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The Trade Opportunity Matrix (TOM): An Overview of Canadian Export Opportunities

Corporate and International Trade Intelligence
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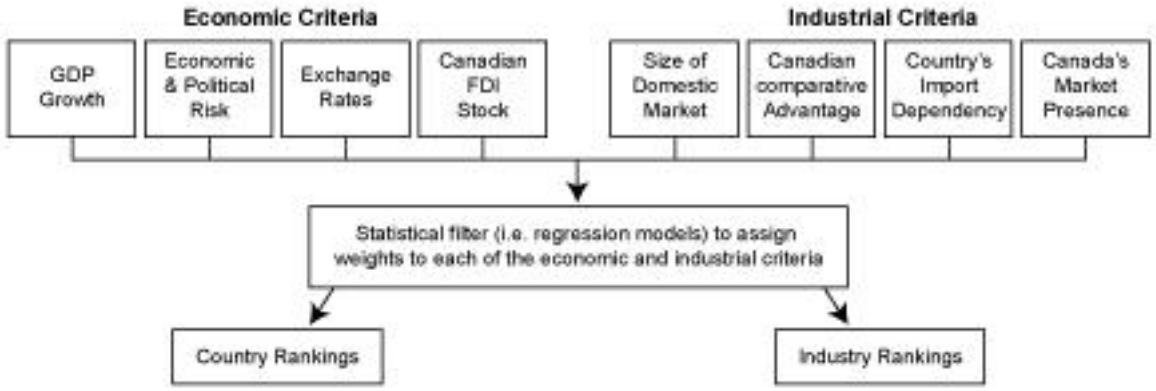
Executive Summary

Canadian companies that want to expand into foreign markets are often in a difficult position. Though a large amount of trade intelligence is available to help them decide which markets to target, this information can often be contradictory, subject to constant change and not necessarily relevant to the company's specific area of business. With so much information available, but of which only a small portion is applicable to them, exporters often rely on generic economic information, such as a country's population size or its GDP growth rate. These indicators, while important, provide little information about their industry in particular, and can lead to sub-optimal decisions when it comes to market selection.

This is where the Trade Opportunity Matrix (TOM) can help. TOM is an empirically-based tool that provides an objective and forward-looking analysis of the most attractive markets for Canadian exporters. (The model focuses on Canadian exports and its results do not apply to exports from other countries). TOM uses up-to-date statistics on national economies and industries to rank 69 countries according to their potential for business in 44 industries, essentially indicating where the greatest potential for new business lies. In addition, for each of the 69 countries, TOM ranks the sectors that are most promising for exporters. The rankings are intended to reveal the sectors and countries where Canadian exporters are most likely to succeed. This could be either because Canadian exporters have a comparative advantage relative to domestic and foreign competitors, or because there is a growing demand for the products they export.

Figure 1: TOM Structure



In order to generate these rankings, TOM uses historical data to estimate statistical models of the drivers of Canadian exports. These models quantify the size and relative significance of the industrial, economic and political economy determinants of Canada's merchandise exports. These relative weights are then used to rank Canadian export opportunities across countries and industries. To rank the best countries per industry, TOM feeds in the latest available data into these models to project what ideally should be the top destinations for Canadian exports at any given point in time. These rankings can then be compared to the actual list of Canada's export markets, providing a starting point for identifying new opportunities. TOM is easily updated, ensuring that its results always reflect the evolving situation in countries and industrial sectors.

TOM's results can be used as a starting-point for strategic decision-making. It is a tool that can help in making an initial triage of countries, with further selection being guided by more detailed industry-specific analysis. Indeed, TOM is most useful when its limits are appreciated. Like all statistical models, TOM uses assumptions and generalizations in order to generate an acceptable approximation of reality. Moreover, TOM's precision is limited by data availability for both countries and sectors. Finally, it is important to be aware that within any industry there are wide variations amongst all its sub-sectors and that this could have an impact on the selection results. For these reasons, TOM output should always be complemented by more in-depth analysis and sector-specific knowledge.

1.0 Introduction: An overview of Canadian export opportunities

Canadian companies that want to expand into foreign markets are often in a difficult position. Though a huge amount of intelligence is available to help them decide which markets to target, this information can often be contradictory, subject to constant change and may not necessarily relate to the company's specific sector of operations. For example, China is growing at a strong pace, but is similar growth also occurring in its wood products sector? Costa Rica has strong institutions, but how competitive is its apparel industry relative to that of Canada? Brazil is a populous country but what are the prospects for growth in its agricultural machinery market? A lack of clarity in the interpretation of all this intelligence can leave the Canadian exporting community uncertain as to which markets to target for expansion. Indeed, many exporters who are unable to fully exploit the information at their disposal must rely on analysis that only considers overall measures of economic potential, such as GDP growth or population size, but says little with respect to their industries in particular.

Up until now, the answer for many companies has been to limit their foreign operations to the United States and perhaps a handful of Western European countries. Unfamiliarity with distant markets and lack of pertinent information are among the reasons most Canadian exporters are not well diversified beyond the US.

Of course, as suggested by numerous empirical studies, as well as common sense, having a strong trade relationship with our largest neighbour is only natural. But ignoring market opportunities outside of the US could limit new growth opportunities for a number of reasons.

