - M1N1R6	94130717	587352125	0.160263
TORONTO-DOMINION BANK - 1450 CLARK AVE W - THORNHILL - L4J7R5	108165664	890099510	0.121521
TORONTO-DOMINION BANK - 1470 DON MILLS RD - NORTH YORK - M3B2X9	31465464	995554005	0.031606
TORONTO-DOMINION BANK - 1492 VICTORIA PARK AVE - NORTH YORK - M4A2M6	54501539	681612930	0.07998
TORONTO-DOMINION BANK - 15 EGLINTON AVE E - TORONTO - M4P1A1	72406064	781533640	0.092646
TORONTO-DOMINION BANK - 1500 MEYERSIDE DR - MISSISSAUGA - L5T1V4	271439	9552140	0.028417
TORONTO-DOMINION BANK - 1500 UPPER MIDDLE RD - BURLINGTON - L7P3P5	118223305	991919925	0.119186
TORONTO-DOMINION BANK - 1500 UPPER MIDDLE RD W - OAKVILLE - L6M3G3	111268558	754419405	0.147489
TORONTO-DOMINION BANK - 151 GILMORE RD - FORT ERIE - L2A2M2	34061742	434487775	0.078395
TORONTO-DOMINION BANK - 1515 REBECCA ST - OAKVILLE - L6L5G8	44058138	822890035	0.053541
TORONTO-DOMINION BANK - 15255 YONGE ST - AURORA - L4G1N5	168651453	1211786535	0.139176
TORONTO DOMINION BANK - 15440 BAYVIEW AVE - AURORA - L4G7J1	15466731	538862080	0.028703
TORONTO-DOMINION BANK - 1591 BAYVIEW AVE - EAST YORK - M4G3B5	109684245	935712315	0.11722
TORONTO-DOMINION BANK - 1601 WILSON AVE - NORTH YORK - M3L1A5	72151397	677584565	0.106486
TORONTO-DOMINION BANK - 161 KING ST E - TORONTO - M5C1G9	51572636	270172750	0.190888
TORONTO-DOMINION BANK - 1635 AVENUE RD - NORTH YORK - M5M3X8	51887693	888746085	0.058383
TORONTO-DOMINION BANK - 165 AVE & DAVENPORT RD - TORONTO - M5R2H7	98502865	688343165	0.143101
TORONTO-DOMINION BANK - 166 LAKESHORE RD E - OAKVILLE - L6J1H6	23590919	525694455	0.044876
TORONTO-DOMINION BANK - 1661 DENISON ST - MARKHAM - L3R6E4	114350151	679381265	0.168315
TORONTO-DOMINION BANK - 16655 YONGE ST - NEWMARKET - L3X1V6	77743613	998201220	0.077884
TORONTO-DOMINION BANK - 1700 LANGSTAFF RD - CONCORD - L4K3S3	30165614	406949030	0.074126
TORONTO-DOMINION BANK - 1705 AVENUE RD - NORTH YORK - M5M3Y5	39646951	771487650	0.05139
TORONTO DOMINION BANK - 1735 KIPLING AVE - ETOBICOKE - M9R2Y8	124805540	827751100	0.150777
TORONTO-DOMINION BANK - 1746 JANE ST - YORK - M9N2S9	91370523	681414930	0.134089
TORONTO-DOMINION BANK - 175 QUEEN ST S - STREETSVILLE - L5M1L2	111723649	955649365	0.116909
TORONTO-DOMINION BANK - 17600 YONGE ST - NEWMARKET - L3Y4Z1	70632042	811674775	0.08702
TORONTO-DOMINION BANK - 1800 SHEPPARD AVE E - NORTH YORK - M2J5A7	181850595	1243246855	0.146271
TORONTO-DOMINION BANK - 1822 WHITES RD - PICKERING - L1V4M1	229899648	1005241380	0.228701
TORONTO-DOMINION BANK - 1840 EGLINTON AVE W - YORK - M6E2J4	38197354	436660505	0.087476
TORONTO-DOMINION BANK - 188 HOLLAND ST W - BRADFORD - L3Z1H7	97469251	1010988725	0.096418
TORONTO-DOMINION BANK - 1900 DIXIE RD - PICKERING - L1V6M4	137556446	1538739215	0.089396
TORONTO-DOMINION BANK - 1900 ELLESMERE RD - SCARBOROUGH - M1H2V6	13386095	435029265	0.030771

APPENDIX V: INDEX VALUES BY FINANCIAL FIRM

TORONTO-DOMINION BANK - 1900 LAKESHORE RD W - MISSISSAUGA - L5J1J7	138061958	1082293060	0.127584
TORONTO-DOMINION BANK - 19132 CENTRE ST - MOUNT ALBERT - L0G1M0	127535460	1082922685	0.117777
TORONTO-DOMINION BANK - 194 JAMES ST S - HAMILTON - L8P3A7	63943294	550110350	0.116237
TORONTO-DOMINION BANK - 1985 YONGE ST - TORONTO - M4S1Z6	98294571	805592755	0.162311
TORONTO-DOMINION BANK - 2 ST CLAIR AVE E - TORONTO - M4T2T5	139772440	1232438740	0.113411
TORONTO-DOMINION BANK - 20 MAIN ST E - GRIMSBY - L3M1M9	80914285	661808275	0.122262
TORONTO-DOMINION BANK - 20 MILVERTON DR - MISSISSAUGA - L5R3G2	17286069	333078955	0.051898
TORONTO-DOMINION BANK - 2025 GUELPH LINE - BURLINGTON - L7P4X4	174380640	1317310450	0.132376
TORONTO-DOMINION BANK - 2038 KIPLING AVE - ETOBICOKE - M9W4K1	12014484	510220700	0.023548
TORONTO-DOMINION BANK - 205 QUEEN ST - DUNNVILLE - N1A1H8	2378200	26600470	0.089404
TORONTO-DOMINION BANK - 2080 DANFORTH AVE - TORONTO - M4C1J9	95072662	878521640	0.108219
TORONTO-DOMINION BANK - 20865 DALTON RD - SUTTON WEST - L0E1R0	111717828	647988235	0.172413
TORONTO-DOMINION BANK - 2101 BRIMLEY RD - SCARBOROUGH - M1S2B4	46498235	459000960	0.101303
TORONTO-DOMINION BANK - 211 MAIN ST S - NEWMARKET - L3Y3Y9	125821653	1166660915	0.107848
TORONTO-DOMINION BANK - 2159 WESTON RD - YORK - M9N1X8	37270365	588245820	0.083358
TORONTO-DOMINION BANK - 2169 QUEEN ST E - TORONTO - M4L1J1	82034812	870738860	0.094213
TORONTO-DOMINION BANK - 2201 FINCH AVE W - NORTH YORK - M9M2Y9	5195766	646655700	0.008035
TORONTO-DOMINION BANK - 221 GLENDALE AVE - ST CATHARINES - L2T2K9	145542751	818817185	0.177448
TORONTO-DOMINION BANK - 2220 BLOOR ST W - TORONTO - M6S1N6	84495289	689789755	0.122494
TORONTO-DOMINION BANK - 2263 YONGE ST - TORONTO - M4P2C6	79211364	871137340	0.090929
TORONTO-DOMINION BANK - 230 SANDALWOOD PKY E - BRAMPTON - L6Z1R3	85730323	1303521380	0.065768
TORONTO-DOMINION BANK - 231 GUELPH ST - GEORGETOWN - L7G4A8	107649028	933181225	0.115357
TORONTO-DOMINION BANK - 235 QUEEN ST E - TORONTO - M5A1S5	42364319	397054885	0.106896
TORONTO-DOMINION BANK - 2400 DUNDAS ST W - MISSISSAUGA - L5K2R8	171546855	1395974115	0.122887
TORONTO-DOMINION BANK - 2425 TRUSCOTT DR - MISSISSAUGA - L5J2B4	210273345	1333219060	0.157719
TORONTO-DOMINION BANK - 2428 EGLINTON AVE E - SCARBOROUGH - M1K2P7	104900764	858953045	0.122126
TORONTO-DOMINION BANK - 2440 BLOOR ST W - TORONTO - M6S1P9	48588290	731373405	0.066434
TORONTO-DOMINION BANK - 2440 FINCH AVE W - NORTH YORK - M9M2E1	43505791	508129415	0.08562
TORONTO-DOMINION BANK - 2447 LAKESHORE RD W - OAKVILLE - L6L1H6	239262196	820271930	0.291686
TORONTO-DOMINION BANK - 245 KING ST W - OSHAWA - L1J2J7	38027136	906174480	0.041964
TORONTO-DOMINION BANK - 246 MARLEE AVE - NORTH YORK - M6B3H7	56833478	551161685	0.103116
TORONTO-DOMINION BANK - 25 THE WEST MALL - ETOBICOKE - M9C1B8	26923703	367588805	0.073244
TORONTO-DOMINION BANK - 250 WINCOTT DR - ETOBICOKE - M9R2R5	107764712	1259509885	0.085561
TORONTO-DOMINION BANK - 2535 MAJOR MACKENZIE DR - MAPLE - L6A1C6	29274670	567440245	0.051591
TORONTO-DOMINION BANK - 255 DUNDAS ST SS 4 - WATERDOWN - L0R2H6	149503417	635480015	0.235261
TORONTO-DOMINION BANK - 255 MORNINGSIDE AVE - SCARBOROUGH - M1E3E6	120978131	764558940	0.158233
TORONTO-DOMINION BANK - 2550 HURONTARIO ST - MISSISSAUGA - L5B1N5	120961543	1270665735	0.095195
TORONTO-DOMINION BANK - 2561 VICTORIA PARK AVE - SCARBOROUGH - M1T1A4	68965013	938557650	0.07348
TORONTO-DOMINION BANK - 2574 FINCH AVE W - NORTH YORK - M9M2G3	62360626	820896035	0.075967
TORONTO-DOMINION BANK - 2623 EGLINTON AVE W - YORK - M6M1T6	58141230	520594100	0.107841
TORONTO-DOMINION BANK - 267 COLLEGE ST - TORONTO - M5T1R6	13000540	129884595	0.100247
TORONTO-DOMINION BANK - 2690 ERIN CENTRE BLVD - MISSISSAUGA - L5M5P5	63164522	1068273235	0.059128
TORONTO-DOMINION BANK - 270 GENEVA ST - ST CATHARINES - L2N2E8	66020534	722140960	0.091423
TORONTO-DOMINION BANK - 2700 KIPLING AVE - ETOBICOKE - M9V4P2	95754586	847281265	0.113014
TORONTO-DOMINION BANK - 2709 JANE ST - NORTH YORK - M3L1S3	175223973	899602780	0.194779
TORONTO-DOMINION BANK - 271 PORT UNION RD - SCARBOROUGH - M1C2L3	69720764	991791480	0.070298
TORONTO-DOMINION BANK - 274 COXWELL AVE - TORONTO - M4L3B6	143812991	819801105	0.175424
TORONTO-DOMINION BANK - 277 CARLISLE RD SS 2 - CARLISLE - L0R1H2	118892739	459042760	0.259001
TORONTO-DOMINION BANK - 2793 BATHURST ST - NORTH YORK - M6B3A4	55886609	657741215	0.084967
TORONTO-DOMINION BANK - 280 SHEPPARD AVE E - NORTH YORK - M2N3B1	55294748	1124573585	0.04917
TORONTO-DOMINION BANK - 2802 LAKE SHORE BLVD W - ETOBICOKE - M8V1H5	42560262	433163275	0.098255
TORONTO-DOMINION BANK - 283 LAKESHORE RD E - OAKVILLE - L6J1J3	83008277	611291045	0.135792
TORONTO-DOMINION BANK - 285 TAUNTON RD E - OSHAWA - L1G3V2	203606404	946822585	0.215042
TORONTO-DOMINION BANK - 2857 KINGSTON RD - SCARBOROUGH - M1M1N3	59703469	665467980	0.089717
TORONTO-DOMINION BANK - 290 KENILWORTH AVE N - HAMILTON - L8H4S9	25447071	410658610	0.061966
TORONTO-DOMINION BANK - 2945 DUNDAS ST W - TORONTO - M6P1Z2	61689317	670141610	0.092054
TORONTO-DOMINION BANK - 2948 FINCH AVE E - SCARBOROUGH - M1W2T4	99624832	1050625880	0.094824
TORONTO-DOMINION BANK - 295 QUEEN ST E - BRAMPTON - L6W3R1	75202268	1286154430	0.058471
TORONTO-DOMINION BANK - 2951 BLOOR ST W - ETOBICOKE - M8X1B8	72777932	661941150	0.109946
TORONTO-DOMINION BANK - 3 WOOTTEN WAY N - MARKHAM - L3P2Y2	198129944	1073242725	0.184609
TORONTO-DOMINION BANK - 300 BOROUGH DR - SCARBOROUGH - M1P4P5	19738644	352513850	0.055994
TORONTO-DOMINION BANK - 3003 LAKE SHORE BLVD W - ETOBICOKE - M8V1K2	39523909	440350740	0.089756
TORONTO-DOMINION BANK - 301 QUEEN ST S - BOLTON - L7E2B2	202781483	1593988095	0.127216
TORONTO-DOMINION BANK - 3060 YONGE ST - TORONTO - M4N2K6	109908332	1005482045	0.109308
TORONTO-DOMINION BANK - 3080 WINDWOOD DR - MISSISSAUGA - L5N2K5	150284126	1395193185	0.107716
TORONTO-DOMINION BANK - 31 QUEEN ST - ST CATHARINES - L2R5G4	57488012	695861405	0.082814
TORONTO-DOMINION BANK - 310 MAIN ST E - MILTON - L9T1P4	74972217	771352780	0.097196
TORONTO-DOMINION BANK - 3100 ST CLAIR AVE E - SCARBOROUGH - M1L1V6	83711686	708234870	0.118198
TORONTO-DOMINION BANK - 313 EGLINTON AVE W - TORONTO - M5N1A1	56387858	833911135	0.067619
TORONTO-DOMINION BANK - 3140 DUFFERIN ST - NORTH YORK - M6A2T1	22207799	283452465	0.078348
TORONTO-DOMINION BANK - 3174 YONGE ST - TORONTO - M4N2L1	137591479	1026420420	0.13405
TORONTO-DOMINION BANK - 321 IROQUOIS SHORE RD - OAKVILLE - L6H1M3	44258433	1082989180	0.040865
TORONTO-DOMINION BANK - 321 MOORE AVE - EAST YORK - M4G3T6	47059582	619182195	0.076003
TORONTO-DOMINION BANK - 325 CENTRAL PKY W - MISSISSAUGA - L5B3X9	135344059	953075710	0.142008
TORONTO-DOMINION BANK - 327 BURNHAMTHORPE RD - ETOBICOKE - M9B2A2	97503859	937173550	0.10404
TORONTO-DOMINION BANK - 3275 BAYVIEW AVE - NORTH YORK - M2K1G4	144957097	1062953050	0.136372

