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Geographical aspects of geo-arbitrage: work in Canada and live in countries with low cost of living

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Abstract. The term geo-arbitrage means taking advantage of the difference in living costs between different geographic locations. This paper focuses on geographical aspects of international geo-arbitrage based on differences in the cost of living from one country to another. More precisely, the paper shows the perspective for a Canadian (student, volunteer, entrepreneur, IT person, or retiree) with some sort of mobile income or savings can take advantage of price differences by traveling to other countries. The paper is based on world development indicators, which cover a wide range of criteria when moving to another country. The data were collected for approximately 200 countries and represent the following categories of criteria: cost of living (economic factors), standard of living (such as safety, health care, environmental issues), and personal preferences (such as distance to home, Internet access or popularity of English language). The user input is required to rank or weight the importance of each of the criteria when moving to another country. One model was developed to emphasize the cost of living by controlling the weights ‘behind-the-scenes’. The results produce a list of the top suitable countries to practice geo-arbitrage. Another model allows the user to input weights for each criteria instead of ranks. The results from both models are mapped based on resulting suitability values. The top selected suitable countries are mapped, and the more specific information on each selected country is presented to the user, including the detailed cost of living, and current travel warning.

1. What is geo-arbitrage?

The idea of geo-arbitrage was introduced in the book titled “*The 4-Hour Workweek*” by Timothy Ferriss in 2007 [1]. The book was translated into dozens of languages and more than 1.4 million copies of this book have been sold worldwide. In his book, Ferriss provided also a guide to join the “New Rich” by benefiting from job outsourcing and new lifestyle. The term *arbitrage* has many meanings but in finance and economics this term is defined as taking advantage of a price difference between two or more markets. In arbitrage, the profit results from differences between market prices in an imbalanced economy. Geo-arbitrage is based on taking advantage of international price differences in costs of living for personal or business purposes. Although the term geo-arbitrage is used in an international context, it can be narrowed to a regional scale within, for example, one larger country. Prices in housing markets, food markets, and services often vary significantly between regions. In one geo-arbitrage-related blog [2], the practice of geo-arbitrage is shortly described as: strong Western salary minus lower Eastern cost of living equals more beer.



In the era of globalization, when the common opinion is that big companies benefit more than individuals, geo-arbitrage can be seen as an attractive alternative solution bringing more freedom and higher quality of life [3]. Geo-arbitrage helps to overturn the process of globalization, by transferring workers to places where they can afford a higher standard of living for the same productivity. It can have a huge impact on personal life, providing quick and profitable return on investment. There is a risk related to geo-arbitrage, resulting from strong inflation of certain world currencies in relation to dollars or euro in some countries (for example, in Russia, Argentina, Colombia, or Botswana). This risk factor may decrease the amount of money saved in local currencies but can be offset by purchasing cheap goods (such as housing or food), or taking advantage of services in the local markets that are heavily discounted relative to the home country.

The Five Flag Theory describes how to arrange your affairs over five different countries [4]. The five flags are:

1. Business Base: these are places where you make money; they must be different from your personal fiscal domicile, the place where you legally reside.
2. Passport & Citizenship: these should be from a country unconcerned about offshore citizens and what they do outside its borders.
3. Domicile: this should be a tax haven with good communications; a place where wealthy, productive people can be creative, live, relax, prosper and enjoy themselves. Such a place should not be threatened by war or revolution and preferably should enjoy good levels of banking secrecy.
4. Asset Repository: this should be a place from which assets, securities, and business affairs can be managed anonymously by proxy.
5. Playgrounds: these are places where you would actually physically spend your time.

Many Canadians planning geo-arbitrage would prefer to live in a country where the majority of people speak English. This factor was taken into consideration when building prototypes. The Canadian diaspora itself is close to 2.8 million people. Such Canadian websites as *Go International*, *Work Abroad*, *Swap Working Holidays*, or the *International Experience for Canadians* by the Government of Canada encourage Canadians to go, work, and travel abroad, mostly as teachers or volunteers.