Table 1: Relative Riskiness in 2007 – Ratio of Claims Submitted to EDC Business Volume

Rank	Market Risk Ranking – Ratio of Claims to EDC Business Volume
1	Netherlands
2	Mexico
3	Germany
4	United States
5	Brazil
6	United Kingdom
7	France
8	Venezuela
9	South Korea
10	China
11	Japan
12	Chile

Source: EDC Corporate Research Department.

One of them is that overseas markets, especially emerging economies, often have better growth prospects than the US. A second is that other countries may be in a different business cycle than the United States, such that when growth conditions are poor south of the border, they may be better elsewhere. A third reason is that US protectionist pressures (and heightened border security controls) could harm some Canadian industries, making it worthwhile for them to expand into non-US markets. A fourth is that, despite an overall benign economic and institutional environment, the US remains probably one of the most competitive and difficult markets to penetrate (see Table 1). Also, from a purely strategic perspective, it is good business practice to begin establishing a presence sooner rather than later in areas that are likely to become the world's leading markets of tomorrow.

Given the importance of diversifying Canada's export-market base, we have developed a unique methodological tool called the Trade Opportunity Matrix (TOM). TOM filters through available statistics on countries and industries to provide guidance to the Canadian exporting community. The tool ranks 69 countries according to their potential for business in 44 industries. It also ranks the

same sectors in relation to their business prospects across each of the countries involved. This bottom-up approach uses quantitative methods to evaluate country and industry-specific statistics and projections according to their importance in determining future exports. Taking into account all this information, TOM is able to indicate where the best opportunities lie. In addition to the statistical framework, market knowledge gleaned from EDC's country and industry exports also feeds into the determination of the rankings.

The factors considered by TOM are forward-looking, such that the analysis is "ahead of the curve." Furthermore, consistent updates will allow the rankings to evolve as the situation changes with incoming data. So, a country or a sector that is forecast to grow faster than previously expected will quickly show up in the rankings.

2.0 Methodology

TOM's primary goal is to provide a ranking of the countries offering the best sales opportunities for Canadian exporters. It ranks the "best" countries by industry, as well as the "best" industries by country. By "best", we mean the industrial sectors or countries where Canadian exporters are most likely to succeed (as measured by increased export sales). This could be either because Canadian exporters have a comparative advantage relative to domestic and foreign competitors in that country, or because there is a growing demand for the products Canadian companies export. Given that TOM aims to identify export opportunities, these "best" or top countries/sectors will often be different from the actual ranking of current export destinations.

In order to generate these rankings, TOM uses historical data as well as forecasts to estimate models of the drivers of Canadian exports. These models quantify the size and significance of the economic and political economy determinants of Canadian exports. To rank the best countries per industry, TOM then feeds the latest available data into these models to project what ideally should be the top destinations for Canadian exports at any given point in time. These rankings can then be compared to the actual list of export markets, providing a starting point for identifying new opportunities. A similar exercise is conducted to find out which sectors are most promising for exporters in a given country (e.g. if you want to do business in Brazil, which industrial sectors are the most attractive from the perspective of Canadian exporters?).

TOM uses economic and industry-specific statistics that are uniformly available for all the countries and industries in our panel (because of the scarcity of data for the services industry, we restrict our analysis to the goods sectors). The same holds true for the sectors-by-country analysis. Limiting the analysis to only what is available across our rather large data panels allows us to make even-handed country-to-country and industry-to-industry comparisons. This is essential to rank countries and sectors objectively. In addition, using a similar set of explanatory variables for all industries and countries simplifies the updating process. The downside of this method, however, is that, for some sectors, different variables (not included in our standard set) important to explaining their exports might be inadvertently excluded.

The data is taken from EDC Economics' forecasts, Bloomberg, the International Country Rating Group, and various balance of payments sources. Industry data is from Global Insight and is based on the International Standard Industry Classification (ISIC) code. The final data set includes both historical data and forecasts. From an operational standpoint, the data is updated every six months, though interim updates are possible to reflect major changes in the forecasts or large revisions in the historical data.

2.1 Export Opportunities: Top Countries by Industry

A longitudinal estimation technique is applied to generate TOM's sectoral models. Panel analysis is appropriate to deal with a heterogeneous sample of countries and industries over a fairly long period of time. This type of estimation allows for more data points, which greatly augments the degrees of freedom in our sample, and hence the reliability of the estimates. Moreover, fixed effects techniques, when selected to be the appropriate panel technique, can single out country/sector specificities that are not captured by the statistics at hand.