0.056653	TORONTO-DOMINION BANK - 330 GRAYS RD - HAMILTON - LB351	462572.10	816505070
0.048084	TORONTO-DOMINION BANK - 3300 BLOOR ST W - ETOBICOKE - M8X2W8	26319903	547377.110
0.16758	TORONTO-DOMINION BANK - 3415 DIXIE RD - MISSISSAUGA - L4Y2B1	181372449	1082305855
0.110648	TORONTO-DOMINION BANK - 3415 YONGE ST - NORTH YORK - M4N2M8	101894808	920879245
0.155931	TORONTO-DOMINION BANK - 3422 DUNDAS ST W - YORK - M6S2S1	92038246	590250715
0.082745	TORONTO-DOMINION BANK - 3450 DANFORTH AVE - SCARBOROUGH - M1L1E1	68297935	825400715
0.049254	TORONTO-DOMINION BANK - 346 LAKE ST - ST CATHARINES - L2M4H4	48021545	974982675
0.063933	TORONTO-DOMINION BANK - 3487 KINGSTON RD - SCARBOROUGH - M1M1R4	49142008	786646895
0.112886	TORONTO-DOMINION BANK - 3567 LAKE SHORE BLVD W - ETOBICOKE - M8W1P4	66693237	599297800
0.052920	TORONTO-DOMINION BANK - 3643 CAYTHRA RD - MISSISSAUGA - L5A2Y4	472620205	89248400
0.154859	TORONTO-DOMINION BANK - 3757 BATHURST ST - NORTH YORK - M3H3M5	108199544	696991990
0.10917	TORONTO-DOMINION BANK - 3850 SHEPPARD AVE E - SCARBOROUGH - M1T1A4	72845917	667268495
0.099617	TORONTO-DOMINION BANK - 39 TEMPERANCE ST - BOWMANVILLE - L1C3A5	77015566	773119765
0.067442	TORONTO-DOMINION BANK - 3930 MONTROSE RD - NIAGARA FALLS - L2H3C9	38007366	565558385
0.138223	TORONTO-DOMINION BANK - 3931 KEELE ST - NORTH YORK - M3J1N6	93106181	673994835
0.093109	TORONTO-DOMINION BANK - 4 KING ST W - OSHAWA - L1H1A3	83042583	891884410
0.0313	TORONTO-DOMINION BANK - 4031 FAIRVIEW ST - BURLINGTON - L7L2A4	30305845	968247955
0.157024	TORONTO-DOMINION BANK - 4141 DIXIE RD - MISSISSAUGA - L4W1V5	147229660	942062015
0.095425	TORONTO-DOMINION BANK - 420 BLOOR ST E - TORONTO - M4W1H4	92942213	973979530
0.108113	TORONTO-DOMINION BANK - 421 DONLANDS AVE - EAST YORK - M4J3S2	72123421	667108615
0.120321	TORONTO-DOMINION BANK - 421 RONCESVALLES AVE - TORONTO - M6R2N1	76243076	633663595
0.103411	TORONTO-DOMINION BANK - 4242 DUNDAS ST W - ETOBICOKE - M8X1Y8	78528640	759383835
0.050131	TORONTO-DOMINION BANK - 430 BROWN LINE - ETOBICOKE - M8W219	25614777	510961085
0.04069	TORONTO-DOMINION BANK - 432 ABERDEEN AVE - HAMILTON - L8F2S2	33386350	820510510
0.086785	TORONTO-DOMINION BANK - 441 CLARK AVE W - THORNHILL - L4J8W7	13820264	1592538015
0.058832	TORONTO-DOMINION BANK - 4424 QUEEN ST - NIAGARA FALLS - L2E2L3	17701449	257169005
0.053648	TORONTO-DOMINION BANK - 443 QUEEN ST W - TORONTO - M5V2B1	9070968	189084480
0.042281	TORONTO-DOMINION BANK & TRUST - 446 SPADINA RD - TORONTO - M5P3M2	45003793	1064489405
0.04218	TORONTO-DOMINION BANK - 4499 HIGHWAY 7 - WOODBRIDGE - L4Y9A9	40597956	962491050
0.04811	TORONTO-DOMINION BANK - 453 GUELPH LINE - BURLINGTON - L7R3L8	93241614	567296880
0.164352	TORONTO-DOMINION BANK - 465 UNIVERSITY AVE - TORONTO - M5C1W8	12302440	144449520
0.049785	TORONTO-DOMINION BANK - 469 WILSON ST E - ANCASTER - L9G2G4	55341753	1111609000
0.011971	TORONTO-DOMINION BANK - 4700 KEELER ST - NORTH YORK - M3J1P3	5774860	482420870
0.059703	TORONTO-DOMINION BANK - 480 DANFORTH AVE - TORONTO - M2X2K4	44901192	752073535
0.163913	TORONTO-DOMINION BANK - 4841 YONGE ST - NORTH YORK - M2N5X2	136802918	836646215
0.120315	TORONTO-DOMINION BANK - 49 LAPSEY RD - SCARBOROUGH - M1B1K1	110520698	91859775
0.064288	TORONTO-DOMINION BANK - 50 FIRWOOD CRES - ETOBICOKE - M9B2W2	69699129	1084202805
0.049478	TORONTO-DOMINION BANK - 50 INSIDE CRES - SCARBOROUGH - M1X1G4	28496398	575942330
0.13286	TORONTO-DOMINION BANK - 500 HIGHWAY 7 E - RICHMOND HILL - L4B1J1	11986865	866630340
0.028518	TORONTO-DOMINION BANK - 5055 STEELES AVE E - SCARBOROUGH - M1V5K1	29572882	103697395
0.125692	TORONTO-DOMINION BANK - 501 DUNDAS ST W - TORONTO - M5T1H1	16766748	133395655
0.109078	TORONTO-DOMINION BANK - 501 ROGERS RD - YORK - M6M1B4	46618879	427353910
0.161254	TORONTO-DOMINION BANK - 510 ST CLAIR AVE W - TORONTO - M6C1A2	130981375	812413120
0.051834	TORONTO-DOMINION BANK - 5150 YONGE ST - NORTH YORK - M2N6L8	43875594	818465960
0.115222	TORONTO-DOMINION BANK - 518 EGLINTON AVE W - TORONTO - M5N1A5	94226838	817803910
0.046759	TORONTO-DOMINION BANK - 54 KING ST E - STONEY CREEK - L8G1K2	52507056	1122927185
0.110402	TORONTO-DOMINION BANK - 540 CONCESSION & E 21ST - HAMILTON - L8V1A9	551818158	497181618
0.01313	TORONTO-DOMINION BANK - 545 STEELES AVE W - BRAMPTON - L6Y4E7	15283033	487808920
0.011669	TORONTO-DOMINION BANK - 55 KING ST W - TORONTO - M3J1P3	4778621	409524955
0.089723	TORONTO-DOMINION BANK - 565 BLOOR ST W - TORONTO - M5S1Y6	48660442	542338530
0.061681	TORONTO-DOMINION BANK - 5650 YONGE ST - NORTH YORK - M2M4G3	48674401	786797870
0.0539375	TORONTO-DOMINION BANK - 5762 HIGHWAY NO 7 - MARKHAM - L3P1A7	69017930	1293073590
0.030668	TORONTO-DOMINION BANK - 5799 MAIN ST - NIAGARA FALLS - L2G5Z6	22722830	740975860
0.089878	TORONTO-DOMINION BANK - 580 SHEPPARD AVE W - NORTH YORK - M3M2S1	8586586	859918725
0.050913	TORONTO-DOMINION BANK - 5875 LESLIE ST - NORTH YORK - M2H1J8	58865470	1175845760
0.35279	TORONTO-DOMINION BANK - 5922 STOUFFVILLE - L4A2S8	88384178	578469760
0.053494	TORONTO-DOMINION BANK - 5928 YONGE ST - NORTH YORK - M2M3V9	58865068	1100412225
0.16577	TORONTO-DOMINION BANK - 601 KING ST E - OSHAWA - L1H1G3	223459842	1348009175
0.193248	TORONTO-DOMINION BANK - 6085 CREDITVIEW RD - MISSISSAUGA - L5Z2A8	77541875	401256470
0.11764	TORONTO-DOMINION BANK - 61 UNDERHILL DR - NORTH YORK - M3A2J8	117549153	989226915
0.120741	TORONTO-DOMINION BANK - 620 BLOOR ST - MISSISSAUGA - L5A3V9	91079344	7541336125
0.13244	TORONTO-DOMINION BANK - 6209 BATHURST ST - NORTH YORK - M2R2A5	198320559	1497441155
0.080835	TORONTO-DOMINION BANK - 6212 MAIN ST - STOUFFVILLE - L4A2S4	47082695	773938485
0.110282	TORONTO-DOMINION BANK - 65 MALL RD - HAMILTON - L8V8B3	121223269	11100111780
0.111688	TORONTO-DOMINION BANK - 65 WELLESLEY ST E - TORONTO - M4Y1G7	74489455	666941095
0.059203	TORONTO-DOMINION BANK - 656 EGLINTON AVE E - TORONTO - M4P1P1	50502124	853051600
0.100992	TORONTO-DOMINION BANK - 657 DUPONT ST - TORONTO - M6G1Z4	46912157	464514525
0.008411	TORONTO-DOMINION BANK - 6575 AIRPORT RD - MISSISSAUGA - L4V1E5	2531485	300958935
0.081271	TORONTO-DOMINION BANK - 658 DANFORTH AVE - TORONTO - M4J5B9	72634648	893738245

APPENDIX V: INDEX VALUES BY FINANCIAL FIRM

TORONTO-DOMINION BANK - 668 KING ST W - TORONTO - M5V1M7	15210342	223948020	0.067919	
TORONTO-DOMINION BANK - 6700 FINCH AVE W - ETOBICOKE - M9W5P5	72009767	883117555	0.08154	
TORONTO-DOMINION BANK - 679 UPPER JAMES ST - HAMILTON - L9C2Z4	75491612	838326430	0.09005	
TORONTO-DOMINION BANK - 686 QUEEN ST W - TORONTO - M6J1E7	37736868	312147020	0.120895	
TORONTO-DOMINION BANK - 687 ST CLAIR AVE W - TORONTO - M6C1B2	104343098	718279305	0.145268	
TORONTO-DOMINION BANK - 697 MCCOWAN RD - SCARBOROUGH - M1J1K2	63878763	807765930	0.079079	
TORONTO-DOMINION BANK - 7 GLENDINNING AVE - SCARBOROUGH - M1W3E2	65181208	705732640	0.09236	
TORONTO-DOMINION BANK - 70 UNIVERSITY AVE - TORONTO - M5J2M4	18030547	333811955	0.054014	
TORONTO-DOMINION BANK - 70 WALTON ST - PORT HOPE - L1A1N3	2414866	28811840	0.083815	
TORONTO-DOMINION BANK - 7085 WOODBINE AV - MARKHAM - L3R1A3	34435321	816873360	0.042155	
TORONTO-DOMINION BANK - 7205 GOREWAY DR - MISSISSAUGA - L4T2T9	126156841	874293720	0.187095	
TORONTO-DOMINION BANK - 742 THE QUEENSWAY - ETOBICOKE - M8Y1L5	66638693	548637525	0.121418	
TORONTO-DOMINION BANK - 77 BLOOR ST W - TORONTO - M5S1M2	32889447	558119155	0.058929	
TORONTO-DOMINION BANK - 7766 MARTIN GROVE RD - WOODBRIDGE - L4L2C7	169113871	691154000	0.244683	
TORONTO-DOMINION BANK - 777 BAY ST - TORONTO - M5G2C8	17729244	292429000	0.060628	
TORONTO-DOMINION BANK - 800 BURNHAMTHORPE RD W - MISSISSAUGA - L5C2R9	85812419	915151920	0.093788	
TORONTO-DOMINION BANK - 800 NIAGARA ST - WELLAND - L3C5Z4	77377334	605039755	0.127888	
TORONTO-DOMINION BANK - 801 YORK MILLS RD - NORTH YORK - M3B1X7	55128394	1088927955	0.050626	
TORONTO-DOMINION BANK - 8125 DIXIE RD - BRAMPTON - L6T2J9	21396979	1119971775	0.019105	
TORONTO-DOMINION BANK - 846 EGLINTON AVE W - TORONTO - M6C2B7	121097013	906895430	0.133529	
TORONTO-DOMINION BANK - 8601 WARDEN AVE - MARKHAM - L3R0B5	115205781	907620995	0.126932	
TORONTO-DOMINION BANK - 878 EGLINTON AVE E - EAST YORK - M4G2L1	58506186	563798575	0.103771	
TORONTO-DOMINION BANK - 88 LAKESHORE RD E - PORT CREDIT - L5G1E1	140544466	694664280	0.20232	
TORONTO-DOMINION BANK - 890 DANFORTH AVE - TORONTO - M4J1L9	61561615	678510935	0.09073	
TORONTO-DOMINION BANK - 900 MIDDLEFIELD RD - SCARBOROUGH - M1V4X1	16605684	618926545	0.02683	
TORONTO-DOMINION BANK - 904 QUEEN ST E - TORONTO - M4M1J3	33587468	496156015	0.067695	
TORONTO-DOMINION BANK - 9350 YONGE ST - RICHMOND HILL - L4C5G2	174459040	1343084945	0.129898	
TORONTO-DOMINION BANK - 939 LAWRENCE AVE E - NORTH YORK - M3C1P8	115491640	776324910	0.148767	
TORONTO-DOMINION BANK - 949 EGLINTON AVE W - YORK - M6C2C3	105674058	807704195	0.130833	
TORONTO-DOMINION BANK - 966 BRIMORTON DR - SCARBOROUGH - M1G2V2	54688439	832446800	0.065696	
TORONTO-DOMINION BANK - 972 ALBION RD - ETOBICOKE - M9V1A7	154059271	802952275	0.191866	
TORONTO-DOMINION BANK - 979 BLOOR ST W - TORONTO - M6H1L7	52404000	480802090	0.108993	
TORONTO-DOMINION BANK - 980 YONGE ST - TORONTO - M4W3V8	75603436	953191110	0.079316	
	Average	79044714	769700161	0.100988865
	Min	271439	9552140	0.008035
	Max	261265935	1593968095	0.291686
	Std Dev	51171420.85	311928303.8	0.050345562