2. Data sources

The aim of this paper is to determine eligible countries with an acceptable standard of living as well as a low cost of living for those individuals with transportable income. The main factors for identifying these eligible countries are:

- Cost of living (and other economic/financial factors)
- Standard of living (for example: health care, crime/safety factors, and pollution factors)
- Personal preferences (for example: language barriers, distance from home country)

Most of the data used in this paper are indicators downloaded from online databases. There are some issues with data quality concerning the number of countries and the year the data was collected. The number of countries in the datasets range from 90 to 244, and dates from the 1960's to 2014. The most recent data (years 2009-2014) often have missing values for many countries. The following are the major sources of data for this paper:

- *The World Bank*: This website has an incredible amount of data available for download and has the most complete datasets [5]. The best of these datasets were the World Development Indicators (WDI) which included data for 244 countries and zones, as well as indicators required for this paper (1261 variables). Most of the economic (cost of living) criteria were gathered from this databank, but this source also includes many variables that were used for other criteria in this paper. For example, the data for "Access to Internet" and "Biodiversity" also came from this source.
- *United Nations Development Program - International Human Development Indicators*: The human development data utilized in the preparation of the Human Development Index (HDI) and other composite indices featured in the Human Development Report are provided by a variety of public international sources and represent the best and most current statistics available for those indicators

at the time of the preparation of this annual report [6]. A total of 50 indicators, including other related variables, were downloaded for a total of 194 countries.

- *Numbeo*: Numbeo is an independent software project launched in May 2009. The project includes almost 2 million prices in nearly 5,500 cities entered by more than 240,000 users worldwide [7]. Numbeo allows the user to see, share, and compare information about cost of living worldwide, by providing online software which allows users to enter or edit cost of living for many cities in the world and calculates derived indexes such as consumer price index, domestic purchasing power and others [8]. All data from this website were acquired through online public data entry, so the dates for cost of living and prices given on this website for each country or city may differ.
- *Percent of English-speakers in Total Population*: These data are necessary in the analysis because many people would prefer to live only in countries which have some English-speakers. The source of data for this variable was Wikipedia, where the percent of English-speakers per total population was given for 124 countries which have English speakers [9]. The countries not included can be assumed to have few or no English speakers.
- *Foreign Affairs and International Trade Canada*: This data source is a regularly updated system which posts any travel warnings worldwide [10]. Cautions may include natural disaster warnings, dangers of terrorism, or any other safety threats which should be avoided. This data source is more of a reference to keep watching as it could change often. This information can be accessed from the model as a URL link for selected countries.
- *Flight Mileage*: This variable shows the flight mileage for each country from Canada. Some people would prefer not to travel too far from home or they cannot afford an expensive plane ticket. In order to include this type of variable, the Star Alliance flight reward chart for countries around the world was used [11].

3. Typical user profiles

To analyze differences in targeting destination countries, five different user profiles, with different importance rankings of criteria, were created and mapped. Each profile includes characteristics of those people who work in the information technology industry, retired individuals, students, entrepreneurs or volunteers from Canada. These profiles were determined based on literature or by either the use of a questionnaire on a target group or a peer-based evaluation. The ranks were assigned as 1 - "Not Important", 2 - "Somewhat Important", and 3 - "Very Important" (figures 1 and 2).

Criterion	Student	IT Person	Retiree	Entrepreneur	Volunteer
Low cost of living	2	3	3	3	2
High Quality of Life	3	2	3	2	2
High Safety Rating	3	2	3	2	2
English-speaking Population	2	1	2	3	3
Short Flight Distance from Home	1	1	2	2	1
Good Health Care System	3	2	3	2	1
Low Risk of Disease	3	2	3	1	2
Good Air Quality	3	3	3	2	3
Good Water Quality	3	3	3	2	2
Good Sanitation System	3	2	3	2	2
Access to Internet	3	3	1	3	1
Access to Phone	2	3	2	3	2
Low Cost of Import/Exporting	2	2	1	3	1
High Biodiversity	2	1	2	1	2