We estimate a fixed-effects and a random-effects model[1] for each one of the 44 manufacturing industries in our panel (for a list of the industries, see Appendix 2). Our unrestricted models for the determinants of Canadian exports by sector are the following:

1) Fixed-effects model:

$$cx_{i,t+1}=\alpha+\alpha_i+\beta_1 gdp_{i,t+1}+\beta_2 gdp_{i,t}+\beta_3 cdia_{i,t}+\beta_4 ca_{i,t}+\beta_5 mkt_{i,t+1}+\beta_6 mkt_{i,t}+\beta_7 er_{i,t+1}+\beta_8 er_{i,t}+\beta_9 CR_{i,t+1}+\beta_{10} CR_{i,t}+\varepsilon_{i,t}$$

(2) Random-effects model:

$$cx_{i,t+1}=\alpha+\beta_1 gdp_{i,t+1}+\beta_2 gdp_{i,t}+\beta_3 cdia_{i,t}+\beta_4 ca_{i,t}+\beta_5 mkt_{i,t+1}+\beta_6 mkt_{i,t}+\beta_7 er_{i,t+1}+\beta_8 er_{i,t}+\beta_9 CR_{i,t+1}+\beta_{10} CR_{i,t}+\omega_{i,t}+\lambda_t+\mu_i$$

Where:

- α is the common intercept, α_i is the individual country intercept, $\varepsilon_{i,t}$ and $\omega_{i,t}$ are the error terms, λ_t is the time error term and μ_i is the individual error term
- $CX_{i,t+1}$ is the dollar value of future Canadian exports of goods produced in sector j to country i
- and $cx_{i,t+1}= CX_{i,t+1}/\Sigma_i CX_{i,t+1}$
- gdp_i is country i's percentage change in real gross domestic product – the term is used in both current and future values
- $CDIA_{i,t}$ is the current level of Canadian Direct Investment Abroad (measured in dollars) and $cdia_{i,t}=CDIA_{i,t}/\Sigma_i CDIA_{i,t}$
- $ca_{i,t}$ is a proxy measuring Canada's current comparative advantage in producing sector j goods relative to country i and foreign competitors (all with a presence in country i) derived as $ca_{i,t} = CX_{i,t}/MKT_{i,t}$ [2]

[1] We test whether a fixed effect or a random effect model best fits the data for each of the industries in the panel, and use the estimates of the best-fitting model for TOM. The difference between the fixed and the random effects models is that in the former we assume heterogeneous intercept coefficients, while in the latter we assume the individual effects are randomly distributed (we think of each intercept as the result of a random deviation from some mean intercept, and that these are not correlated with the individual regressors).

[2] Note that to avoid any simultaneity problems, we use a lag between this variable and the dependent variable.

- MKT_i is the market size of sector j in country i given by domestic production of product j plus net imports and $mkt_{i,t+1}=MKT_{i,t+1}/\Sigma_i MKT_{i,t+1}$ – this term is used in both current and future values
- er_i is the percentage change in the cross-exchange rate between the Canadian dollar and country i's currency
- CR_i is a proxy for country risk that is computed using EDC economic and political ratings, as well as International Country Risk Guide political rating scores[3]

The variables we have selected for the export models depend largely on the availability of statistics across our country/industry samples. To deal with potential non-stationarity issues, we express all variables in terms of percentage change (the only exception is country risk, which is a nominal variable that we know is stationary). Tests of multicollinearity were done and those variables that were found to have high cross-correlations were dropped from the estimation.

2.2 Export Opportunities: Top industries by country

The model used to determine the best or top industries by country is different than models (1) and (2) presented in the previous section. First of all, it will not contain any country macro-economic data, given that the country in question has already been determined *a priori*. Only industry data will therefore be used.

Second, we assume that the impact of industry-specific statistics is uniform across all countries. This means that, for instance, the impact of the market share or Canadian comparative advantage on Canadian exports of product j is the same in, say, Algeria as in South Africa. So in the case of ranking top the industrial sectors within a country, the individual components of our data panel are going to be the various industries (before they were the countries). We use aggregated industry data (e.g. Canadian world exports of good j, overall world market size of product j, etc.) as the dependent variable in our model. The coefficients obtained in this model are then used to rank the 44 sectors across all 69 countries in our panel.

Last but not least, we introduce some dynamic effects in this model, for the purpose of tying future with past exports. This is particularly important given the limited availability of industry data, as otherwise a substantial amount of the explanatory power of our model would depend on the constant or the disturbance terms. By having past Canadian exports of product j on the right-hand side of the equation, however, is effectively the same as including some non-measurable and unknown regressors among our explainable variables. So the model is:

(3) $cx_{j,t+1}=\alpha+\alpha_j+\delta cx_{j,t}+\beta_1 mkt_{j,t+1}+\beta_2 mkt_{j,t}+\beta_3 ca_{j,t+1}+\beta_6 ca_{j,t}+\varepsilon_{j,t}$

Where: j=Agriculture, …,Jewellery (see Appendix 2 for list of 44 industries)

[3] This composite index allows us to differentiate the countries in our sample on the basis of their economic performance, creditworthiness, the strength of their institutions, and the ease of conducting business. It also allows us to further differentiate countries based on risks particularly faced by exporters, such as the risk of expropriation, violence and transfer and convertibility. Because our in-house political risk ratings exclude developed economies, we used ICRG ratings to stratify scores amongst this group of countries. Indeed, if business conditions in Finland are known to be much better than, say, in Greece, then we need to provide an adequate score that reflects this fact in these two countries.

t=1994,…,2003

The estimation of model (3) however, presents a problem because the lagged dependent variable will be correlated with the error term. To overcome this issue, we are going to use the Arellano-Bond (1991) method that uses the Generalised Method of Moments (GMM) procedure, and treats the model as a system of equations, one for each time period. The equations differ only in their instrument/moment condition set. Both the dependent and independent variables are first differenced and become the instruments that will be then estimated. So, equation (3) becomes:

