# Appendix C: Methodology

To avoid subjective judgments, objective methods were used to calculate and weight the variables. For all variables, each observation was transformed into a number from zero to 10 using the following formula: $(V_{max} - V_i) / (V_{max} - V_{min}) \times 10$, where $V_{max}$ is the largest value found within a variable, $V_{min}$ is the smallest, and $V_i$ is the observation to be transformed. For each variable, the mini-max calculation included all data for all years to allow comparisons over time.

To transform the individual variables into areas and overall summary indexes, Areas 1, 2, and 3 were equally weighted, and each of the variables within each area was equally weighted. For example, the weight for Area 1 was 33.3%. Area 1 has two variables, each of which received equal weight in calculating Area 1, or 16.7% in calculating the overall index.

Calculating the income tax variable was more complicated. The variable examining the top marginal income tax rate and income threshold at which it applies was transformed into a score from zero to 10 using matrix 1 and matrix 2. Canadian nominal thresholds were first converted into constant 2000 Canadian dollars by using the implicit chain price index and then converted into US dollars using the average US/Canada exchange rate for each year. US nominal thresholds were converted into real 2000 US dollars using the Chain-type Quantity Index. This procedure is based on the transformation system found in *Economic Freedom of the World: 1975–1995* (Gwartney et al. 1996), modified for this study to take into account a different range of top marginal tax rates and income thresholds.

Matrix 1 was used in calculating the score for Area 2B, Top Marginal Income Tax Rate and the Income Threshold at Which It Applies,  at an all-government level; matrix 2 was used to calculate the score for Area 2B at a subnational level.

In setting the threshold levels for income taxes at the subnational level, we faced an interesting quandary. In the United States, state thresholds were, with rare exceptions, below US federal thresholds. In Canada, provincial thresholds were  frequently higher than federal thresholds. Whenever the provincial or state threshold was higher than the federal threshold, the federal threshold was used at a subnational level since, when a provincial threshold is above the national level, the cause is typically the imposition of a relatively small surcharge on high-income earners. Because of the structure of these matrixes, this can produce perverse scoring results. For example, in matrix 2 a jurisdiction gets a score of 2.5 if it has a marginal income tax rate of, say, 12.5% for incomes over $50,000. Let's say the jurisdiction imposes a surcharge for income earners above $100,000, increasing the marginal rate to 13%. In matrix 2, even though additional taxes in the form of a surcharge have been imposed, the state's score perversely increases to 3 because of the increase in the threshold level.

Our decision to use the federal threshold as the default threshold when the provincial threshold was higher is, frankly, a matter of judgement. Thus, it was important to understand whether this would affect the results significantly. To see whether this was so, we calculated the overall index both ways and found that changes were small and that the overall results were not affected. (Results of the tests are posted on our website, www.freetheworld.com.)

### Matrix 1: Income Tax Matrix for Area 2B: All-Government Level

| Top Marginal Tax Rate | Income Threshold Level (2000US$) | | |
| --- | --- | --- | --- |
| | Less than $50,000 | $50,000 to $100,000 | More than $100,000 |
| 27% or less | 10.0 | 10.0 | 10.0 |
| 27% to 30%[2] | 9.0 | 9.5 | 10.0 |
| 30% to 33% | 8.0 | 8.5 | 9.0 |
| 33% to 36% | 7.0 | 7.5 | 8.0 |
| 36% to 39% | 6.0 | 6.5 | 7.0 |
| 39% to 42% | 5.0 | 5.5 | 6.0 |
| 42% to 45% | 4.0 | 4.5 | 5.0 |
| 45% to 48% | 3.0 | 3.5 | 4.0 |
| 48% to 51% | 2.0 | 2.5 | 3.0 |
| 51% to 54% | 1.0 | 1.5 | 2.0 |
| 54% to 57% | 0.0 | 0.5 | 1.0 |
| 57% to 60% | 0.0 | 0.0 | 0.5 |
| 60% or more | 0.0 | 0.0 | 0.0 |

### Matrix 2: Income Tax Matrix for Area 2B: Subnational Level

| Top Marginal Tax Rate | Income Threshold Level (US$2000) | | |
| --- | --- | --- | --- |
| | Less than $50,000 | $50,000 to $100,000 | More than $100,000 |
| 1.5% or less | 10.0 | 10.0 | 10.0 |
| 1.5% to 3.0% | 9.0 | 9.5 | 10.0 |
| 3.0% to 4.5% | 8.0 | 8.5 | 9.0 |
| 4.5% to 6.0% | 7.0 | 7.5 | 8.0 |
| 6.0% to 7.5% | 6.0 | 6.5 | 7.0 |
| 7.5% to 9.0% | 5.0 | 5.5 | 6.0 |
| 9.0% to 10.5% | 4.0 | 4.5 | 5.0 |
| 10.5% to 12.0% | 3.0 | 3.5 | 4.0 |
| 12.0% to 13.5% | 2.0 | 2.5 | 3.0 |
| 13.5% to 15.0% | 1.0 | 1.5 | 2.0 |
| 15.0% to 16.5% | 0.0 | 0.5 | 1.0 |
| 16.5% to 18.0% | 0.0 | 0.0 | 0.5 |
| 18.0 %or more | 0.0 | 0.0 | 0.0 |