Figure 1: Five profiles and corresponding ranks

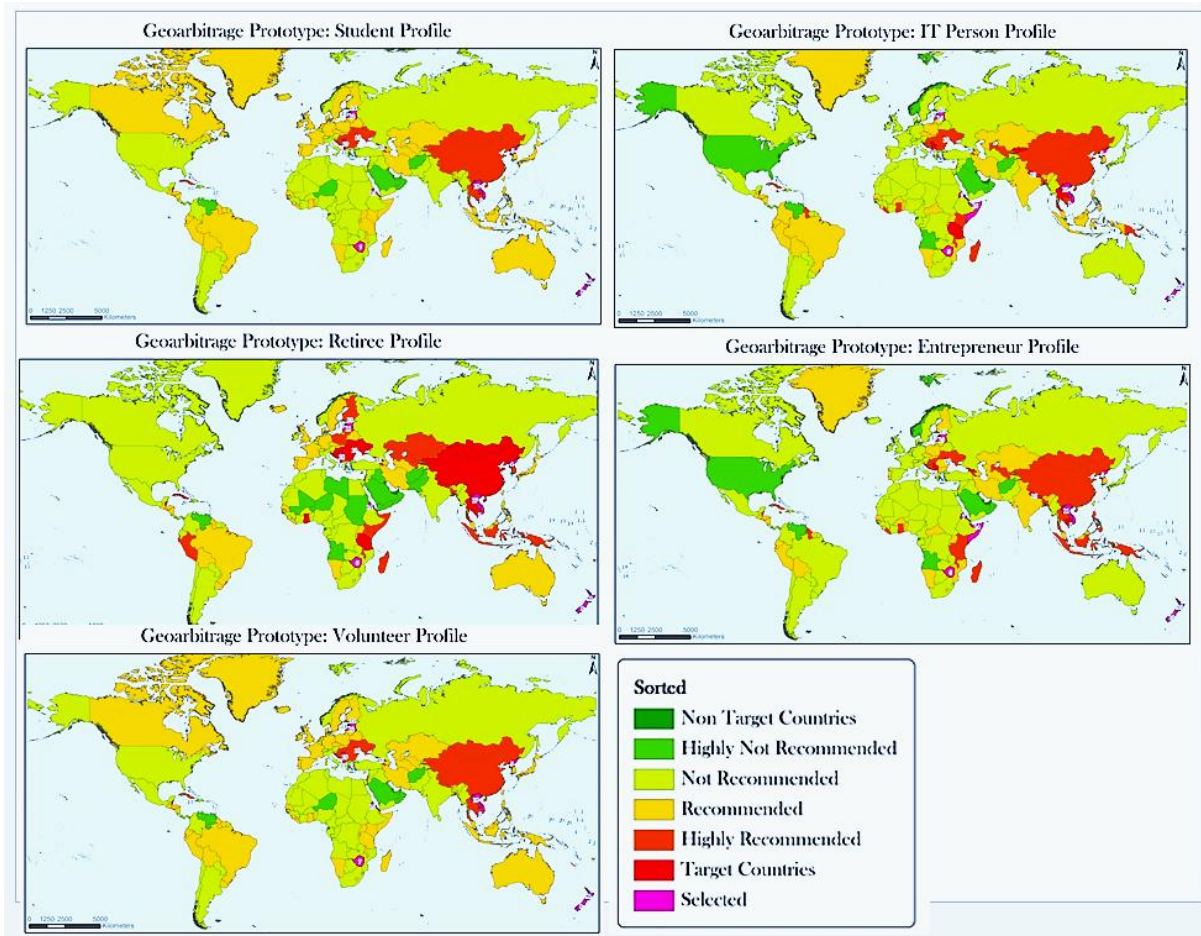


Figure 2. Distribution of preferences for five profiles

4. Geo-arbitrage prototypes

The technology used includes ArcGIS geoprocessing Python scripting, JavaScript (client-based forms), MySQL database, PHP programming (server-based queries), Google Maps JavaScript API (for mapping), and WAMP server. The prototypes could be shared with other people using the desktop version or they can be placed on a server for others to access. A WAMP (Windows-Apache-MySQL-PHP) server is used to serve the prototype on a local host connection. This server is available to download for free from *wampserver.com* to use on a Windows platform and comes with easy installation instructions. The Apache provides an open-source HTTP server for the Windows operating system which may be used to serve the data on the local host or live Internet. MySQL is an open source relational database management system that runs as a server providing multi-user access to user-imported data. This part of the WAMP Server allows importing of data for all countries. The PHP is a hypertext preprocessor file which is embedded into the HTML file to process the data. This file is called to query, process, and map the results with Google Maps JavaScript API. A CSV file with the world country names with centroid coordinates and indicator attributes is also required to effectively calculate target countries. The Google Maps JavaScript API allows Google Maps to be embedded in the results page. It is a free service which can be accessed by calling it from the PHP file. The Google Road Maps were used to display data with a red marker.

There are two versions of the prototype created which use the imported data, the first using controlled weights (figure 3), and the second allowing the user to enter their own weights (figure 5). The purpose of the first prototype is to collect user input ranks for fourteen criteria and to calculate

results based on controlled weights for the geo-arbitrage concept. The user may select a radio button corresponding to the rank column as “Not Important”, “Somewhat Important”, or “Very Important” and only one rank may be selected for each category. The “Reset” button will reset all selected radio buttons to “Somewhat Important”. The “Map Results” button will take the user to the next screen where a map is displayed and the top countries are marked.