$(cx_{j,t+1}- cx_{j,t})=(\alpha-\alpha)+(\alpha_j-\alpha_j)+ \delta(cx_{j,t}- cx_{j,t-1})+\beta_1(mkt_{j,t+1}-mkt_{j,t})+\beta_2(mkt_{j,t}-mkt_{j,t-1})+\beta_3(ca_{j,t+1}-ca_{j,t})+\beta_4(ca_{j,t}-ca_{j,t-1})+(\varepsilon_{j,t}-\varepsilon_{j,t-1})$

Or, alternatively:

(4) $\Delta cx_{j,t+1}=\delta\Delta cx_{j,t}+\beta_1\Delta mkt_{j,t+1}+\beta_2\Delta mkt_{j,t}+\beta_3\Delta ca_{j,t+1}+\beta_4\Delta ca_{j,t}+\Delta\varepsilon_{j,t}$

Note that in model (4), the industry-specific effects were eliminated by first-differencing.

3.0 Empirical Results

3.1 Top countries by industry

Models (1) and (2) have been estimated for each of the 44 sectors in our data panel. Because of the dominance of the US economy both in terms of its size and its preponderance in the Canadian trade data, we considered it an outlier and thus removed it from our panel for estimation purposes. This was done to ensure that a single country's characteristics do not dominate our estimation coefficients. Of course, we re-introduced the US when it came to ranking the countries (as it turns out, the US usually remains among those markets offering the best export opportunities).

The final specification was designed to minimize multicollinearity and has passed a battery of diagnostic tests. We retained those variables that have a persistent and robust effect, even if statistical significance is occasionally below the 95% confidence level, to ensure that all salient variables are included in the export models.[4] Robust standard errors were used with clustering around country groupings.

To determine which of models (1) or (2) was the most appropriate per sector, a Hausman test was run, combined with either an F-test[5] on the individual intercept (if the fixed-effects model was initially chosen), or a Breush-Pagan Lagrange Multiplier test[6] (if random-effects was selected). For the sake of brevity and with an aim to explain our methodology through examples, we present the results for three sectors, which follow in Table 2.

[4] In regression analysis all the variables with t-stats values higher than ±1.98 are considered significant at the 95% confidence level (assuming a large sample). This means that 19 times out of twenty, the independent variable is having an impact on the dependent variable that is different from zero.

[5] Essentially, the F-test on the individual country components α_i is used to determine whether a fixed-effects model is preferable to a simple cross-sectional model, which ignores the time-series aspect of the panel. Under the null hypothesis, the fixed components are jointly equal to zero. A rejection of the null signifies that a cross-section estimation would yield biased results, and hence the fixed-effect model is more suitable.

[6] The BP Lagrange Multiplier test is used to verify whether or not a random effects model (2) is preferable to a simple cross-section. The null hypothesis is that the variance of the individual components μ_i is zero. If the null is rejected, then the random-effects equation (2) is preferable to a simple cross-section.

Table 2: Regression results for best countries by industry

Sector	Processed Food Products	Non-Energy Mining	Metal & Wood Working Machinery
Sample size	583	391	416
R^2	0.966	0.7794	0.3963
$gdp_{i,t+1}$	0.0102 (1.95)***	0.0166 (1.95)***	0.0029 (1.66)**
$gdp_{i,t}$	0.0056 (1.67)**		
$cdia_{i,t}$			3.1794 (3.48)****
$ca_{i,t}$	5.6415 (1.33)*	0.6412 (4.41)****	
$mkt_{i,t+1}$	0.1205 (2.06)****		
$mkt_{i,t}$	0.946 (2.49)****	0.5552 (2.45)****	0.0448 (4.19)****
$er_{i,t}$			
$CR_{i,t}$			0.0001 (1.11)*

*Wald-z stats are in brackets, where ****=1%, ***= 5%, **= 10%, *=20% level of significance.*
Panel analysis was done for each of the 44 sectors to determine which variables of equation (1) or (2) were selected. Shaded areas denotes equation (2) was used.

We begin with the processed food sector (first column in Table 2). Our test results tell us that model (1) is better suited for estimating the exports of food products (sectors using the random effects model are shaded in the table). For this sector, the individual country-effects appear to be important determinants of future Canadian business abroad. As explained before, the country-effects implicitly assume all the non-measurable factors that are not specifically expressed in the left-hand side of our model. These factors could include proximity, bilateral trade agreements, reputation (the Canada-brand), etc.

The explanatory variables that we selected are future and current GDP growth (given that food-related demand is very dependent on discretionary spending, this is no surprise); Canadian food companies' comparative advantage, and the dollar amount spent on food products by the residents of country *i*. By contrast, current and future movements in the cross-exchange rate did not seem to matter much, probably because foreign food sales, like most commodities, are set in US dollars and prices tend to be relatively sticky. In addition, food product provisioning depends on fixed contract-prices (which don't adjust automatically to exchange rate fluctuations).[7] Current and future levels of country risk were also insignificant, probably because foreign demand for food products depends more on households' financial situation than on political-economic risk in the public sector (which is what this indicator primarily captures).