Bank of Nova Scotia

Branch Name and Location	Probable Dollars	Total Dollars	Opportunity Index
BANK OF NOVA SCOTIA - 340 HARWOOD AVE S - AJAX - L1S2J1	180156373	1344916595	0.133954
BANK OF NOVA SCOTIA - 15 WESTNEY RD N - AJAX - L1T1P4	54648837	1478751150	0.036956
BANK OF NOVA SCOTIA - 60 KINGSTON RD E - AJAX - L1Z1G1	81414233	1554190695	0.052384
BANK OF NOVA SCOTIA - 356 WILSON ST E - ANCASTER - L9G2C2	49208157	1151428340	0.042737
BANK OF NOVA SCOTIA - 851 GOLF LINKS RD - ANCASTER - L9K1L5	45696929	1001658075	0.045821
BANK OF NOVA SCOTIA - 15185 YONGE ST - AURORA - L4G1L8	179846711	1258869500	0.142864
BANK OF NOVA SCOTIA - 15420 BAYVIEW AVE - AURORA - L4G7J1	15894045	574766475	0.027653
BANK OF NOVA SCOTIA - 360 QUEEN ST S - BOLTON - L7E4Z8	204161453	1597042075	0.127837
BANK OF NOVA SCOTIA - 200 KING ST E - BOWMANVILLE - L1C1P3	82611041	726379785	0.11373
BANK OF NOVA SCOTIA - 68 KING ST E - BOWMANVILLE - L1C3X2	91781942	773119765	0.118716
BANK OF NOVA SCOTIA - 76 HOLLAND W - BRADFORD - L3Z2B6	163552351	1333558615	0.122644
BANK OF NOVA SCOTIA - 47 MOUNTAINASH RD - BRAMPTON - L6R1W4	104669159	731074150	0.143172
BANK OF NOVA SCOTIA - 36 AVONDALE BLVD - BRAMPTON - L6T1H3	54254741	688559170	0.078795
BANK OF NOVA SCOTIA - 700 BALMORAL DR - BRAMPTON - L6T1X2	122914758	951658685	0.129158
BANK OF NOVA SCOTIA - 25 PEEL CENTRE DR - BRAMPTON - L6T3R5	164587249	1383912115	0.118929
BANK OF NOVA SCOTIA - 199 ADVANCE BLVD - BRAMPTON - L6T4N2	1009329	51004980	0.019789
BANK OF NOVA SCOTIA - 284 QUEEN ST E - BRAMPTON - L6V1C2	57836963	1598875780	0.036174
BANK OF NOVA SCOTIA - 543 STEELES AVE E - BRAMPTON - L6W4S2	935168	251756810	0.003715
BANK OF NOVA SCOTIA - 27 MAIN ST N - BRAMPTON - L6X1M8	89451224	1424121890	0.062811
BANK OF NOVA SCOTIA - 7700 HURONTARIO ST - BRAMPTON - L6Y4M3	105279230	940952465	0.111886
BANK OF NOVA SCOTIA - 27 RUTH AVE - BRAMPTON - L6Z4R2	346002381	1263837040	0.273771
BANK OF NOVA SCOTIA - 5385 LAKESHORE RD - BURLINGTON - L7L1C8	47281338	782505625	0.060423
BANK OF NOVA SCOTIA - 4049 NEW ST - BURLINGTON - L7L1S8	144199708	978936815	0.147302
BANK OF NOVA SCOTIA - 1001 CHAMPLAIN AVE - BURLINGTON - L7L5Z4	26793798	440456670	0.060832
BANK OF NOVA SCOTIA - 3505 UPPER MIDDLE RD - BURLINGTON - L7M4C6	108183149	976371855	0.110801
BANK OF NOVA SCOTIA - 547 BRANT ST - BURLINGTON - L7R2G6	65325137	870814680	0.075016
BANK OF NOVA SCOTIA - 11 ARGYLE ST S - CALEDONIA - N3W1J1	3413451	58869945	0.057983
BANK OF NOVA SCOTIA - 36 MAIN ST - CAMPBELLVILLE - L0P1B0	121492003	963857405	0.126048
BANK OF NOVA SCOTIA - 2180 HIGHWAY 7 - CONCORD - L4K1W6	55899545	388138650	0.14402
BANK OF NOVA SCOTIA - 10 NORTH RIVERMEDE RD - CONCORD - L4K2H2	30165614	406949030	0.074126
BANK OF NOVA SCOTIA - 7800 JANE ST - CONCORD - L4K4R8	26811243	367722465	0.072912
BANK OF NOVA SCOTIA - 1500 HIGHWAY 2 - COURTYCE - L1E2T5	121752430	813776210	0.149814
BANK OF NOVA SCOTIA - 24 PLAZA DR - DUNDAS - L9H4H4	120673384	1565157305	0.0771
BANK OF NOVA SCOTIA - 802 O'CONNOR DR - EAST YORK - M4B2S9	90036906	724868940	0.124212
BANK OF NOVA SCOTIA - 3 THE MARKET PLACE - EAST YORK - M4C5M2	117686515	848258450	0.138739
BANK OF NOVA SCOTIA - 880 EGLINTON AVE E - EAST YORK - M4G2L2	75440056	522314945	0.144434
BANK OF NOVA SCOTIA - 1002 PAPE AVE - EAST YORK - M4K3V9	94004892	632435060	0.14864
BANK OF NOVA SCOTIA - 2895 LAKE SHORE BLVD W - ETOBICOKE - M8V1J3	45698182	410950465	0.111201
BANK OF NOVA SCOTIA - 388 BROWNS LINE - ETOBICOKE - M8W3T8	56162680	541041705	0.103805
BANK OF NOVA SCOTIA - 2954 BLOOR ST W - ETOBICOKE - M8X1B7	66920280	833395030	0.105653
BANK OF NOVA SCOTIA - 188 THE QUEENSWAY - ETOBICOKE - M8Y1J3	15356713	617527435	0.024688
BANK OF NOVA SCOTIA - 406 ROYAL YORK RD - ETOBICOKE - M8Y2R5	78174909	532256115	0.146875
BANK OF NOVA SCOTIA - 1580 THE QUEENSWAY - ETOBICOKE - M8Z1V1	6570624	229037160	0.028688
BANK OF NOVA SCOTIA - 1092 ISLINGTON AVE - ETOBICOKE - M8Z4R9	37400687	349582825	0.106987
BANK OF NOVA SCOTIA - 270 THE KINGSWAY - ETOBICOKE - M9A3T7	191364481	744172260	0.257151
BANK OF NOVA SCOTIA - 250 THE EAST MALL ST - ETOBICOKE - M9B3Y8	68143710	576917550	0.118117
BANK OF NOVA SCOTIA - 195 THE WEST MALL - ETOBICOKE - M9C5K1	6538034	384024855	0.017025
BANK OF NOVA SCOTIA - 900 ALBION RD - ETOBICOKE - M9V1A5	76080110	504326510	0.150855
BANK OF NOVA SCOTIA - 900 DIXON RD - ETOBICOKE - M9W1J7	2981366	166880940	0.017865
BANK OF NOVA SCOTIA - 2267 ISLINGTON AVE - ETOBICOKE - M9W3W7	96386325	471356250	0.204487
BANK OF NOVA SCOTIA - 1839 ALBION RD - ETOBICOKE - M9W5S8	31844581	792448170	0.040185
BANK OF NOVA SCOTIA - 135 QUEEN'S PLATE DR - ETOBICOKE - M9W6V1	8957274	138528685	0.06466
BANK OF NOVA SCOTIA - 200 GARRISON RD - FORT ERIE - L2A5S6	35501417	408639620	0.086877
BANK OF NOVA SCOTIA - 304 GUELPH ST - GEORGETOWN - L7G4B1	111467251	961365445	0.115947
BANK OF NOVA SCOTIA - 686 QUEENSTON RD - HAMILTON - L8G1A3	121085326	824421765	0.146873
BANK OF NOVA SCOTIA - 276 PARKDALE AVE N - HAMILTON - L8H5X7	23100767	357823890	0.064595
BANK OF NOVA SCOTIA - 1396 MAIN ST E - HAMILTON - L8K1C1	81036519	627383820	0.129166
BANK OF NOVA SCOTIA - 1087 BARTON ST E - HAMILTON - L8L3E2	32772465	284626915	0.115142
BANK OF NOVA SCOTIA - 600 JAMES ST N - HAMILTON - L8L7Z2	20187052	265494920	0.076036
BANK OF NOVA SCOTIA - 924 KING ST E - HAMILTON - L8M1B8	21996328	449765905	0.048906
BANK OF NOVA SCOTIA - 12 KING ST E - HAMILTON - L8N4G9	24467723	283650545	0.08626
BANK OF NOVA SCOTIA - 21 KING ST W - HAMILTON - L8P4W7	34653443	480239830	0.072159
BANK OF NOVA SCOTIA - 580 UPPER OTTAWA ST - HAMILTON - L8T3T2	49121202	988193070	0.049708
BANK OF NOVA SCOTIA - 1070 STONE CHURCH RD E - HAMILTON - L8W3K8	276153625	1027456885	0.268774
BANK OF NOVA SCOTIA - 171 MOHAWK RD E - HAMILTON - L9A2H4	35702772	1109427030	0.032181
BANK OF NOVA SCOTIA - 1550 UPPER JAMES ST - HAMILTON - L9B2L6	112151998	925849200	0.121134
BANK OF NOVA SCOTIA - 630 UPPER JAMES ST - HAMILTON - L9C2Z1	71734615	670460945	0.106993
BANK OF NOVA SCOTIA - 443 THE QUEENSWAY S - KESWICK - L4P3J4	107770728	765212990	0.140838
BANK OF NOVA SCOTIA - 10019 KEELE ST - MAPLE - L6A1R6	72850543	479889495	0.151807
BANK OF NOVA SCOTIA - 101 MAIN ST N - MARKHAM - L3P1X9	68819854	1179281515	0.058357
BANK OF NOVA SCOTIA - 8505 WARDEN AVE - MARKHAM - L3R0Y8	40124912	752331075	0.053334
BANK OF NOVA SCOTIA - 4491 HIGHWAY 7 - MARKHAM - L3R1M1	46966052	1015683405	0.046241
BANK OF NOVA SCOTIA - 7321 WOODBINE AVE - MARKHAM - L3R3V7	7039104	486940485	0.014456
BANK OF NOVA SCOTIA - 55 HARVEST MOON DR - MARKHAM - L3R4C3	37386773	598744025	0.062442
BANK OF NOVA SCOTIA - 625 COCHRANE DR - MARKHAM - L3R9R9	108165664	890099510	0.121521