Note:  The range is actually from 27.00% to 29.99% but for convenience we have written it as "27% to 30%." This applies to all other marginal tax-rate ranges in matrix 1 and matrix 2 as well.

# Appendix D: Adjustment Factors

Due to constitutional differences and differences in policy, in the United States, subnational jurisdictions take a proportionately smaller share of overall government spending than in Canada. In 1999, for instance, provinces and local governments accounted for about 78% of government consumption in Canada, while, in the United States, state and local government are responsible for 73% of government consumption, just 93% of the level in Canada to be precise: 0.73/0.78 = 0.93. This is what we term the adjustment factor or, put more precisely, $R_U/R_C$, where $R_U$ is the percent of total government spending at the state level in the United States, and $R_C$ is the percent of total government spending at the provincial level in Canada. Because of this difference in government structure in the United States and Canada, a direct comparison would not be appropriate. Instead, we use this adjustment factor, multiplying provincial and local government consumption in Canada by 0.93 so that it will be comparable to United States data.

At the subnational level, similar adjustment factors are calculated for each year for each variable in Areas 1 and 2 as well as for variable 3B: Government Employment as a Percentage of Total State/Provincial Employment. For example, the adjustment factor for 2A: Total Government Revenue from Own Source as a Percentage of GDP, at a subnational level is calculated as average total government revenue at a state level as a percentage of average total government revenue at all-government levels in the United States divided by average total government revenue at a provincial level as a percentage of average total government revenue at all-government level in Canada.

No adjustment factor is necessary at the all-government level because every level of government is counted. Note that 2D: Sales Tax as a Percentage of GDP is not adjusted because the United States does not have a federal sales tax and Canada does.

We faced another common problem in comparing statistics across time, changes in the structure of some series over time. Similarly, some spending categories were not strictly comparable between Canada and the United States. This required the use of judgment in some cases. Fortunately, with one exception, these problems arose with minor-subcomponents of variables which typically represent only 1% or 2% of the overall size of the variable. The exception was accounting for medical care spending, which is structured as government consumption in Canada and as a set of transfer programs in the United States. Given that the index captures the impact of both government consumption and of transfer programs, we decided the most accurate method of accounting was to reflect the actual nature of the spending, a transfer program in the United States and government consumption in Canada, rather than artificially include one or other in an inappropriate variable.

A further complication arose in applying the adjustment factor to the income tax variable at the sub-national level. To construct this adjustment factor, the Canadian top marginal tax rates at a subnational level are multiplied by the ratio of average personal tax revenue at a state level as a percentage of average personal tax revenue at an all-government level in US and average personal tax revenue at a provincial level as a percentage of average personal tax revenue at an all-government level in Canada. For example, in 1999, in Canada, provinces collected 39.40% of the income tax revenue raised in Canada. In the United States, states collected 18.35% of all income taxes. Thus, 18.35/39.40 equals 46.57%. In Ontario, the top marginal rate in 1999 was 17.87%. This is reduced to 8.32% when the adjustment factor is applied.

# Appendix E: Explanation of the Variables & Data Sources

## Area 1. Size of Government

### 1A. General Consumption Expenditures by Government as a Percentage of GDP

The Canadian data at a subnational and all-government level are from the Provincial Economic Accounts, Statistics Canada. General consumption expenditure at a provincial and local (subnational) level is defined as net current expenditure by provincial and local governments (i.e., total expenditures minus transfers to persons, transfers to businesses, transfers to other governments, and interest on public debt). At an all-government level, consumption expenditure is defined as net current expenditure by federal, provincial, and local governments where the definition of net expenditure is the same as at a subnational level. In order to account for the different split of responsibilities between the federal and other levels of government in Canada and the United States, an adjustment factor was applied to the Canadian data (see Appendix D: Adjustment Factors for more information).