[7] We are not denying that an increase/decrease of the US dollar does not affect the profitability of Canadian food exporters. We are simply saying that for the purpose of ranking countries, it doesn't seem to be a major factor.

For the non-energy mining industry (second column in Table 2) the variables that were retained are future growth in gross domestic product, Canadian comparative advantage, and current spending on mining products by domestic residents of country *i*. Fluctuations in cross-exchange rates and country risk didn't seem to play a significant role, perhaps because demand for raw materials is priced in US dollars and depends more on current economic conditions. For this industry, equation (1) again was selected.

The metal and wood-working machinery sector has different determinants. The variables that were retained for this sector are forecasted GDP, the dollar-amount spent in this industry and the share of Canadian direct investment abroad. This last variable implies that cross-border investment by Canadian equipment manufacturers may well spur demand for their products. Interestingly, country risk is significant for this industry, because capital spending requires a stable political-economic environment. Model (2) was used for this industry.

In order to rank our 69 countries according to the results generated by estimating equations (1) and (2), we need to develop a matrix that makes our sector-specific results comparable across countries. To do so, we calculate the products of the estimated coefficients and the actual explanatory variables corresponding to these coefficients (e.g. we multiply the coefficient for future GDP growth with our forecast for GDP growth in each country of our panel). We then take the sum of all the multiplied terms (we also include country constants for those sectors that use the fixed-effect model) to generate a score for each country. The higher the final score, the higher the country's position in the rankings.

Table 3: Top ten country ranking for selected sectors

	TOP TEN POTENTIAL MARKETS (Processed Food)	Actual Canadian food exports 2007 (mn$)	TOP TEN POTENTIAL MARKETS (Non-Energy Mining)	Actual Canadian NEM exports 2007 (mn$)	TOP TEN POTENTIAL MARKETS (Metal/Wood working machinery)	Actual Canadian MWWM. Exports 2007 (mn$)
1	United States	11,606.8	UK	3,752.9	United States	1,311.0
2	China	621.1	Belgium	1,266.7	UK	10.4
3	Hong Kong	173.5	Japan	1,140.4	Ireland	2.3
4	Russia	224.5	Germany	781.4	France	4.0
5	Panama	16.5	Switzerland	536.2	Australia	16.8
6	India	3.3	Netherlands	240.1	Germany	24.4
7	Jamaica	46.6	China	987.2	Brazil	11.0
8	Venezuela	32.4	South Korea	158.0	Switzerland	2.9
9	Singapore	20.3	India	346.9	Netherlands	2.3
10	Japan	1,382.3	Taiwan	112.4	Chile	5.9

Values of actual exports are in millions of Canadian dollars (nominal).

In Table 3, TOM results for the three industries discussed above are compared with actual exports in 2007. Note that some of the countries that rank quite high in the top-10 chart are not necessarily those where the actual level of Canadian exports are the highest. For instance, in the processed food industry, TOM ranks China at number 2 while Japan sits at number 10, but actual Canadian food exports to Japan are much higher than shipments to China.

The reason for this discrepancy is that TOM evaluates where Canadian companies have the most export potential, which may or may not reflect where they are already doing business. The reason the data does not necessarily match the actual rankings can be due to different factors, the principal one being that TOM is a forward-looking tool that also uses forecasts to rank the countries, while actual export data refers to the past. Other differentiating factors may include sectoral specificities; a lack of awareness of buyer-seller matching opportunities; general exporter "near-home bias", whereby Canadian companies prefer to deal with more familiar markets (such as the US); and the existence of specific trade agreements and/or tariffs that may be diverting exports from markets where Canadian companies might have an edge.

TOM output, such as that seen in the examples in Table 3, constitutes a good starting point for company management to strategically select those countries where Canadian exporters could be most successful. It is important to stress that TOM rankings must be carefully interpreted and analyzed before deciding which market to target. Although TOM can quickly filter through a wealth of information with respect to sectors and countries to derive a clear bottom line, the tool remains based on approximations and broad-aggregation, and may not be perfectly applicable to a specific industry (e.g. the prepared-fish industry within the food sector; the tool and die industry within the auto sector; etc.). This means that industry-specific knowledge must complement TOM's findings to get a meaningful analysis of the best potential export markets.

We believe TOM's output would be especially useful for individual companies trying to narrow down the markets where they have the best prospects, as well as for chambers of commerce and industry associations interested in promoting business abroad.

3.2 Top sectors by country

Table 4 presents the statistical results for top industries by country that are derived from the estimation of equation (4). Again, only those variables that proved to be robust were retained. The validity of instruments was tested using a Sargan test of over-identifying restriction and serial correlation. First and second-order serial correlation in the first differenced residuals was tested using m1 and m2 statistics (Arellano-Bond 1991 test[8]). The model and the instruments used proved to be good for determining future Canadian exports, as both the Sargan test of over-identifying restriction and second-order serial correlation in the residual (m2 statistic) were not rejected.

We assumed in this model that the behaviour of the regressors would not change across countries (i.e. the impact of Canadian comparative advantage was the same in Argentina as in Egypt). Therefore equation (4) was estimated using aggregated data for Canada and the world (i.e. Canadian share of world exports for sector j; Canadian world comparative advantage in sector j; world's relative dollar spending for goods of sector j).