Criterion	Ranking		
	Not Important	Somewhat Important	Very Important
Cost of Living	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Quality of Life	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
High Safety Rating	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
English-Speaking Population	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Short Flight Distance from Home	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Good Health Care System	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Low Risk of Disease	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Good Air Quality	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Good Water Quality	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Good Sanitation System	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Access to Internet	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to Phone	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Cost of Import/Exporting	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
High Biodiversity	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Result			

Figure 3. Data input for the first prototype

Beside the results shown, the user may click on the red marker of selected countries to see information on the single country (figure 6). For example, a user can click on Vietnam and the criteria will display in a categorical format (figure 4). There are also two URL links at the bottom of the info window to open a web browser. The top link will open a Web page for the cost of living for that particular country from *Numbeo.com* (figure 7). The second link opens a Web page which gives the current travel and safety warnings from *Foreign Affairs and International Trade Canada*.

Country: Viet Nam

Cost of living: Low

Quality of life: Very high

High safety rating: Exercise high degree of caution

Percent of people speaking English: Medium

Cost of flights from Canada: High

Health care: Low

Low risk of disease: High

Air quality: Low

Water quality: High

Sanitation: High

Internet access: Medium

Phone access: High

Import/export: High

Biodiversity: Very high

[More detailed information about the cost of living in Viet Nam](#)

[Foreign Affairs and International Trade Canada: Travel Reports & Warning](#)

Figure 4. Values of fourteen criteria for selected country (Vietnam)

The second prototype allows the user to assign a desired weight (from 0 to 1.00) for each of fourteen criteria. The total of weights for all criteria must add up to 1 (100%). Used weights can increase the emphasis for chosen criteria. Once the weights have been validated, the user may click “Map Results” to calculate and display the target countries. This form also includes a “Reset” button which sets all text box values back to the default value. The default values for some criteria have been set by assigning a value to the text box when the HTML file loads.

Weights	Criterion
<input type="text" value="0.50"/>	Cost of Living
<input type="text" value="0.10"/>	Quality of Life
<input type="text" value="0.30"/>	High Safety Rating
<input type="text" value="0.00"/>	English-Speaking Population
<input type="text" value="0.00"/>	Fly Far Away from Home
<input type="text" value="0.00"/>	Good Health Care System
<input type="text" value="0.10"/>	Low Risk of Disease
<input type="text" value="0.00"/>	Good Air Quality
<input type="text" value="0.00"/>	Good Water Quality
<input type="text" value="0.00"/>	Good Sanitation System
<input type="text" value="0.00"/>	Access to Internet
<input type="text" value="0.00"/>	Access to Phone
<input type="text" value="0.00"/>	Cost of Import/Exporting
<input type="text" value="0.00"/>	High Biodiversity
<input type="text" value="1"/>	Weights Total (Should be 1.00)