APPENDIX V: INDEX VALUES BY FINANCIAL FIRM

BANK OF NOVA SCOTIA - 4394 STEELES AVE E - MARKHAM - L3R9V9	89344450	720935710	0.123928
BANK OF NOVA SCOTIA - 2002 MIDDLEFIELD RD - MARKHAM - L3S1Y5	166285468	971469115	0.171169
BANK OF NOVA SCOTIA - 244 MAIN ST E - MILTON - L9T1N8	57484939	809405895	0.071021
BANK OF NOVA SCOTIA - 500 LAURIER AVE - MILTON - L9T4R3	81865812	611884270	0.133793
BANK OF NOVA SCOTIA - 7205 GOREWAY DR - MISSISSAUGA - L4T2T9	126156641	674293720	0.187095
BANK OF NOVA SCOTIA - 6725 AIRPORT RD - MISSISSAUGA - L4V1V2	2791688	412992920	0.00678
BANK OF NOVA SCOTIA - 1525 BRITANNIA RD E - MISSISSAUGA - L4W1S5	245903	9552140	0.025743
BANK OF NOVA SCOTIA - 4900 DIXIE RD - MISSISSAUGA - L4W2R1	7682291	449580670	0.017088
BANK OF NOVA SCOTIA - 2700 MATHESON BLVD E - MISSISSAUGA - L4W4V9	7485706	212510120	0.035225
BANK OF NOVA SCOTIA - 1825 DUNDAS ST E - MISSISSAUGA - L4X2X1	30998432	527928340	0.058717
BANK OF NOVA SCOTIA - 1077 NORTH SERVICE RD - MISSISSAUGA - L4Y1A6	55789507	642886230	0.08678
BANK OF NOVA SCOTIA - 755 QUEENSWAY E - MISSISSAUGA - L4Y4C5	14286386	643745795	0.022193
BANK OF NOVA SCOTIA - 2 ROBERT SPECK PKY - MISSISSAUGA - L4Z1H8	42132091	1043735885	0.040367
BANK OF NOVA SCOTIA - 49 MATHESON BLVD E - MISSISSAUGA - L4Z2Y5	88513051	372111070	0.18412
BANK OF NOVA SCOTIA - 3295 KIRWIN AVE - MISSISSAUGA - L5A4K9	81841142	935864410	0.08745
BANK OF NOVA SCOTIA - 1791 LAKESHORE RD W - MISSISSAUGA - L5J1J6	51336840	1202557905	0.04269
BANK OF NOVA SCOTIA - 2225 ERIN MILLS PKY - MISSISSAUGA - L5K1T9	237540665	1836897805	0.145118
BANK OF NOVA SCOTIA - 3355 THE COLLEGE WAY - MISSISSAUGA - L5L5T3	158263041	966030545	0.161758
BANK OF NOVA SCOTIA - 1525 BRISTOL RD W - MISSISSAUGA - L5M4Z1	38848631	814814995	0.047878
BANK OF NOVA SCOTIA - 5100 ERIN MILLS PKY - MISSISSAUGA - L5M4Z5	97992114	1071537070	0.09145
BANK OF NOVA SCOTIA - 8611 FALCONER DR - MISSISSAUGA - L5N1R3	25250913	958261025	0.026351
BANK OF NOVA SCOTIA - 6750 WINSTON CHURCHILL BLVD - MISSISSAUGA - L5N4C4	188468882	1102771550	0.152769
BANK OF NOVA SCOTIA - 34 EGLINTON AVE W - MISSISSAUGA - L5R3E7	138293412	978197835	0.141865
BANK OF NOVA SCOTIA - 660 EGLINTON AVE W - MISSISSAUGA - L5R3V2	134044533	1041995505	0.128642
BANK OF NOVA SCOTIA - 1240 EGLINTON AVE W - MISSISSAUGA - L5V1N3	95831970	972857750	0.098506
BANK OF NOVA SCOTIA - 16635 YONGE ST - NEWMARKET - L3X1V6	78539891	1066244205	0.07368
BANK OF NOVA SCOTIA - 258 MAIN ST S - NEWMARKET - L3Y3Z5	132819379	1221008850	0.108779
BANK OF NOVA SCOTIA - 1100 DAVIS DR - NEWMARKET - L3Y7V1	108022873	1015669090	0.106356
BANK OF NOVA SCOTIA - 17480 YONGE - NEWMARKET - L3Y8A8	25917240	1182711590	0.021913
BANK OF NOVA SCOTIA - 4800 VICTORIA AVE - NIAGARA FALLS - L2E4C2	26704987	267868825	0.099894
BANK OF NOVA SCOTIA - 6225 THOROLD STONE RD - NIAGARA FALLS - L2J1A6	72615945	682270130	0.106433
BANK OF NOVA SCOTIA - 1682 VICTORIA PARK AVE - NORTH YORK - M1R1P7	112052013	736808125	0.152078
BANK OF NOVA SCOTIA - 3550 VICTORIA PARK AVE - NORTH YORK - M2H2N5	150845195	1158577580	0.130199
BANK OF NOVA SCOTIA - 3650 VICTORIA PARK AVE - NORTH YORK - M2H3P7	50492514	992821100	0.050858
BANK OF NOVA SCOTIA - 2175 SHEPPARD AVE E - NORTH YORK - M2J1W8	39925287	1240327415	0.032189
BANK OF NOVA SCOTIA - 2901 BAYVIEW AVE - NORTH YORK - M2K1E6	169715375	1026838305	0.18528
BANK OF NOVA SCOTIA - 5607 YONGE ST - NORTH YORK - M2M3S9	48984330	808019245	0.060623
BANK OF NOVA SCOTIA - 5805 YONGE ST - NORTH YORK - M2M3T9	49189862	1002782200	0.049054
BANK OF NOVA SCOTIA - 4885 YONGE ST - NORTH YORK - M2N5N4	122863976	738721635	0.16632
BANK OF NOVA SCOTIA - 4950 YONGE ST - NORTH YORK - M2N6K1	47838898	800369060	0.059771
BANK OF NOVA SCOTIA - 4110 YONGE ST - NORTH YORK - M2P2B7	18428161	717803570	0.025673
BANK OF NOVA SCOTIA - 1500 DON MILLS RD - NORTH YORK - M3B3K4	34199402	1228318965	0.027842
BANK OF NOVA SCOTIA - 885 LAWRENCE AVE E - NORTH YORK - M3C1P7	67790712	825886635	0.082082
BANK OF NOVA SCOTIA - 789 DON MILLS RD - NORTH YORK - M3C1T5	30706812	698791735	0.043943
BANK OF NOVA SCOTIA - 15 GERVAIS DR - NORTH YORK - M3C1Y8	26297681	625908725	0.042015
BANK OF NOVA SCOTIA - 8 PRINCE ANDREW PL - NORTH YORK - M3C2H4	12410586	799007475	0.015533
BANK OF NOVA SCOTIA - 3809 KEELE ST - NORTH YORK - M3J1N5	45178351	774873625	0.058319
BANK OF NOVA SCOTIA - 845 FINCH AVE W - NORTH YORK - M3J2C7	18190495	613328485	0.029659
BANK OF NOVA SCOTIA - 2616 WILSON AVE - NORTH YORK - M3L1A3	79946769	719828555	0.111064
BANK OF NOVA SCOTIA - 1616 WILSON AVE - NORTH YORK - M3L1A3	77664211	863758510	0.117007
BANK OF NOVA SCOTIA - 2780 JANE ST - NORTH YORK - M3N2J2	108055510	956503130	0.112989
BANK OF NOVA SCOTIA - 3094 BATHURST ST - NORTH YORK - M6A2A1	73342665	692433850	0.10592
BANK OF NOVA SCOTIA - 3401 DUFFERIN ST - NORTH YORK - M6A2T9	19883937	395234615	0.050309
BANK OF NOVA SCOTIA - 700 LAWRENCE AVE W - NORTH YORK - M6A3B4	23114395	398147185	0.058348
BANK OF NOVA SCOTIA - 1391 LAWRENCE AVE W - NORTH YORK - M6L1A4	29179884	453823235	0.064298
BANK OF NOVA SCOTIA - 2 TORYOK DR - NORTH YORK - M9L1X6	13583860	422378955	0.03216
BANK OF NOVA SCOTIA - 4877 STEELES AVE W - NORTH YORK - M9L2W1	1748233	212607850	0.008223
BANK OF NOVA SCOTIA - 2304 SHEPPARD AVE W - NORTH YORK - M9M1M1	3761278	803001450	0.006238
BANK OF NOVA SCOTIA - 1542 JANE ST - NORTH YORK - M9N2R5	101717039	664514065	0.15307
BANK OF NOVA SCOTIA - 525 IROQUOIS SHORE RD - OAKVILLE - L6H1M3	45603267	1139921480	0.040006
BANK OF NOVA SCOTIA - 2391 TRAFALGAR RD - OAKVILLE - L6H6K7	45339137	601272035	0.075405
BANK OF NOVA SCOTIA - 207 LAKESHORE RD E - OAKVILLE - L6J1H7	40766360	579608785	0.070334
BANK OF NOVA SCOTIA - 320 SPEERS RD - OAKVILLE - L6K3R9	22592175	821180050	0.027512
BANK OF NOVA SCOTIA - 611 THIRD LINE - OAKVILLE - L6L4A8	43797589	906907580	0.048293
BANK OF NOVA SCOTIA - 300 NORTH SERVICE RD W - OAKVILLE - L6M2S2	115052653	1103955410	0.104219
BANK OF NOVA SCOTIA - 1500 UPPER MIDDLE RD W - OAKVILLE - L6M3G3	109595208	876190160	0.162077
BANK OF NOVA SCOTIA - 285 TAUNTON RD E - OSHAWA - L1G3V2	205894892	961778560	0.214077
BANK OF NOVA SCOTIA - 11 SIMCOE ST N - OSHAWA - L1G4R7	46400733	740575875	0.062655
BANK OF NOVA SCOTIA - 193 KING ST E - OSHAWA - L1H1C2	44950401	1155007810	0.038918
BANK OF NOVA SCOTIA - 200 JOHN ST W - OSHAWA - L1J2B4	40805596	897061405	0.045488
BANK OF NOVA SCOTIA - 800 KING ST W - OSHAWA - L1J2L5	55567449	1669523835	0.033283
BANK OF NOVA SCOTIA - 1355 KINGSTON RD - PICKERING - L1V1B8	144535720	1170947115	0.123435
BANK OF NOVA SCOTIA - 1360 KINGSTON RD - PICKERING - L1V3B4	179341035	1306174155	0.137303
BANK OF NOVA SCOTIA - 705 KINGSTON RD - PICKERING - L1V6K3	63916519	1125024180	0.056813
BANK OF NOVA SCOTIA - 1020 BROCK RD - PICKERING - L1W3H2	59202293	1243744105	0.0478
BANK OF NOVA SCOTIA - 105 CLARENCE ST W - PORT COLBORNE - L3K3G2	72847344	384212285	0.189602