The results from equation (4) show us that the lagged dependent variable $cx_{j,t}$ (representing past business[9]), Canada's comparative advantage in sector j in a given country i, and the relative

[8] The GMM system estimator is consistent if there is no second-order serial correlation in the residuals (m2 statistic). The dynamic panel data model is valid if the estimator is consistent and the instruments are valid.

[9] It makes sense that the amount of past business in a given country is a good predictor of future sales in the same market, as it implies a certain relationship between Canadian exporters and foreign importers. Furthermore, this backward-looking indicator not only quantifies the degree of Canadian market penetration,

demand for product j in country i are the leading determinants of future Canadian exports in that same market.

Table 4: Top industries by country

Independent Variables	Coefficient estimates
$cx_{j,t}$	0.91951094 (20.19)*
$ca_{j,t}$	0.7291757 (2.22)**
$mkt_{j,t}$	0.4575943 (2.16)**
Sample size	428

*Wald-z stats are in brackets, where *= <1%, **= 3% or better levels of significance.*
Regression is performed using GMM system, with robust standard errors.

To rank those Canadian export sectors that had the most potential in a given country, we took the product of the estimates in Table 4 and the actual sectoral statistic corresponding to them, and then summed the totals to yield an industry score. The higher the score, the higher a given sector would rank within that country.

Table 5 shows an example of how TOM ranks different industrial sectors in the US, Mexico and the UK. Again, note that the position ranking does not necessarily correspond to the actual dollar value of Canadian exports to these same markets, for the same reasons that were mentioned in the analysis of the best countries by sector.

but also captures some immeasurable and/or hard to quantify information, such as bilateral trade agreements for certain industries or existing supplying linkages, that is not necessarily captured by the other variables of the model.

Table 5: Best sectors by country for 2007

	TOP TEN POTENTIAL SECTORS in the US	Actual 2007 exports to the US	TOP TEN POTENTIAL SECTORS in Mexico	Actual 2007 exports to Mexico	TOP TEN POTENTIAL MARKETS in the UK	Actual 2007 exports to the UK
1	ISIC 3843 - Motor Vehicles & Parts	66,802.6	ISIC 3843 - Motor Vehicles & Parts	916.3	ISIC 23 & 29 - Metals, ores, non-metallic minerals	3,752.9
2	ISIC 21 & 22 - Energy (oil and gas)	70,184.0	ISIC 1 - Agriculture, Hunting, Forestry, Fishing	757.5	ISIC 372 - Non-Ferrous Metals	2,357.7
3	ISIC 331 - Wood Products	10,672.0	ISIC 3842 - Railroad Equipment	104.2	ISIC 3845 – Aircraft	577.0
4	ISIC 341 - Paper & Products	13,531.0	ISIC 314 – Tobacco Products	140.7	ISIC 351 – Industrial Chemicals	1,400.5
5	ISIC 39 - Jewellery, Musical & Sporting Goods	2,186.7	ISIC 311 - Processed Food Products	404.7	ISIC 383 - Electrical & Electronic Products	581.0
6	ISIC 372 - Non-Ferrous Metals	17,746.5	ISIC 371 – Iron and Steel	270.4	ISIC 341 - Paper & Products	363.4
7	ISIC 342 - Printing & Publishing	1,488.0	ISIC 351 - Industrial Chemicals	333.1	ISIC 3821 - Engines & Turbines	125.5
8	ISIC 3845 - Aircraft	7,522.6	ISIC 341 - Paper & Products	203.8	ISIC 3829 – Other Machinery & Equipment	159.9
9	ISIC 354 – Petrochemicals and Coal Products	712.9	ISIC 383 - Electrical & Electronic Products	202.6	ISIC 3842 - Railroad Equipment	80.5
10	ISIC 3829 – Other Machinery and Equipment	10,078.8	ISIC 3821 – Engines and Turbines	47.2	ISIC 3851 - Professional, Science, Measuring Equipment	143.8

Values of actual exports are in millions of Canadian dollars.

The “best sectors by country” ranking could benefit Canada’s trade commissioners based abroad, who would like to support exports to specific countries by targeting Canadian companies belonging to those sectors that have the best export opportunities.

Also, this type of analysis could be used by those companies that already have in mind what market(s) they want to move into, and would therefore need to assess their potential for new export business in these countries. Of course, if a company finds that its industry is not amongst the top ten, this doesn’t necessarily mean that it would have poor prospects in that given country. Indeed, these sectors are ranked relatively to one another and not in absolute terms. This means that, if we take the US as an example, a company operating in the automotive industry has the best opportunities, relative to a company in any other industry. By contrast, a printing and publishing company, for example, may also do very well, but it will face relatively stronger headwinds in terms of competition, regulations and other factors when compared with a Canadian automotive company.

4.0 Conclusion

TOM is a statistics-based tool that quickly narrows down where the best country and industry opportunities for Canadian exporters are found. It could serve a variety of end-users, from individual companies seeking to expand into new export markets, to Canadian trade commissioners trying to foster more business for Canada by targeting those industries and countries that offer the greatest export potential.