The US data for general consumption expenditures at a state and local level are from the US Census Bureau (various files available online http://www.census.gov/govs/www/estimate.html). The 1980's data are from US Census Bureau "ftp" files (ftp://ftp.census.gov/pub/outgoing/). General government consumption expenditures at a state and local level are defined as other direct general expenditures minus welfare (i.e., total expenditures minus expenditures on utilities, insurance trust—worker's compensation and employment insurance—capital outlays, and direct—not intergovernmental—public welfare payments). The data for government expenditures at a federal level are from *Facts and Figures on Government Finance*, The Tax Foundation (various issues) from 1981 to 1997. The data from 1998 to 2000 are from the *Consolidated Federal Funds Report*, US Census Bureau (various issues). General consumption expenditure at an all-government level is defined as consumption expenditure at a state and local level plus federal consumption expenditure (i.e., federal salaries and wages plus federal procurement).

### 1B: Transfers and Subsidies as a Percentage of GDP

The Canadian data for transfers at a subnational and all government level are from Provincial Economic Accounts, Statistics Canada. Transfers are defined as current transfers to persons and businesses.

The US data for transfers at a state and local level are from the US Census Bureau "ftp" files (ftp://ftp.census.gov/pub/outgoing/). At a subnational level, transfers are defined as total insurance trust benefits (expenditures) plus total assistance and subsidies minus total retirement expenditures. At an all-government level, transfers are calculated as total transfer payments by federal, state, and local governments to persons and businesses. The data for transfers at an all-government level are from the Bureau of Economic Analysis (http://www.bea.doc.gov/bea/regional/spi).

## Area 2: Takings and Discriminatory Taxation

### 2A: Total Government Revenue from Own Source as a Percentage of GDP

The Canadian data, at a subnational level, are from Financial Management System, Public Institutions Division, Statistics Canada. At a subnational level, own source revenue is defined as a sum of income taxes, consump-

tion taxes, property and other taxes, health insurance premiums, contributions to social insurance plans, taxes from sales of goods and services, investment income, and other own-source revenue. The data for own-source revenue at an all-government level are from Provincial Economic Accounts, Statistics Canada. At an all-government level, own-source revenue is defined as a sum of direct taxes from persons, direct taxes from businesses, taxes from non-residents, contributions to social insurance plans, indirect taxes, other transfers from persons and investment income.

The US data at a subnational level are from US Census Bureau "ftp" files (ftp://ftp.census.gov/pub/outgoing/). Own-source revenue at a subnational level is calculated as general state and local own-source revenue plus insurance trust, liquor store, and utility revenue. Own-source revenue at an all-government level is calculated as own-source revenue at a subnational level plus own-source revenue at a federal level. The data for the federal own-source revenue are from *Facts and Figures on Government Finance*, The Tax Foundation (various issues).

### 2B: Top Marginal Income Tax Rate and the Income Threshold at Which It Applies

The Canadian data at a subnational and all-government level are from the *Finances of the Nation*, Canadian Tax Foundation (various issues). Thresholds are first converted into 2000 Canadian dollars using GDP implicit chain price deflator from CANSIM, Statistics Canada (Table 380-0056). Then the thresholds were transformed into US currency using the average exchange rate for the appropriate year retrieved from the Pacific Exchange Rate Service (pacific.commerce.ubc.ca/xr/data.html).

The US data are from *Facts and Figures on Government Finances*, The Tax Foundation (various issues). The federal tax rates, for some of the years, are from Internal Revenue Service , Department of the Treasury (various issues). Some of the data for state top marginal tax rates and thresholds at which these rates apply are from *Significant Features of Fiscal Federalism*, Advisory Commission on Intergovernmental Relations (various issues), and Federation of Tax Administrators web site (http://www.taxadmin.org). Threshold are converted into 2000 US dollars using Quantity index for Real GSP from the Bureau of Economic Analysis (available at www.bea.doc.gov).

### 2C: Indirect Taxes as a Percentage of GDP

The Canadian data at a subnational and all-government level are from Provincial Economic Accounts, Statistics Canada. Indirect tax revenue at a subnational level is defined as total indirect tax revenue plus employer contributions to worker's compensation minus sales tax revenue. Indirect tax revenue at an all-government level is defined as indirect tax revenue at a subnational level plus federal indirect tax, employer and employee contributions to employment insurance, employer and employee contributions to Canada Pension Plan (plus employer and employee contributions to Quebec Pension Plan for Quebec) minus federal sales tax revenue.

The US data at a subnational level are from US Census Bureau "ftp" files (ftp://ftp.census.gov/pub/outgoing/). Indirect tax revenue at a subnational level is defined as the sum of property tax, total selective sales tax, total license tax, liquor store revenue, unemployment payroll tax, and total worker compensation revenue minus the alcohol beverage and tobacco tax revenue at a state and local level. The data at a federal level are from *Facts and Figures on Government Finances*, Tax Foundation (various issues). The indirect tax at an all-government level is defined as indirect tax at a subnational level plus social insurance, custom duties, airport trust fund, highway trust fund, other excise, and estate and gift tax revenue at a federal level.