APPENDIX V: INDEX VALUES BY FINANCIAL FIRM

BANK OF NOVA SCOTIA - 268 LAKESHORE RD E - PORT CREDIT - L5G1H1	96901379	720295835	0.13453
BANK OF NOVA SCOTIA - 69 WALTON ST - PORT HOPE - L1A1N2	2424113	28811840	0.084138
BANK OF NOVA SCOTIA - 420 HIGHWAY 7 E - RICHMOND HILL - L4B3K2	97881554	856759635	0.114246
BANK OF NOVA SCOTIA - 9325 YONGE ST - RICHMOND HILL - L4C0A8	175008325	1487348840	0.117665
BANK OF NOVA SCOTIA - 10131 YONGE ST - RICHMOND HILL - L4C1T5	53346839	1501794505	0.035522
BANK OF NOVA SCOTIA - 10909 YONGE ST - RICHMOND HILL - L4C3E3	154204963	944353370	0.163292
BANK OF NOVA SCOTIA - 9555 YONGE ST - RICHMOND HILL - L4C9M5	179632644	1782172545	0.100794
BANK OF NOVA SCOTIA - 9665 BAYVIEW AVE - RICHMOND HILL - L4C9V4	196110006	1218691940	0.160918
BANK OF NOVA SCOTIA - 13311 YONGE ST - RICHMOND HILL - L4E3L6	63130506	759819345	0.083088
BANK OF NOVA SCOTIA - 31 TAPSCOTT RD - SCARBOROUGH - M1B4Y7	177307915	846258215	0.20952
BANK OF NOVA SCOTIA - 305 PORT UNION RD - SCARBOROUGH - M1C2L5	64849224	1074469400	0.060355
BANK OF NOVA SCOTIA - 4509 KINGSTON RD - SCARBOROUGH - M1E2P1	114710922	1251877490	0.091631
BANK OF NOVA SCOTIA - 3515 LAWRENCE AVE E - SCARBOROUGH - M1H1B2	102757821	1024958530	0.100256
BANK OF NOVA SCOTIA - 683 MARKHAM RD - SCARBOROUGH - M1H2A4	120167994	884791855	0.135815
BANK OF NOVA SCOTIA - 1137 MARKHAM RD - SCARBOROUGH - M1H2Y5	54321074	567803110	0.095703
BANK OF NOVA SCOTIA - 2500 EGLINTON AVE E - SCARBOROUGH - M1K2R5	77483605	990670330	0.078213
BANK OF NOVA SCOTIA - 3495 DANFORTH AVE - SCARBOROUGH - M1L1E2	76668707	857979085	0.08936
BANK OF NOVA SCOTIA - 1880 EGLINTON AVE E - SCARBOROUGH - M1L2L1	37875146	558231200	0.067848
BANK OF NOVA SCOTIA - 2863 KINGSTON RD - SCARBOROUGH - M1M1N3	60039728	690555085	0.086944
BANK OF NOVA SCOTIA - 2479 KINGSTON RD - SCARBOROUGH - M1N1V4	89715550	590964370	0.151812
BANK OF NOVA SCOTIA - 1877 KENNEDY RD - SCARBOROUGH - M1P2L9	92258020	401582485	0.229748
BANK OF NOVA SCOTIA - 300 BOROUGH DR - SCARBOROUGH - M1P4P6	19738644	352513850	0.055994
BANK OF NOVA SCOTIA - 2154 LAWRENCE AVE E - SCARBOROUGH - M1R3A8	52394681	532344530	0.098423
BANK OF NOVA SCOTIA - 3 ELLESMERE RD - SCARBOROUGH - M1R4B7	166008680	836594040	0.198434
BANK OF NOVA SCOTIA - 4220 SHEPPARD AVE E - SCARBOROUGH - M1S1T5	63402483	528782580	0.119903
BANK OF NOVA SCOTIA - 4651 SHEPPARD AVE E - SCARBOROUGH - M1S3V4	70907343	388405835	0.18256
BANK OF NOVA SCOTIA - 3585 MCNICOLL AVE - SCARBOROUGH - M1V2N3	13780364	552924365	0.024923
BANK OF NOVA SCOTIA - 250 ALTON TOWERS - SCARBOROUGH - M1V3Z4	75478047	1021750560	0.073869
BANK OF NOVA SCOTIA - 325 BAMBURGH CIR - SCARBOROUGH - M1W3Y1	148955786	762566770	0.195335
BANK OF NOVA SCOTIA - 285 GENEVA ST - ST CATHARINES - L2N2G1	132279667	1003251815	0.131851
BANK OF NOVA SCOTIA - 229 WELLAND AVE - ST CATHARINES - L2R2P4	23537532	501007105	0.04698
BANK OF NOVA SCOTIA - 185 ST. PAUL ST - ST CATHARINES - L2R3M5	65714594	694097065	0.094878
BANK OF NOVA SCOTIA - 327 ONTARIO ST - ST CATHARINES - L2R5L3	158712167	635113380	0.248896
BANK OF NOVA SCOTIA - 319 MERRITT ST - ST CATHARINES - L2T1K3	39580890	666050740	0.059426
BANK OF NOVA SCOTIA - 276 BARTON ST - STONEY CREEK - L8E2K6	52360927	730350165	0.071893
BANK OF NOVA SCOTIA - 6323 MAIN ST - STOUFFVILLE - L4A1G5	158431421	497421015	0.318506
BANK OF NOVA SCOTIA - 128 QUEEN ST S - STREETSVILLE - L5M1K8	124631817	1666563200	0.074784
BANK OF NOVA SCOTIA - 114 HIGH ST - SUTTON WEST - L0E1R0	109988014	615317320	0.178747
BANK OF NOVA SCOTIA - 7681 YONGE ST - THORNHILL - L3T2C3	54780793	1212399435	0.045184
BANK OF NOVA SCOTIA - 2900 STEELES AVE E - THORNHILL - L3T4X1	138916291	963742660	0.144143
BANK OF NOVA SCOTIA - 800 STEELES AVE W - THORNHILL - L4J7L2	164887014	1594962305	0.10338
BANK OF NOVA SCOTIA - 7700 BATHURST ST - THORNHILL - L4J7Y3	151932022	1254417720	0.121118
BANK OF NOVA SCOTIA - 250 ALTON TOWERS CIR - TORONTO - M1V3Z4	72298752	917455855	0.078804
BANK OF NOVA SCOTIA - 145 KING W - TORONTO - M5H1J8	14138982	212980865	0.066386
BANK OF NOVA SCOTIA - 2077 DANFORTH AVE - TORONTO - M4C1J8	30494012	858409900	0.035524
BANK OF NOVA SCOTIA - 2553 DANFORTH AVE - TORONTO - M4C1L4	172345003	948701580	0.181664
BANK OF NOVA SCOTIA - 2080 QUEEN ST E - TORONTO - M4E1E1	99831564	844440150	0.118222
BANK OF NOVA SCOTIA - 615 KINGSTON RD - TORONTO - M4E1R3	66783775	1147135185	0.058218
BANK OF NOVA SCOTIA - 1016 KINGSTON RD - TORONTO - M4E1T2	93754290	985155975	0.095167
BANK OF NOVA SCOTIA - 1188 DANFORTH AVE - TORONTO - M4J1M3	56397552	615980785	0.091557
BANK OF NOVA SCOTIA - 1573 DANFORTH AVE - TORONTO - M4J1N8	72987529	745985735	0.09784
BANK OF NOVA SCOTIA - 649 DANFORTH AVE - TORONTO - M4K1R2	65887844	796310535	0.082741
BANK OF NOVA SCOTIA - 363 BROADVIEW AVE - TORONTO - M4K2M7	182082284	760806330	0.239328
BANK OF NOVA SCOTIA - 1943 GERRARD ST E - TORONTO - M4L2C2	89865209	1112888835	0.080749
BANK OF NOVA SCOTIA - 1046 QUEEN ST E - TORONTO - M4M1K4	33633645	483268710	0.069596
BANK OF NOVA SCOTIA - 3169 YONGE ST - TORONTO - M4N2K9	130073991	1062933195	0.122373
BANK OF NOVA SCOTIA - 245 EGLINTON AVE E - TORONTO - M4P3B7	77101485	773548610	0.098672
BANK OF NOVA SCOTIA - 1867 YONGE ST - TORONTO - M4S1Y5	106364645	888864035	0.119664
BANK OF NOVA SCOTIA - 2200 YONGE ST - TORONTO - M4S2C7	45382595	739530990	0.061367
BANK OF NOVA SCOTIA - 1 ST CLAIR AVE E - TORONTO - M4T2V7	124797316	1067057425	0.116955
BANK OF NOVA SCOTIA - 151 ST CLAIR AVE W - TORONTO - M4V1P7	40403341	1098689540	0.036774
BANK OF NOVA SCOTIA - 19 BLOOR ST W - TORONTO - M4W1A3	37573720	652209005	0.05761
BANK OF NOVA SCOTIA - 160 BLOOR ST E - TORONTO - M4W1B9	40263248	748677555	0.053779
BANK OF NOVA SCOTIA - 555 YONGE ST - TORONTO - M4Y3A6	69935052	611785085	0.114313
BANK OF NOVA SCOTIA - 543 QUEEN ST E - TORONTO - M5A1V1	10115729	440065395	0.022987
BANK OF NOVA SCOTIA - 405 PARLIAMENT ST - TORONTO - M5A3A1	73129418	581295350	0.125804
BANK OF NOVA SCOTIA - 1 CARLTON ST - TORONTO - M5B1L2	62687946	479159095	0.130829
BANK OF NOVA SCOTIA - 37 KING ST E - TORONTO - M5C1E9	18190964	351717835	0.05172
BANK OF NOVA SCOTIA - 79 QUEEN ST E - TORONTO - M5C1R8	65200461	209877025	0.031066
BANK OF NOVA SCOTIA - 100 YONGE ST - TORONTO - M5C2W1	6845461	94363150	0.072544
BANK OF NOVA SCOTIA - 1 QUEEN ST E 5TH FLR - TORONTO - M5C2W5	19686773	340812990	0.057784
BANK OF NOVA SCOTIA - 522 UNIVERSITY AVE - TORONTO - M5G1W7	17677144	121429360	0.145576
BANK OF NOVA SCOTIA - 44 KING ST W - TORONTO - M5H1H1	2734212	50435490	0.054212
BANK OF NOVA SCOTIA - 40 KING ST W - TORONTO - M5H3Y2	4042432	113149565	0.035726
BANK OF NOVA SCOTIA - 41 SQ HARBOUR - TORONTO - M5J2G4	38043084	324415315	0.117267
BANK OF NOVA SCOTIA - 151 FRONT ST W - TORONTO - M5J2N1	34153237	277803180	0.12294

APPENDIX V: INDEX VALUES BY FINANCIAL FIRM

BANK OF NOVA SCOTIA - 438 EGLINTON AVE W - TORONTO - M5N1A2	55210617	811650380	0.068023
BANK OF NOVA SCOTIA - 416 SPADINA RD - TORONTO - M5P2W4	44401991	987894200	0.044946
BANK OF NOVA SCOTIA - 292 SPADINA RD - TORONTO - M5R2V6	63302558	788010790	0.080332
BANK OF NOVA SCOTIA - 130 BLOOR ST W - TORONTO - M5S1N6	19295878	554523695	0.034797
BANK OF NOVA SCOTIA - 332 BLOOR ST W - TORONTO - M5S1W6	67643625	543861160	0.124377
BANK OF NOVA SCOTIA - 1033 BAY ST - TORONTO - M5S3A5	70758803	333014205	0.21248
BANK OF NOVA SCOTIA - 440 COLLEGE ST - TORONTO - M5T1T3	32564556	298555395	0.109074
BANK OF NOVA SCOTIA - 347 BATHURST ST - TORONTO - M5T2S7	25008775	251150505	0.099577
BANK OF NOVA SCOTIA - 222 QUEEN ST W - TORONTO - M5V1Z3	10623065	74240855	0.143089
BANK OF NOVA SCOTIA - 110 SPADINA AVE - TORONTO - M5V2K4	8362903	185165470	0.045184
BANK OF NOVA SCOTIA - 720 KING ST W - TORONTO - M5V2T3	47591288	214539780	0.22183
BANK OF NOVA SCOTIA - 949 ST CLAIR AVE W - TORONTO - M6C1C7	45471472	663733750	0.068509
BANK OF NOVA SCOTIA - 643 COLLEGE ST - TORONTO - M6G1B7	36535614	400952795	0.091122
BANK OF NOVA SCOTIA - 1034 BLOOR ST W - TORONTO - M6H1M3	45749199	549412845	0.083269
BANK OF NOVA SCOTIA - 1251 BLOOR ST W - TORONTO - M6H1N6	60450367	476975885	0.126737
BANK OF NOVA SCOTIA - 1441 KING ST W - TORONTO - M6K1H9	71529501	478017845	0.149638
BANK OF NOVA SCOTIA - 1464 QUEEN ST W - TORONTO - M6K1M2	107201885	648076175	0.165418
BANK OF NOVA SCOTIA - 1616 DUNDAS ST W - TORONTO - M6K1V1	48941603	753401515	0.064961
BANK OF NOVA SCOTIA - 233 OSLER ST - TORONTO - M6N2Z2	39948237	485548890	0.082274
BANK OF NOVA SCOTIA - 2962 DUNDAS ST W - TORONTO - M6P1Y8	40907436	673005010	0.060783
BANK OF NOVA SCOTIA - 1709 BLOOR ST W - TORONTO - M6P4E5	66153530	754407650	0.087689
BANK OF NOVA SCOTIA - 347 JANE ST - TORONTO - M6S3Z3	103258936	637488225	0.161978
BANK OF NOVA SCOTIA - 1 DOUGLAS ST - UXBRIDGE - L9P1M6	43325649	477788315	0.09068
BANK OF NOVA SCOTIA - 38 EAST MAIN ST - WELLAND - L3B3W3	47682019	830577715	0.057408
BANK OF NOVA SCOTIA - 354 LINCOLN ST - WELLAND - L3B4N4	155668324	749018990	0.20783
BANK OF NOVA SCOTIA - 440 NIAGARA ST - WELLAND - L3C1L5	44651039	1023289450	0.043635
BANK OF NOVA SCOTIA - 185 BROCK ST N - WHITEY - L1N4H3	167685746	1405126690	0.119339
BANK OF NOVA SCOTIA - 3050 GARDEN ST - WHITEY - L1R2G7	139500306	1393511115	0.100107
BANK OF NOVA SCOTIA - 8565 27 HWY - WOODBRIDGE - L4L1A7	28167873	573475915	0.049118
BANK OF NOVA SCOTIA - 7000 PINE VALLEY DR - WOODBRIDGE - L4L4Y8	84986981	546074405	0.155633
BANK OF NOVA SCOTIA - 7600 WESTON RD - WOODBRIDGE - L4L8B7	32527222	423091540	0.07688
BANK OF NOVA SCOTIA - 2700 DUFFERIN ST - YORK - M6B4J3	18834130	415398660	0.04534
BANK OF NOVA SCOTIA - 859 EGLINTON AVE W - YORK - M6C2B9	88677448	877937065	0.101007
BANK OF NOVA SCOTIA - 2201 EGLINTON AVE W - YORK - M6E2K6	29891528	422530815	0.070744
BANK OF NOVA SCOTIA - 2256 EGLINTON AVE W - YORK - M6E2L3	58661228	452554050	0.129623
BANK OF NOVA SCOTIA - 501 OAKWOOD AVE - YORK - M6E2W8	54939035	604337380	0.090908
BANK OF NOVA SCOTIA - 1151 WESTON RD - YORK - M6M4P3	54971674	647543930	0.084893
BANK OF NOVA SCOTIA - 2444 BLOOR ST W - YORK - M6S1R2	42840260	702549730	0.060978
BANK OF NOVA SCOTIA - 1885 WESTON RD - YORK - M9N1V9	88205930	659251495	0.133797
Average	73271354	752983108	0.096197677
Min	245903	9552140	0.003715
Max	346002381	1782172545	0.318506
Std Dev	54010510.59	356020324.8	0.054889435