TOM is a framework that is largely based on the objective observation of past information and future expectations, and as such, it provides an unbiased and ahead-of-the-curve type of analysis. Because of its construction, it is relatively easy to update, which insures its results are always pertinent. Recent changes in a country's or sector's performance will immediately be evident in the rankings.

The results of TOM should be used as a starting-point for strategic decision-making. It is a research tool that is best used to conduct an initial triage of countries, with further selection being guided by additional industry-specific analysis. This is because, like all statistical models, TOM uses assumptions and generalizations in order to generate an acceptable approximation of reality. Moreover, TOM's precision is limited by data availability for both countries and sectors. Finally, it is important to be aware that within any industry there are wide variations among its sub-sectors (this is especially true for those industries for which the data has been broadly aggregated) and that this could have an impact on the selection results. For these reasons, TOM output should always be complemented with more in-depth analysis and sector-specific knowledge.

Appendix 1: List of Countries

Argentina	India	Russia
Australia	Indonesia	Saudi Arabia
Austria	Iran	Senegal
Bangladesh	Ireland	Singapore
Belgium	Israel	Slovak Republic
Bolivia	Italy	South Africa
Brazil	Jamaica	South Korea
Bulgaria	Japan	Spain
Camaroon	Jordan	Sri Lanka
Chile	Kenya	Sweden
China	Kuwait	Switzerland
Colombia	Malaysia	Taiwan
Costa Rica	Mexico	Thailand
Czech Republic	Morocco	Tunisia
Denmark	Netherlands	Turkey
Ecuador	New Zealand	Ukraine
Egypt	Norway	United Kingdom
Finland	Pakistan	United States
France	Panama	Uruguay
Germany	Peru	Venezuela
Greece	Philippines	Zimbabwe
Honduras	Poland	
Hong Kong	Portugal	
Hungary	Romania	

Appendix 2: Industry Concordance Tables

ISIC Code	NAICS/HS Codes
ISIC 1 - Agriculture, Hunting, Forestry, Fishing	NAICS 11 - Agriculture, Forestry, Fishing and Hunting: NAICS 111 - Crop Production + NAICS 112 - Animal Production + NAICS 113 - Forestry and Logging + NAICS 114 - Fishing, Hunting and Trapping + NAICS 115 - Support Activities for Agriculture and Forestry
ISIC 21 & 22 - Energy Mining	NAICS 211 - Oil and Gas Extraction + NAICS 2121 - Coal Mining
ISIC 23 & 29 - Non-Energy Mining	NAICS 2122 - Metal Ore Mining + NAICS 2123 - Non-Metallic Mineral Mining and Quarrying
ISIC 311 - Food	NAICS 311 - Food Manufacturing
ISIC 313 - Beverages	NAICS 3121 - Beverage Manufacturing
ISIC 314 - Tobacco	NAICS 3122 - Tobacco Manufacturing
ISIC 321 - Textiles	NAICS 313 - Textile Mills + NAICS 314 - Textile Product Mills
ISIC 322 - Wearing Apparel	NAICS 315 - Clothing Manufacturing
ISIC 323 - Leather & Products	NAICS 316 - Leather and Allied Product Manufacturing - (NAICS 3162 - Footwear Manufacturing)
ISIC 324 - Footwear	NAICS 3162 - Footwear Manufacturing
ISIC 331 - Wood Products	NAICS 321 - Wood Product Manufacturing
ISIC 332 - Furniture & Fixtures	NAICS 337 - Furniture and Related Product Manufacturing
ISIC 341 - Paper & Products	NAICS 322 - Paper Manufacturing
ISIC 342 - Printing & Publishing	HS 4820 + HS 4821 + HS 4901 + HS 4902 + HS 4903 + HS 4904 + HS 4905 + HS 4906 + HS 4907 + HS 4908 + HS 4909 + HS 4910 + HS 4911
ISIC 351 - Industrial Chemicals	NAICS 3251 - Basic Chemical Manufacturing + NAICS 3252 - Resin, Synthetic Rubber, and Artificial and Synthetic Fibres and Filaments Manufacturing + NAICS 3253 - Pesticide, Fertilizer and Other Agricultural Chemical Manufacturing
ISIC 352 - Other Chemical Products	NAICS 3254 - Pharmaceutical and Medicine Manufacturing + NAICS 3255 - Paint, Coating and Adhesive Manufacturing + NAICS 3256 - Soap, Cleaning Compound and Toilet Preparation Manufacturing + NAICS 3259 - Other Chemical Product Manufacturing
ISIC 353 - Petroleum Refineries	NAICS 32411 - Petroleum Refineries
ISIC 354 - Petroleum & Tar & Coal Product	NAICS 324 - Petroleum and Coal Products Manufacturing - (NAICS 32411 - Petroleum Refineries)
ISIC 355 - Rubber Products	NAICS 3262 - Rubber Product Manufacturing
ISIC 356 - Plastic Products, nec	NAICS 3261 - Plastic Product Manufacturing
ISIC 361 - Pottery, China etc.	NAICS 3271 - Clay Product and Refractory Manufacturing
ISIC 362 - Glass & Products	NAICS 3272 - Glass and Glass Product Manufacturing
ISIC 369 - Non-Metallic Products, nec	NAICS 3273 - Cement and Concrete Product Manufacturing + NAICS 3274 - Lime and Gypsum Product Manufacturing + NAICS 3279 - Other Non-Metallic Mineral Product