### 2D: Sales Taxes Collected as a Percentage of GDP

The Canadian data at a subnational and all-government level are from Provincial Economic Accounts, Statistics Canada. Sales tax at a subnational and all-government level is defined as retail sales tax revenue at local and provincial level and local, provincial, and federal level respectively.

The US data at a subnational level are from US Census Bureau "ftp" files (ftp://ftp.census.gov/pub/outgoing/). The sales tax is defined as a general sales tax revenue. Note that the Unied States does not have a federal sales tax.

# Area 3: Labor Market Freedom

### 3A: Minimum Wage Legislation

Provincial minimum wage data are from Human Resources Development Canada (http://206.191.16.130/psait_spila/lmnec_eslc/eslc/salaire_minwage/report2/report2_e.cfm). This variable was calculated as minimum wage multiplied by 2,080, which is the full-time equivalent measure of work hours per year (52 weeks multiplied by 40 hours per week) as a percentage of per-capita GDP.

US minimum wage data are from *The Book of the States*, Council of State Governments (various issues) and the *Monthly Labor Review*, Bureau of Labor Statistics (stats.bls.gov/opub/mlr/mlrhome.htm). Note that federal minimum wage is not used at an all-government level; the minimum wage at state or provincial level is used instead because the federal minimum wage applies to a very small percentage of working population.

### 3B: Government Employment as a Percentage
### of Total State/Provincial Employment

The Canadian data at a subnational and all-government level are from Provincial Economic Accounts, Statistics Canada (total employment data) and from Financial Management System, Public Institutions Division, Statistics Canada (government employment data).

The US data for government employment and total state employment are from the US Census Bureau (www.bea.doc.gov). Note that neither the United States nor Canadian government employment at a federal level includes military employment.

### 3C: Occupational Licensing

Canadian information was found in *Occupational Regulation in Canada* by Evans and Stanbury and updated by Faisal Arman using provincial statute records. The US information was from *The Book of the States* (various issues) and the *Directory of Professional and Occupational Regulation in the United States and Canada*, CLEAR.

The occupational licensing variable does not look exhaustively at the number of regulated occupations but rather at a subset of occupations. To be included in this subset, the occupation needs to be regulated in at least one case in both Canada and the United States. This was done because the US data was more extensive and comprehensive, with multiple subprofessionals being recorded as regulated. If each subprofession were counted, this would tend to inflate the US numbers but it would not be accurate to claim that more occupations were regulated than in Canada. Another unfortunate complication is that the data for the early time period are less complete than the later information. The assumption used to compute a score, which would tend to bias the results, is that any occupation that does not have information recorded for it in the early period was regulated similarly as it was in the later period.

# Data Sources for Other Variables

The Gross Domestic Product and population data for Canadian provinces are from Provincial Economic Accounts, Statistics Canada. The implicit chained price index was used to transform the nominal GDP into real GDP values. After the Canadian per-capita GDP was deflated, it was transformed in US dollars using the exchange rate from Pacific Exchange Rate Service (http://pacific.commerce.ubc.ca/xr/data.html).

The US Gross State Product and population data are from the Bureau of Economic Analysis (http://www.bea.doc.gov). The GSP deflator (Quantity Index for Real GSP) from the Bureau of Economic Analysis (http://www.bea.doc.gov/bea/regional/gsp/action.cfm) was used to transform nominal GSP values into real US dollars.

The Canadian data for high school graduates as a percentage of population (25 years old and older) are from two sources. The data on high school graduates are from Catalogue #81-229-Education, Statistics Canada. Note that the Canadian data include public, private, and federal schools and schools for visually and hearing impaired as well as schools overseas. The data on population 25 years and older are from Statistics Canada on

line (CANSIM label numbers are D985116, D985398, D985680, D985962, D986244, D986526, D986808, D987090, D987372, and D987654).

The data on US public high school graduates are from the Statistical Abstract of the United States (various issues) for the period from 1981 to 1993. From 1993 to 2000, data on public high school graduates are from National Center for Education Statistics, US Department of Education (http://nces.ed.gov/quicktables). Private high-school graduates data are from Statistical Abstract of the United States for 1981 and from *Private High School Survey*, National Center for Education Statistics, US Department of Education (various issues) from 1985 to 2000. The data on population 25 years and older are from Population Division, the US Census Bureau (http://eire.census.gov/popest/archives/1990.php for 1990 to 2000 data and http://eire.census.gov/popest/archives/1980.php for 1980 to 1990 data).