Credit Unions

Branch Name and Location	Probable Dollars	Total Dollars	Opportunity Index
ALL TRANS CREDIT UNION - 3250 BLOOR ST W - ETOBICOKE - M8X2X9	32409131	612807780	0.052886
ALL TRANS CREDIT UNION - 1100 BATHURST ST - TORONTO - M5R3G9	59232210	569108985	0.104079
ALL TRANS CREDIT UNION - 50 EUSTON AVE - TORONTO - M4J3N3	59370360	686823135	0.086467
AMCU CREDIT UNION INC - 2405 EGLINTON AVE E - SCARBOROUGH - M1K2M5	97423157	666661655	0.146136
BREAD & ROSS CREDIT UNION - 21 VAUGHAN RD - TORONTO - M6G2N2	100897261	826317930	0.122105
BUDUCHNIST CREDIT UNION LTD - 221 MILNER AVE - SCARBOROUGH - M1S4P4	16064474	554352170	0.028979
BUDUCHNIST CREDIT UNION LTD - 140 BATHURST ST - TORONTO - M5V2R3	32087681	263024205	0.121995
BUDUCHNIST CREDIT UNION LTD - 2280 BLOOR ST W - TORONTO - M6S1N9	82640025	776138025	0.106476
CAMERA HEIGHTS CREDIT UNION - 1177 WESTON RD - YORK - M6M4P5	62843653	632198375	0.099405
CROATIAN TORONTO CREDIT UNION - 1165 BLOOR ST W - TORONTO - M6H1M9	56505459	499110690	0.113212
CUNA COMMUNITY CREDIT UNION - 1370 DON MILLS RD - NORTH YORK - M3B3N7	44105941	1169270205	0.037721
CUSTOMS CREDIT UNION LTD - 1 FRONT ST W - TORONTO - M5J1A5	44119760	336658395	0.131052
CZECHOSLOVAK CREDIT UNION LTD - 740 SPADINA AVE - TORONTO - M5S2J2	47061893	453146020	0.103856
DUCA COMMUNITY CREDIT UNION - 2184 KIPLING AVE - ETOBICOKE - M9W4K9	40920050	626931550	0.06527
DUCA COMMUNITY CREDIT UNION - 1451 ROYAL YORK RD - ETOBICOKE - M9P3B2	36899265	916767565	0.040249
DUCA COMMUNITY CREDIT UNION - 5290 YONGE ST - NORTH YORK - M2N5P9	68904994	875016180	0.078747
DUCA COMMUNITY CREDIT UNION - 607 MILNER AVE - SCARBOROUGH - M1B2K4	28654489	914287585	0.031341
DUCA COMMUNITY CREDIT UNION - 124 EGLINTON AVE W - TORONTO - M4R2G8	31171544	761712685	0.040923
ESTONIAN CREDIT UNION LTD - 958 BROADVIEW AVE - EAST YORK - M4K2R8	44786359	829112550	0.054017
FINNISH CREDIT UNION LTD - 191 EGLINTON AVE E - TORONTO - M4P1K1	71213784	840941150	0.084683
FIRST SLOVAK CREDIT UNION LTD - 385 THE WEST MALL - ETOBICOKE - M9C1E7	32800438	1038383045	0.031588
FOOD FAMILY CREDIT UNION - 2044 DANFORTH AVE - TORONTO - M4C1J6	41970453	835403525	0.05024
FORT YORK COMMUNITY CU - 30 THE QUEENSWAY - TORONTO - M6R1B5	12036999	494397215	0.024347
HEPCOE CREDIT UNION LTD - 1501 ELLESMERE RD - SCARBOROUGH - M1P4T6	10592024	303147420	0.03494
HEPCOE CREDIT UNION - 777 BAY ST - TORONTO - M5G2C8	16598541	260038540	0.063831
HEPCOE CREDIT UNION INC - 1 WENLOCK GATE - SCARBOROUGH - M1V2J7	93340878	879448080	0.106136
HEPCOE CREDIT UNION LTD - 800 KIPLING AVE - ETOBICOKE - M8Z5S4	32258799	867908495	0.037188
HEPCOE CREDIT UNION LTD - 2405 EGLINTON AVE E - SCARBOROUGH - M1K2M5	100203630	738669765	0.135654
HEPCOE CREDIT UNION LTD - 4218 LAWRENCE AVE E - SCARBOROUGH - M1E4X9	113278584	782328660	0.144797
HEPCOE CREDIT UNION LTD - 700 UNIVERSITY AVE - TORONTO - M5G1X6	3487647	89338670	0.039038
J E KREK'S SLOVENIAN CU - 646 EUCLID AVE - TORONTO - M6G2T5	28361793	453908150	0.062484
KOREAN CATHOLIC CHURCH CU - 439 DUNDAS ST E - TORONTO - M5A2B1	50712988	538301045	0.094209
KOREAN CREDIT UNION - 703 BLOOR ST W - TORONTO - M6G1L5	30405218	420551155	0.072299
LAKESHORE CREDIT UNION LTD - 3025 LAKE SHORE BLVD W - ETOBICOKE - M8V1K5	35195222	356409715	0.098749
LATVIAN CREDIT UNION LTD - 4 CREDIT UNION DR - NORTH YORK - M4A2N8	17171934	742990520	0.023112
LATVIAN CREDIT UNION LTD - 491 COLLEGE ST - TORONTO - M6G1A5	38520437	336265455	0.114554
METRO CREDIT UNION - 549 SAMMON AVE - EAST YORK - M4J2B3	68420687	706138925	0.096894
METRO CREDIT UNION - 230 BROWN'S LINE - ETOBICOKE - M8W3T4	52130149	630158215	0.082725
METRO CREDIT UNION - 3025 LAKE SHORE BLVD W - ETOBICOKE - M8V1K5	40510699	491275970	0.08246
METRO CREDIT UNION - 1175 BRIMLEY RD - SCARBOROUGH - M1P3G5	22245405	336506835	0.066107
METRO CREDIT UNION LTD - 1175 BRIMLEY RD - SCARBOROUGH - M1P3G5	22421204	410528210	0.054816
METRO CU - 4700 KEELE ST - NORTH YORK - M3J1P3	6019467	495148560	0.012157
METRO CU LTD - 245 COLLEGE ST - TORONTO - M5T1R5	13000540	129884595	0.100247
NORTH YORK COMMUNITY CU - 5799 YONGE ST 2ND FLR - NORTH YORK - M2M3V3	45532030	877808505	0.05187
OUR LADY OF VICTORY CU - 1199 WESTON RD - YORK - M6M4P6	65931923	621184745	0.106139
PARAMA LITHUANIAN CREDIT UNION - 2975 BLOOR ST W - ETOBICOKE - M8X1C1	65709742	633428985	0.103737
PORTUGUESE-TORONTO CU LTD - 980 BLOOR ST W - TORONTO - M6H1L8	57487289	506477770	0.113504
RESURRECTION PARISH CU - 999 COLLEGE ST - TORONTO - M6H1A8	41793330	482977515	0.086533
RESURRECTION PARISH CU - 1011 COLLEGE ST - TORONTO - M6H1A8	42598328	527648560	0.080733
SANTONE C U - 2100 FINCH AVE W - NORTH YORK - M3N2Z9	15353814	697241715	0.022021
SLOVENIA PARISHES CREDIT UNION - 618 MANNING AVE - TORONTO - M6G2V9	37199634	449168915	0.082819
SO-USE CREDIT UNION LTD - 2265 BLOOR ST W - TORONTO - M6S1P1	69973191	640144340	0.109308
ST DEMETRIUS PARISH CU - 135 LA ROSE AVE - ETOBICOKE - M9P1A6	33660162	874499700	0.038719
ST ELIZABETH CREDIT UNION - 432 SHEPPARD AVE E - NORTH YORK - M2N3B7	39788010	1018464585	0.039047
ST JOSAPHAT'S PARISH CU - 12 PARKMAN AVE - TORONTO - M6P3R5	51066658	564273700	0.0905
ST MARY'S CREDIT UNION - 4 BELLWOODS AVE - TORONTO - M6J2P4	31067985	441126350	0.070429
ST MARY'S CREDIT UNION - 832 BLOOR ST W - TORONTO - M6G1M2	34003799	444810630	0.076446
ST MARY'S CREDIT UNION - 2299 BLOOR ST W - TORONTO - M6S1P1	82472048	760041330	0.10851
ST STANISLAUS-ST CASIMIR'S CU - 220 RONCESVALLES AVE - TORONTO - M6R2L7	56509690	631713535	0.089455
ST STANISLAUS-ST CASMIR'S CU - 2987 BLOOR ST W - ETOBICOKE - M8X1C1	69946769	683567540	0.102326
ST STANISLAUS-ST CASMIR'S CU - 3055 LAKE SHORE BLVD W - ETOBICOKE - M8V1K6	36522979	414979665	0.088011
TAIWANESE CANADIAN TORONTO CU - 220 DUNCAN MILL RD - NORTH YORK - M3B3J5	43128341	1209244740	0.035666
TORONTO CREDIT UNION - 1997 AVENUE RD - NORTH YORK - M5M4A3	73437356	671211230	0.10941
UJPO CREDIT UNION LTD - 585 CRANBROOKE AVE - NORTH YORK - M6A2X9	53293456	676277220	0.078804
UKRAINIAN CREDIT UNION LTD - 225 THE EAST MALL ST - ETOBICOKE - M9B6J1	50798537	412680870	0.123094
UKRAINIAN CREDIT UNION LTD - 2387 BLOOR ST W - TORONTO - M6S1P6	61762603	810891825	0.076166
UKRAINIAN CREDIT UNION LTD - 295 COLLEGE ST - TORONTO - M5T1S2	30204813	224596390	0.134485
UNI-QUEEN PROVINCIAL CIVIL CU - 133 RICHMOND ST W - TORONTO - M5H2L3	808773	39022710	0.020726
UNIVERSITIES & COLLEGES CU - 200 ELIZABETH ST - TORONTO - M5G2C4	10078936	154287705	0.065326
UNIVERSITIES & COLLEGES CU - 350 VICTORIA ST - TORONTO - M5B2K3	37546376	332315705	0.112984
ADJALA CREDIT UNION - RR #1-4 - TOTTENHAM - L0G1W0	214448033	1317840065	0.162727
AVESTEL CREDIT UNION - 895 BRANT ST - BURLINGTON - L7R2J6	37391260	993392095	0.03784
AVESTEL CREDIT UNION - 3300 FAIRVIEW ST - BURLINGTON - L7N3N7	84445349	853205270	0.098974
AVESTEL CREDIT UNION - 928 BARTON ST E - HAMILTON - L8L3C3	32619181	348783810	0.093523
AVESTEL CREDIT UNION - 200 CENTENNIAL PKY N - HAMILTON - L8E4A1	36075424	620027255	0.058184