	Manufacturing
ISIC 371 - Iron & Steel	NAICS 3311 - Iron and Steel Mills and Ferro-Alloy Manufacturing + NAICS 3312 - Steel Product Manufacturing from Purchased Steel + NAICS 33151 - Ferrous Metal Foundries
ISIC 372 - Non-Ferrous Metals	NAICS 3313 - Alumina and Aluminum Production and Processing + NAICS 3314 - Non-Ferrous Metal (except Aluminum) Production and Processing + NAICS 33152 - Non-Ferrous Metal Foundries
ISIC 381 - Fabricated Metal Excl. Mach. & Equip.	NAICS 332 - Fabricated Metal Product Manufacturing
ISIC 3821 - Engines & Turbines	NAICS 3336 - Engine, Turbine and Power Transmission Equipment Manufacturing
ISIC 3822 - Agricultural Machinery	HS 8432 + HS 8433 + HS 8434 + HS 8435 + HS 8436 + HS 8701 + HS 843710
ISIC 3823 - Metal & Wood Working Machinery	NAICS 33321 - Sawmill and Woodworking Machinery Manufacturing + NAICS 3335 - Metalworking Machinery Manufacturing
ISIC 3824 - Special Industry Machinery	HS 8429 + HS 8430 + HS 843780 + HS 843790 + HS 8438 + HS 8439 + HS 8440 + HS 8441+ HS 8442 + HS 8443 + HS 8444 + HS 8445 + HS 8446 + HS 447 + HS 8448 + HS 8449 + HS 845020 + HS 845090 + HS 845110+ HS 845129 + HS 845130 + HS 845140 + HS 845150 + HS 845180
ISIC 3825 - Office & Computing Machinery	HS 8423 + HS 8469 + HS 8470 + HS 8471 + HS 8472 + HS 8473 + HS 9009
ISIC 3829 - Machinery & Equipment nec	HS 8401 + HS 8405 + HS 8409 + HS 8413 HS 8414 + HS 8415 + HS 8416 + HS 8417 + HS 8418 + HS 8419 + HS 8420 + HS 8421 + HS 8422 + HS 8424 + 8425 + 8426 + 8428 + 8431 + 845011 + 845012 + 845019 + 845121 + 8452 + 8467 + 8476 + 8481 + 8482 + 8483 + 8485 + 8514
ISIC 383 - Electrical & Electronic Products	NAICS 334 - Computer and Electronic Product Manufacturing - (NAICS 3341 - Computer and Peripheral Equipment Manufacturing) - (NAICS 3345 - Navigational, Measuring, Medical and Control Instruments Manufacturing) + NAICS 335 - Electrical Equipment, Appliances
ISIC 3841 - Shipbuilding & Repairing	NAICS 3366 - Ship and Boat Building
ISIC 3842 - Railroad Equipment	NAICS 3365 - Railroad Rolling Stock Manufacturing
ISIC 3843 - Motor Vehicles & Parts	NAICS 3361 - Motor Vehicle Manufacturing + NAICS 3362 - Motor Vehicle Body and Trailer Manufacturing + NAICS 3363 - Motor Vehicle Parts Manufacturing
ISIC 3844 - Motorcycles & Bicycles	HS 8711 + HS 8712 + HS 8714 + HS 8713 + HS 9501 + HS 871680 + HS 871690
ISIC 3845 - Aircraft	NAICS 3364 - Aerospace Product and Parts Manufacturing
ISIC 3849 - Transportation Equipment, nec	NAICS 3369 - Other Transportation Equipment Manufacturing
ISIC 3851 - Professional, Science, Measuring, etc.	HS 3005 + HS 3407 + HS 854311 + HS 854319 + HS 9014 + HS 9015 + HS 9016 + HS 9017 + HS 9018 + HS 9019 + HS 9020 + HS 9023 + HS 9024 + HS 9025 + HS 902140 + HS 9026 + HS 9027 + HS 9028 + 9029 + HS 9030 + HS 9031 + HS 9032 + HS 9033 + HS 9402 + HS 9604

ISIC 3852 - Photographic & Optical Goods	HS 9001+ HS 9002 + HS 9003 + HS 9004 + HS 9005 + HS 9006 + HS 9007 + HS 9008 + HS 9010 + HS 9011 + HS 9012 + HS 9013 + HS 902111 + HS 902119 + HS 902121 + HS 902129 + HS 902130 + HS 902150 + HS 902190
ISIC 3853 - Watches & Clocks	HS 9101 + HS 9102 + HS 9103 + HS 9104 + HS 9105 + HS 9106 + HS 9107 + HS 9108 + HS 9109 + HS 9110 + HS 9111 + HS 9112 + HS 9114
ISIC 39 - Incl. Jewelry, Musical & Sporting Gds.,	NAICS 339 - Miscellaneous Manufacturing
ISIC 4 - Electricity, Gas & Water	NAICS 22 - Utilities