Figure 3. Example of data input for second prototype

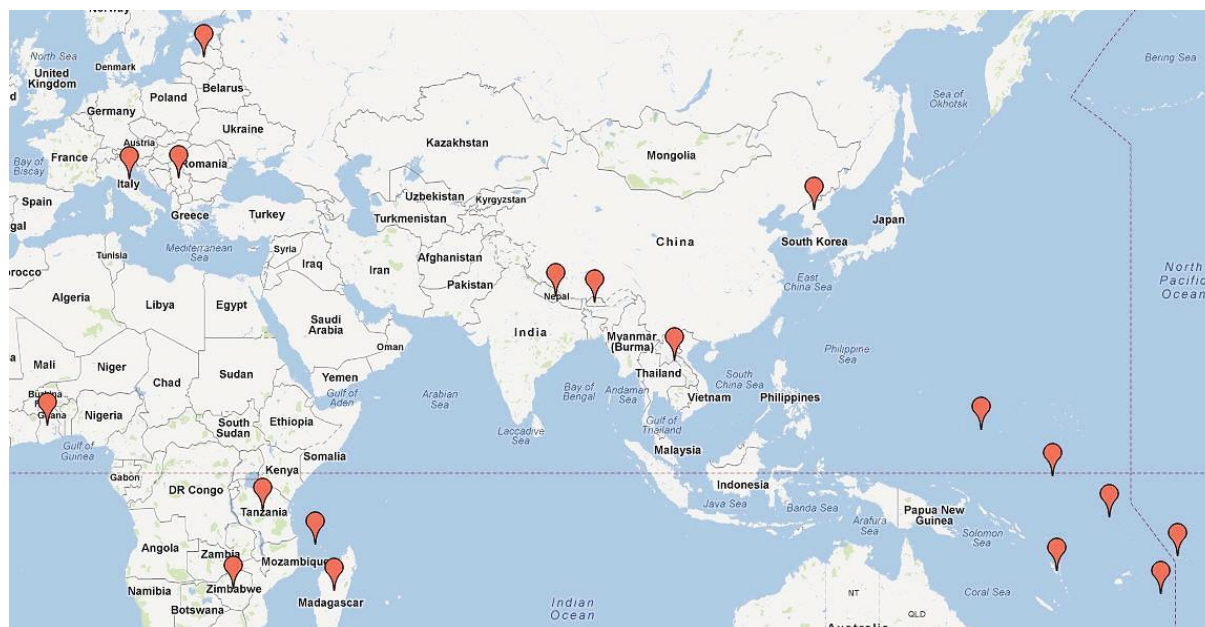


Figure 6. Selected top twenty countries

Not all selected countries, even if they satisfied all specified criteria, are suitable for travelling. The political situation in some regions changes dramatically and it is not recommended to visit them. The

user can receive the updated safety information on a selected country from the Canadian government website.

Currency: CAD [Sticky Currency](#) [Switch to metric measurement units](#)

	Halifax	Hanoi	Difference
Restaurants	[Edit]	[Edit]	
Meal, Inexpensive Restaurant	15.00 C\$ (257,527.50 đ)	2.33 C\$ (40,000.00 đ)	-84.47 %
Meal for 2 People, Mid-range Restaurant, Three-course	70.00 C\$ (1,201,794.99 đ)	23.30 C\$ (400,000.00 đ)	-66.72 %
McMeal at McDonalds (or Equivalent Combo Meal)	8.00 C\$ (137,348.00 đ)	5.24 C\$ (90,000.00 đ)	-34.47 %
Domestic Beer (0.5 liter draught)	5.75 C\$ (98,718.87 đ)	0.87 C\$ (15,000.00 đ)	-84.81 %
Imported Beer (0.33 liter bottle)	6.00 C\$ (103,011.00 đ)	1.89 C\$ (32,500.00 đ)	-68.45 %
Cappuccino (regular)	4.00 C\$ (68,674.00 đ)	2.04 C\$ (35,000.00 đ)	-49.03 %
Coke/Pepsi (0.33 liter bottle)	2.20 C\$ (37,732.55 đ)	0.55 C\$ (9,363.64 đ)	-75.18 %
Water (0.33 liter bottle)	1.79 C\$ (30,753.08 đ)	0.34 C\$ (5,800.00 đ)	-81.14 %

You would need around 44,234,570.94đ (2,576.50C\$) in **Hanoi** to maintain the same standard of life that you can have with 4,900.00C\$ in **Halifax** (assuming you rent in both cities). This calculation uses our Consumer Prices Including Rent Index. This comparison assumes net earnings (after income tax).

Figure 7. Comparing the cost of living in Halifax (Canada) and Hanoi (Vietnam)

5. Conclusions

The implementation of the prototype tool could benefit any person who wishes to practice geo-arbitrage by profiting from differences in market prices. For example, seasonal workers from Canada make the majority of their salary from April to October and have the winter months off. They could use this prototype to find a list of possible target countries and use some of the resources provided to get further information on moving there. These individuals could make arrangements to live in a country such as Vietnam for the winter months. According to *Numbeo.com*, people spending \$C4,900 monthly in Halifax (Canada) could live at the same standard for slightly more than \$C2,500 in Hanoi (Vietnam). These individuals could live for two months in Vietnam for the price of one month's rent in Canada. If they owned property in Canada, they could rent it for a higher cost than the mortgage payment, and live off the money gathered from the renters. Although this is not a permanent move, if individuals practiced this yearly, they would potentially save money over the winter months each year and avoid cold Canadian weather.

The data collected and used to identify the target countries produced the desired results in this paper. When either prototype is implemented, the results generated are as expected, based on the weights used. For example, when the cost of living is heavily weighted, the results produce such target countries as Vietnam or Laos. When the cost of living is not heavily weighted, and quality of life along with criteria such as good water source, sanitation, or health care system are important, the results produced are quite different (e.g. Norway, Australia, Sweden). The prototypes effectively predict the target countries. The prototype which uses ranks effectively targets the high or low values for each criterion by increasing the range of values by a multiplication factor (1-3). When weights are used, the results can be affected dramatically, because there is potential for a much higher multiplication factor. For example, the cost of living is much more heavily enforced when its weight is 80% than if it is ranked as 3. Rankings give a limited range of emphasis for every criterion, so that one

cannot be emphasized much more than the others. Both of these methods are useful, and the prototypes in this paper give the opportunity to use weights, ranks, or both. An individual could definitely use this tool to find potential countries to practice geo-arbitrage. The results are based on output values for each country, so within the top selected countries the user can find the most suitable destination.

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