APPENDIX V: INDEX VALUES BY FINANCIAL FIRM

AVESTEL CREDIT UNION - 50 DUNDURN ST S - HAMILTON - L8P4W3	31704213	519605925	0.061016
AVESTEL CREDIT UNION - 135 FENNEL AVÉ E - HAMILTON - L9A1S2	18055369	649993985	0.027778
AVESTEL CREDIT UNION - 77 JAMES ST N - HAMILTON - L8R2K3	20978851	238071360	0.08812
AVESTEL CREDIT UNION - 688 QUEENSDALE AVE E - HAMILTON - L8V1M1	37600050	813611060	0.046214
AVESTEL CREDIT UNION - 486 UPPER SHERMAN AVE - HAMILTON - L8V3L8	42870611	901043840	0.047579
AVESTEL CREDIT UNION LTD - 60 LAKESHORE RD W - OAKVILLE - L6K1E1	37582204	363941825	0.103264
BUDUCHNIST CREDIT UNION - 4196 DIXIE RD - MISSISSAUGA - L4W1M6	45390397	723233955	0.06276
CATARACT SAVINGS-CREDIT UNION - 17172 DORCHESTER RD - NIAGARA FALLS - L2G5V	113606271	518408310	0.219144
CATARACT SAVINGS-CREDIT UNION - 6289 HUGGINS ST - NIAGARA FALLS - L2J1H2	85792250	571832490	0.15003
CENTENNIAL CREDIT UNION LTD - 600 FERGUSON AVE N - HAMILTON - L8L4Z9	5109901	267074180	0.019133
CENTENNIAL CREDIT UNION LTD - 593 KING ST E - HAMILTON - L8N1E4	58051361	382210935	0.151883
CROATION CREDIT UNION LTD - 318 QUEENSTON RD - HAMILTON - L8K1H5	38026108	840698030	0.045232
CROATION TORONTO CREDIT UNION - 19 DUNDAS ST W - MISSISSAUGA - L5B1H2	138884487	937811175	0.148094
DUCA COMM CREDIT UNION LTD - 17310 YONGE - NEWMARKET - L3Y7R9	80953696	1267427040	0.063872
DUCA COMMUNITY CREDIT UNION - 136 KING ST E - BOWMANVILLE - L1C1N7	68288013	679992640	0.100425
DUCA COMMUNITY CREDIT UNION - 7900 MCLAUGHLIN RD - BRAMPTON - L6V3N2	98688304	905445425	0.108994
DUCA COMMUNITY CREDIT UNION - 17310 YONGE ST - NEWMARKET - L3Y7R8	77198097	1183486530	0.085229
DUCA COMMUNITY CREDIT UNION - 15 CHARLES ST - OSHAWA - L1H4X5	37835752	893655660	0.042338
DUCA COMMUNITY CREDIT UNION - 9174 YONGE ST - RICHMOND HILL - L4C7A1	20043747	971756755	0.020626
FAMILY SAVINGS & CREDIT UNION - 3969 MONTROSE RD - NIAGARA FALLS - L2H3A1	47678871	527729095	0.090347
FAMILY SAVINGS & CREDIT UNION - 500 GRANTHAM AVE - ST CATHARINES - L2M3J7	88346572	728448155	0.121281
FAMILY SAVINGS & CREDIT UNION - 148 NIAGARA ST - ST CATHARINES - L2R4L4	22680857	364014500	0.062308
FAMILY SAVINGS & CREDIT UNION - 600 ONTARIO ST - ST CATHARINES - L2N7H8	60576446	705104800	0.085911
FAMILY SAVINGS & CREDIT UNION - 215 PELHAM RD - ST CATHARINES - L2S1W2	50443237	754503065	0.066856
FAMILY SAVINGS & CREDIT UNION - 35 ALBERT ST W - THOROLD - L2V2G4	42434523	535323205	0.079269
FORT ERIE COMMUNITY CU - 1201 GARRISON RD - FORT ERIE - L2A1N8	68430934	440498750	0.155349
FORT ERIE COMMUNITY CU - 201 JARVIS ST - FORT ERIE - L2A2S7	21487333	434487775	0.049454
GANARASKA CREDIT UNION - 17 QUEEN ST - PORT HOPE - L1A2Y8	1235005	28811840	0.042864
GARDEN CITY CREDIT UNION LTD - 2 NELSON ST - ST CATHARINES - L2M7M9	41180018	541825370	0.078002
HALD-NOR COMM CREDIT UNION LTD - 22 CAITHNESS ST E - CALEDONIA - N3W1B7	2118947	38653300	0.054819
HALTON COMMUNITY CREDIT UNION - 187 GUELPH ST - GEORGETOWN - L7G4A1	36765325	423106020	0.086894
HALTON COMMUNITY CU LTD - 44 MAIN ST E - MILTON - L9T1N3	20342222	842043505	0.024158
HAMILTON COMMUNITY CU - 698 KING ST E - HAMILTON - L8M1A3	49709523	473355030	0.105015
HEPCOE CREDIT UNION - 297 WELLINGTON ST E - AURORA - L4G6K9	17688155	1151551200	0.01536
HEPCOE CREDIT UNION - 320 HOLT RD RR 2 - BOWMANVILLE - L1C3K3	78313208	788527315	0.099318
HEPCOE CREDIT UNION - 9050 YONGE ST - RICHMOND HILL - L4C9S6	20968843	781097565	0.028845
HEPCOE CREDIT UNION LTD - 320 HOLT RD RR 2 - BOWMANVILLE - L1C3K3	68542031	701594140	0.097695
HEPCOE CREDIT UNION LTD - 859 HYDRO RD - MISSISSAUGA - L5E3C1	26596405	511581660	0.051989
HEPCOE CREDIT UNION LTD - 1450 KINGSTON RD - PICKERING - L1V1C1	73983044	1012215990	0.07309
HEPCOE CREDIT UNION LTD - 400 DUNDAS ST W - WHITBY - L1N2M7	94480424	1213364975	0.077866
INDUSTRIAL FAMILY CREDIT UNION - 1005 KING ST E - HAMILTON - L8M1C6	42808519	449416885	0.095253
INDUSTRIAL FAMILY CREDIT UNION - 132 MELVIN AVE - HAMILTON - L8H2J8	35289902	401553540	0.087883
JET POWER COMMUNITY CU - 334 QUEEN ST S - BOLTON - L7E4Z9	198833124	1443189860	0.137773
JET POWER COMMUNITY CU - 2829 DERRY RD E - MISSISSAUGA - L4T1A5	32556557	473430310	0.068767
JET POWER CREDIT UNION LTD - 201 COUNTY COURT BLVD - BRAMPTON - L6W4L2	29303639	523702770	0.055955
LATVIAN CREDIT UNION LTD - 16 QUEEN ST N - HAMILTON - L8R2T8	38657008	630459010	0.061318
MC MASTER SAVINGS & CU LTD - BOX 2000 - HAMILTON - L8N3Z5	28070353	300218475	0.0935
NIAGARA CREDIT UNION - 1561 HIGHWAY 55 - VIRGIL - L0S1T0	27104336	217881255	0.1244
NIAGARA CREDIT UNION LTD - 4520 ONTARIO ST SS 2 - BEAMSVILLE - L0R1B5	42830272	530849010	0.080713
NIAGARA CREDIT UNION LTD - 1401 PELHAM ST - FONTHILL - L0S1E0	65548448	426514395	0.153684
NIAGARA CREDIT UNION LTD - 155 MAIN ST E - GRIMSBY - L3M1P2	45586039	640967425	0.071121
NIAGARA CREDIT UNION LTD - 6175 DUNN ST - NIAGARA FALLS - L2G2P4	104115871	547721905	0.190089
NIAGARA CREDIT UNION LTD - 4780 PORTAGE RD - NIAGARA FALLS - L2E6A8	24531516	760301970	0.032265
NIAGARA CREDIT UNION LTD - 43 CLARENCE ST W - PORT COLBORNE - L3K3G1	5743680	118399135	0.048511
NIAGARA CREDIT UNION LTD - 75 CORPORATE PARK DR - ST CATHARINES - L2S3W2	30991816	510791325	0.060674
NIAGARA CREDIT UNION LTD - 111 COURTLAND ST - ST CATHARINES - L2R6P9	47262069	183401050	0.257698
NIAGARA CREDIT UNION LTD - 210 GLENDALE AVE - ST CATHARINES - L2T3Y6	104533307	814538280	0.128334
NIAGARA CREDIT UNION LTD - 531 LAKE ST - ST CATHARINES - L2N4H6	45742289	901042995	0.050766
NIAGARA CREDIT UNION LTD - 350 SCOTT ST - ST CATHARINES - L2N6T4	100195185	1049494615	0.09547
NIAGARA CREDIT UNION LTD - 2763 STEVENSVILLE RD - STEVENSVILLE - L0S1S0	12367787	71313080	0.173429
NIAGARA CREDIT UNION LTD - HIGHWAY 8 - VINELAND - L0R2C0	31731164	371331795	0.085452
NIAGARA CREDIT UNION LTD - 3370 REGIONAL ROAD - VINELAND - L0R2C0	3770549	247692630	0.015223
NIAGARA CREDIT UNION LTD - 1561 HWY 55 - VIRGIL - L0S1T0	27104336	217881255	0.1244
NIAGARA CREDIT UNION LTD - 18M80 HWY 3 - WAINFLEET - L0S1V0	39350417	90139710	0.436549
NIAGARA CREDIT UNION LTD - 610 NIAGARA ST - WELLAND - L3C1L8	42033502	738363665	0.056928
OSHAWA COMM CREDIT UNION LTD - 214 KING ST E - OSHAWA - L1H1C7	30096027	1591989615	0.018905
PACE SAVINGS & CREDIT UNION - 10 PEEL CENTRE DR - BRAMPTON - L6T4G4	74650170	1795845190	0.041568
PACE SAVINGS & CREDIT UNION - 201 CITY CENTRE DR - MISSISSAUGA - L5B2T4	28703556	936148890	0.030661
PACE SAVINGS & CREDIT UNION - 5935 MAVIS RD - MISSISSAUGA - L5R3T7	40924398	850254485	0.048132
POLISH PARISHES CREDIT UNION - 3015 PARKERHILL RD - MISSISSAUGA - L5B4B2	52475316	1073241530	0.048894
POLISH ST CATHARINES CU - 45 FACER ST - ST CATHARINES - L2M5H7	31751739	560169920	0.056682
PROVINCIAL CIVIL SERVANTS CU - 119 KING ST W - DUNDAS - L9H1V1	166450768	1286423935	0.12939
RESURRECTION PARRISH CU - 2185 STAVEBANK RD - MISSISSAUGA - L5C1T3	23339022	1313451920	0.017789
SAINT CASIMER'S CREDIT UNION - 709 BARTON ST E - HAMILTON - L8L3A5	23695040	325264840	0.072848
SAINT LAWRENCE PARISH CU - 475 MARY ST - HAMILTON - L8L4X3	21771534	275383405	0.079059
SHERIDAN PARK CREDIT UNION LTD - 2251 SPEAKMAN DR - MISSISSAUGA - L5K1B2	36452392	1287460855	0.028313

APPENDIX V: INDEX VALUES BY FINANCIAL FIRM

SLOVENIA PARISHES CREDIT UNION - 23 DELAWANA DR - HAMILTON - L8E3N6	675181251	633790630	0.106531
SO-USE CREDIT UNION LTD - 26 EGLINTON AVE W - MISSISSAUGA - L5R3E7	133507251	900633325	0.148237
SO-USE CREDIT UNION LTD - 31 BLOOR ST E - OSHAWA - L1H3L9	35762092	547093275	0.065367
ST STANISLAUS CREDIT UNION - 50 RICHMOND ST E - OSHAWA - L1G7C7	57324196	1017217655	0.056354
ST STANISLAUS PARISH CU - 1900 DUNDAS ST E - MISSISSAUGA - L4X2Z4	25553726	421940285	0.060562
ST STANISLAUS-ST CASMIR'S CU - 40 JOHN ST - OAKVILLE - L6K1G8	34952334	493878810	0.0708
STARNEWS CREDIT UNION LTD - 1 CENTURY PL - WOODBRIDGE - L4L8R2	35509815	442564920	0.060236
TAIWANESE CANADIAN TORONTO CU - 3636 STEELES AVE E - MARKHAM - L3R1K9	20784214	482236760	0.0431
TALKA LITHUANIAN CREDIT UNION - 830 MAIN ST E - HAMILTON - L8M1L6	50866144	500792080	0.101571
THOROLD COMMUNITY CREDIT UNION - 63 FRONT ST S - THOROLD - L2V1W8	54713491	492511125	0.111091
TWIN OAK CREDIT UNION - 464 MORDEN RD - OAKVILLE - L6K3W4	74182703	1038787855	0.071413
TWIN OAK CREDIT UNION LTD - 2150 STEELES AVE E - BRAMPTON - L6T1A7	4381287	190015670	0.023057
TWIN OAK CREDIT UNION LTD - 200 WILLIAMS PKY - BRAMPTON - L6X4G4	68019281	1051849515	0.064666
TWIN OAK CREDIT UNION LTD - 1045 INDUSTRY ST - OAKVILLE - L6J2X3	36128791	1190944800	0.030336
UKRAINIAN CREDIT UNION LTD - 118 NIAGARA ST - ST CATHARINES - L2R4L4	23773372	476283540	0.049914
UKRANIAN CREDIT UNION LTD - 38 JACKSON AVE - OSHAWA - L1H3C3	88388084	561644555	0.157374
UXBRIDGE CREDIT UNION - 70 BROCK ST W - UXBRIDGE - L9P1P4	72682967	494583295	0.146958
WIRA HAMILTON CREDIT UNION LTD - 239 KENILWORTH AVE N - HAMILTON - L8H4S4	23673013	464880620	0.050945
CAISSE POPULAIRE - 287 KILLALY ST E - PORT COLBORNE - L3K1P3	23444850	412229930	0.056873
CAISSE POPULAIRE CTR-SVC - 284 GENEVA ST - ST CATHARINES - L2N2E8	52766100	511650910	0.103129
CAISSE POPULAIRE WELLAND LTD - 6700 MORRISON ST - NIAGARA FALLS - L2E5Z8	72237466	880301925	0.08206
CAISSE POPULAIRE WELLAND LTEE - 59 EMPIRE ST - WELLAND - L3B2L3	87881202	472227775	0.186099
	Average	48235611	636784284
	Min	808773	28811840
	Max	214448033	1795845190
	Std Dev	33051803.86	319487253.9

Appendix VI: Review of Other Indices

This appendix provides brief reviews of various other indices not mentioned in the text of this document. The description includes stock indices and the consumer price index.

Securities Averages and Indicators

In this section the mathematics of averages, indices and technical indicators used in the securities industry are discussed. Once the possible ways of constructing an index and the benefits and drawbacks are illustrated two examples of indices are given (TSE 300 and Toronto 35).

Most indices begin with some type of average or mean. The arithmetic mean is intended to measure the central, typical or representative value of a range of values that are closely related in magnitude. In a statistical sense, the unweighted arithmetic average best represents the typical value of a set of values only if the difference between the highest and the lowest values in this set is relatively small.

Geometric mean is used primarily when there is a large spread between the lowest and highest values of a set. It is determined by taking the Nth root of the product of N values.

$$\text{Geometric average} = \frac{(A*B*C*...*Z)^{1/26}}{d}$$

One property of the geometric mean is that price changes of the higher-valued items have no greater effect on the average than similar percentage changes in the lower values items. Therefore geometric average is often referred to as an equally weighted average. Also the value will always be smaller than the arithmetic mean

The divisor shown is not part of the definition of the geometric mean. It is included in the equation as a parameter that allows adjustment of the mean to keep its value unchanged when the list of values in the numerator is modified. Many stock indicators are based on the arithmetic average calculation and in the event that a component must be added or deleted some provisions must be made to ensure the overall average price of the indicator remains the same. This is important because if a component (issue) is removed or added and the denominator is not adjusted the effect may be that the index shows a drastic change in the market, which is not a reflection of the activity only of the change in the index calculation. To ensure index continuity over time the divisor is adjusted.

"If the average was computed after the change without adjusting the divisor, then its value would always be distorted and would never equal the true average value. As a consequence, the historical continuity would be lost"

The formula for determining a new divisor is the following:

$$\text{New divisor} = \frac{\text{New total of stock prices}}{\text{Old total of stock prices}} * \text{Old divisor}$$

(this formula also applies in the event of a stock split)

Narrow-Based indices have a small number of components and are usually concentrated on a particular market sector. Broad-based generally cover an entire industry or market.

Elementary Indices: are intended to measure the values of a single variable it can be defined and measured as the ratio of the observed current price to a reference price of the base period. This is called a relative index (Index = P_t/P_o). The current value of an index is $I_t = (P_t/P_o)*I_o$.

Composite Indices

An index of a set of combined variables is considered a composite index. The fundamental problem in devising a composite index is to find the appropriate formula to express the combined effect of the relevant variables. Here are some examples

Dow Jones Average: Is a stock price average computed by Dow Jones & Company. The "Dow" is the most commonly used indicator of the general trends in stock and bond prices in the United States. Dow Jones & Company, a financial news publisher founded by Charles Henry Dow and Edward D. Jones, began computing a daily industrial average in 1897, using a list of 12 stocks and dividing their total price by 12. The list of stocks has since been broadened, and the divisor has been adjusted to compensate for stock splits, stock substitutions, and significant dividend changes. Thus, the averages are no longer arithmetic means but are averages in the sense of indicators of general market price trends. The most commonly quoted is the industrial average, based on the prices of 30 selected industrial stocks. The other Dow Jones averages published include one based on 20 transportation stocks, one based on 15 utility stocks, a composite based on all 65 stocks, and several bond averages.

Laspeyres index: was proposed by economist Étienne Laspeyres (1834-1913) for measuring current prices or quantities in relation to those of a selected base period. A Laspeyres price index is computed by taking the ratio of the total cost of purchasing a specified group of commodities at current prices to the cost of that same group at base-period prices, and multiplying by 100. The base-period index number is thus 100, and periods with higher price levels will have index numbers greater than 100. The distinctive feature of the Laspeyres index is that it uses a group of commodities purchased in the base period as the basis for comparison. In other words, in computing the index, a commodity's relative price (the ratio of the current price to the base-period price) is weighted by the commodity's relative importance to all purchases during the base period. Compare Paasche index.

Some observers believe that the Laspeyres price index tends to overstate price increases because, as prices change, consumers normally alter their patterns of consumption to include smaller amounts of products with large price increases and larger amounts of products with little or no price increases. If they can do this without reducing their total satisfaction, the use of base-period commodity selections tends to overstate declines in the standard of living. The Laspeyres quantity index operates in a similar way, using base-period prices to compare aggregate production levels in two periods.

Paasche index, index developed by German economist Hermann Paasche for measuring current price or quantity levels relative to those of a selected base period. It differs from the Laspeyres index (q.v.) in that it uses current-period weights; that is, in computing the index, a commodity's price relative (ratio of current price to base-period price) is weighted by the commodity's relative importance to all purchases in the current period. Taking the ratio of the total cost of purchasing a specified bundle of current-period commodities valued arrives at the index at current prices to the value of those same commodities at base-period prices and multiplying by 100.

The Paasche price index tends to understate price increases, since it already reflects some of the change in consumption patterns with which consumers respond to price increases (i.e., increased consumption of goods that show little or no price change).

The Toronto Stock Exchange 35 Index

The Toronto 35 Stock Index is a narrow-based index of the share prices of 35 Canadian blue-chip companies. Its changes closely parallel those in the TSE 300 Composite Index. Developed in 1987, the index is also capitalization-weighted by the Paasche formula and its base level was set at 100 as of 1987. Since its formation, the index has been the basis for European-style, cash-settled index option contracts that are traded on the TSE under the ticker symbol TXO, while similarly based futures contracts are traded on the Toronto Futures Exchange under the ticker symbol TXF.

$$\frac{\text{Aggregate QMV}}{\text{Divisor}} = \text{Toronto 35 Index (SPIV)}$$

- Aggregate QMV =** The sum of the quoted market value of the 35 issues which comprise the Index. The QMV is (# of predetermined shares) x price
- Predetermined Shares =** Number of shares allocated to each in the Index (i.e. 2000 Abitibi-Price (A), 2000 BCE Inc. (B), etc.).
- Price =** The last trade price for a board lot of shares. This information is obtained directly from the TSE on-line trading system.
- Divisor =** Whenever a change to the Index occurs (i.e., additions, deletions, or large stock/cash distributions). The divisor is adjusted in order to ensure that the Index level remains unaltered following the changes.

The TSE 300 Composite Index

The TSE 300 Composite Index is a tool used to measure price performance of the broad Canadian equity market. The current index was created in January 1977, and is a broad-based index of 300 listed stocks divided into 14 industry sectors. To be included in the index the stocks are selected on the following criteria:

- Only common shares are included
- Company must be incorporated in Canada or be substantially Canadian-owned
- Stock must be listed for at least 12 months prior to consideration
- Capitalization must be at least C\$3 million
- Stock must trade at least 25,000 shares for a value of C\$1 million in the year prior to consideration.

The index is capitalization-weighted by use of the Paasche formula (basis of the current-year method) which is defined as follows (base value was set at 1000 in 1975):

$$\frac{\text{Aggregate Float QMV}}{\text{Divisor}} \times 1000 = \text{TSE 300 Index (SPIV)}$$

Aggregate Float QMV = The sum of the float quoted market value of the 300 issues which comprise the Index. The float QMV is (outstanding shares - control block) x price

Outstanding Shares = Number of shares each company issued and outstanding. This information is obtained from the TSE's Listings Department and the individual companies.

Control Block = any individual or group of related individuals who control 20% or more of the outstanding shares. This information is obtained from each company's information circular, contact with the company, or from insider reports from the Ontario Securities Commission.

Price = The last trade price for a board lot of shares. This information is obtained directly from the TSE on-line trading system.

Divisor = The trade-weighted average float quoted market value for all original Index stocks for the year 1975. Whenever a change to the Index occurs (i.e., additions, deletions, changes in share capital), the divisor is adjusted in order to ensure that the Index level remains unaltered following the changes.

1000 = This multiplier is always 1000. It was put in place so the start-up of the Index level would be approximately 1000 in 1977.

References:

Berlin, Howard M. The Handbook of Financial Market Indices, Averages, and Indicators
Dow Jones-Irwin, Illinois 1990

"Dow Jones average" Britannica Online. <<http://www.eb.com:180/cgi-bin/g?DocF=micro/176/89.html>> [Accessed 21 January 1999].

"Laspeyres index" Britannica Online. <<http://www.eb.com:180/cgi-bin/g?DocF=micro/339/43.html>> [Accessed 21 January 1999].

"Paasche index" Britannica Online. <<http://www.eb.com:180/cgi-bin/g?DocF=micro/446/36.html>> [Accessed 21 January 1999].

Consumer Price Index

The consumer price index is a measure of living costs based on changes in retail prices. Such indices are generally based on a survey of a sample of the population in question to determine which goods and services compose the typical "market basket." These goods and services are then priced periodically, and their prices are combined in proportion to the relative importance of the goods. This set of prices is compared with the initial set of prices (collected in the base year) to determine the percentage increase or decrease.

Consumer price indices are widely used to measure changes in the cost of maintaining a given standard of living. Such indices are available for more than 100 countries (as in the United Nations' Monthly Bulletin of Statistics) and are usually prepared by the country's ministry of labour or central statistical office. The indices of the various countries differ widely in coverage and methods, but there are some general characteristics that can be described.

The population group covered almost always includes families of wage and salary earners, but the indices vary in the extent to which they include single individuals and other occupational groups such as the self-employed or professionals. It is quite common for the indices to refer only to urban areas, and some are restricted to a limited number of cities (e.g., six state capitals in Australia) or even to the capital city alone (e.g., Mexico City). Some indices are, of course, broader in coverage; the Japanese index, for example, includes all households, urban or rural, except one-person households and those headed by farmers or fishermen. These limitations in the coverage of the indices are often overlooked. For broad analytical uses such as measuring changes in the national welfare, a comprehensive index is needed that covers the whole population, including persons living in rural areas, single persons, and high-income families in urban areas.

In most countries the consumer price indices, usually published monthly, include indices for major categories of expenditures such as food, clothing, rent, and so forth. Sometimes they include more detailed categories (such as dairy products) and even individual items (such as milk). This depends partly on the number of products for which prices are gathered.

The most common formula used in calculating consumer price indices is a weighted arithmetic mean of price relatives. The price relatives described earlier are weighted according to the amounts consumers spend on each product; the resulting figures are summed for all commodities and divided by the sum of the base year expenditures for the same collection of commodities.

Reference:

"consumer price index" Britannica Online. <<http://www.eb.com:180/cgi-bin/g?DocF=micro/142/5.html>> [Accessed 21 January 1999].

Appendix VII: The Financial Services Industry in Canada

Historically, the Canadian financial sector was divided into the four pillars of banking, trust, insurance and securities activities. A series of reforms has led to considerable, though not complete, relaxation of those boundaries. These changes mean that more institutions may offer the same products. The resulting increase in competition gives the consumer more innovative products, improved access to financial services, greater convenience and more attractive pricing.

In 1992, significant revisions to the Bank Act, integrated with changes to federal legislation governing other types of financial institutions, resulted in expanded bank activities both within and outside the financial sector. Banks now have the right to own a broader range of institutions within the financial sector. They gained the right to own securities dealers in 1987 and now may own trust firms and insurance companies.

There are more than 3,000 organizations in Canada providing financial services. Canada's 54 banks compete vigorously with each other and credit unions caisses populaires, trust co's, loan and mortgage companies, life and health insurance companies, pension funds, mutual fund companies and government agencies for retail and business customers.

Chartered Banks

Establishments of companies, chartered under the Bank Act and listed in Schedule "A" or "B" of the Bank Act, primarily engaged in banking activities such as the creation of deposit facilities, transfer of deposit monies and provision of credit. As part of these activities, banks accept deposits from individuals and other entities and make them available through loans to, and investments in, all sectors of the economy. In addition, some of the deposit liabilities of the banks serve as a means of payment and therefore, as a medium of exchange.

Canada's 54 banks employ more than 221,400 people. Manage over \$1.2 trillion in assets. Operate over 8,140 branches and 14,484 automated banking machines. In 1992, the Bank Act and the legislation governing other types of financial institutions underwent major revisions and increased competition by permitting banks, trust and loan companies to diversify into each other's markets. This public-policy framework continues to evolve. Rapid industry changes are being powered by technological innovation, globalized financial markets and shifting customer demographics, expectations and behavior. Financial institutions are trying to respond through mergers, joint ventures, strategic alliances and acquisitions. Along with these changes the branch service network becomes a larger issue. Banking is a high-volume, low-margin industry: in percentage terms, profit margins are slim. For every \$100 of assets (including loans) in 1997, banks earned 71 cents on average.

Net interest income represents roughly 55% of gross revenues and fee-based income represents 45%. Of total revenues, personal service fees account for only about 4%. In 1997, the major banks paid \$37.7 billion in interest expenses, more than \$14.8 billion to employees and over \$7 billion to Canadian suppliers for goods and services. These and other expenses, including \$6.9 billion in taxes and levies and \$1.9 billion in provisions for credit losses, led to total expenditures by the major banks of close to \$70 billion in 1997 to earn \$ 7.5 billion in net income globally.

Miscellaneous Banking Facts:

- As of Sept 1997 banks had \$321 billion in outstanding consumer loans
- Mortgages held, over 2.5 million
- In 1997, banks and their subsidiaries directly employed more than 221,400 people an increase of 4% since 1994
- The six largest banks have a payroll of \$13.8 billion (1.6% of Canadian employment)
- Interest-based activities are still the largest source of bank revenues but they are declining in proportion to other sources
- When ranked against international banks by asset size in fiscal 1996 - Royal was 50th, CIBC 54th, BoM 65th, Scotia 75th, TD 86th, National 174th. But in the early 1980s there were four Canadian banks among the world's 50 biggest banks; by 1996 Canada's largest bank ranked 50th in the world in terms of assets.

Credit Unions

Alphonse Desjardins established the first credit union in Canada in 1900 in Quebec, as a *caisse populaire*, in response to the banks' policies of only lending money to merchants and industrialists. Farmers, labourers, tradesmen, and fishermen had been able to obtain credit from moneylenders, but only at exorbitant interest rates. The *caisses populaires* were owned and controlled by the people in the local community, based on the principle of people helping each other. Each *caisse populaire* provided savings and loan services, but only to members, and only to those in the local parish, where people knew each other. Small loans were preferred, and were granted where it was felt to be productive or helpful to the borrower.

Miscellaneous Credit Union Facts

- Typically, Credit Union members are related by a common bond (eg. Living in the same community, working in the same occupation or company, or being part of the same religious group).
- 72.5% of the Quebec population were members, Saskatchewan with 58.%, British Columbia and Nova Scotia with 35%, Ontario with 19%, and the lowest is Newfoundland which had 7.5% in 1991
- By 1994 more than one in three of all Canadians was a member of a credit union
- Credit unions are provincially regulated therefore British Columbia can sell insurance however Ontario credit unions cannot
- Credit unions and *Caisse populaires* operate differently from other financial institutions in that they are owned by their members, and are democratically run.

Each member is required to purchase a nominal share in the credit union (which may be as low as \$5), and has one vote toward a voluntary board of directors. Earnings are distributed back to members based on their use of the services provided.

- Credit Unions have a reputation for being friendly and providing good service, and are the most highly rated of the financial institutions in this regard. They not only provide members with financial services, but contribute to the community by investing in local projects, and sponsor local events.
- Credit unions have typically had lower loan losses than banks. In addition to a lower loss ratio, credit unions had the lowest turn down rate for loans to small and medium-sized businesses (although at a slightly higher interest rate). Typically, a credit union knows the member requesting a loan, having had past dealings with him or her.
- Credit unions have been innovative, being the first financial institutions to offer daily interest savings accounts, variable rate mortgages, debit cards, and weekly payment mortgages. Caisse populaires in Quebec were among the first users of automated teller machines.
- In more than 300 communities across Canada the credit union is the only financial service institution
- Credit Union Central of Canada is the system's finance facility and represents 835 credit unions coast to coast. Canada's credit unions have combined assets in excess of \$48 billion and currently serve more than 4.5 million Canadians.
- Vancouver City Savings Credit Union, is leading a movement to combine over a dozen credit unions assets and form a "national community bank." This would require relatively minor changes to the Co-operative Credit Associations Act, however a community bank could not happen without the creation of a new category, or schedule, of banks under the Bank Act.
- Like the banks, the credit unions are seeking from Ottawa the right to retail insurance. They also want to be able to take trust deposits.

Trust Companies

These are establishments operating under the Trust Companies Act or corresponding provincial legislation. They are primarily engaged in two distinct activities, namely banking-type activities and fiduciary activities. As part of the first, they accept deposits and make them available to the economy primarily in the form of mortgage loans. Under the fiduciary activity, they may act as executors, administrators or receivers of trusts of all types, act as agents for stock and bond issues, act as real estate agents and managers, act as investment managers, receive or manage sinking funds, act as custodians, and administer pension plans. Establishments known as retirement savings funds and estate, trust and agency funds administered by trust companies are included.

Trust services for individuals tend to centre on the administration of estates. Other personal trust work of trust companies is concerned chiefly with living trusts and testamentary trusts. Any person during his lifetime may convey property in trust to a trust company with instructions as to the disposal of the income from the property and eventually of the property itself. Such living trusts are used especially by the wealthy who seek to reduce the burden of estate taxes. Testamentary trusts, which originate in

wills, arise when a person stipulates that his estate is not to be distributed but is to be held in trust for a certain period of time.

Miscellaneous Trust Information

- In 1998, the trust companies in Canada earned over \$4,228,000 while operating were approximately \$3,945,000. Assets amounted to over \$54,178,000.

References:

Canadian Bankers Association Canadian Bank Facts published by the CBA, 1997-1998 version. <http://www.cba.ca/eng/Tools/Brochures/BankFacts.pdf> accessed 1999-05-06.

Pille, Peter. Performance analysis of Ontario credit unions. Ph.D. Thesis, Department of Mechanical and Industrial Engineering, University of Toronto, 1998.

Gordon, Sheldon More power to the credit unions *Canadian Banker*, Toronto; Jan/Feb 1999

North, David Brother, you're in my way *Canadian Business' Toronto'* Jul 31-Aug 14, 1998

Blackwell, Richard Ontario law expands credit unions' powers *Financial Post*; Toronto; Feb 21, 1995

Desjardins: A model for the rest of Canada? *Canadian Banker*; Toronto; Jan/Feb 1999; Anonymous

"trust companies" Britannica Online. <<http://www.eb.com:180/cgi-bin/g?DocF=micro/142/5.html>> [Accessed 21 January 1999].

Statistics Canada, Canadian Statistics <http://www.statcan.ca/english/Pgdb/Economy/financ.htm#tru> [Accessed 21 January 1999].