Measuring Government

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Our relationship with government can be complicated…

Government has traditionally spawned a lot of commentary both for and against…

Revenues…

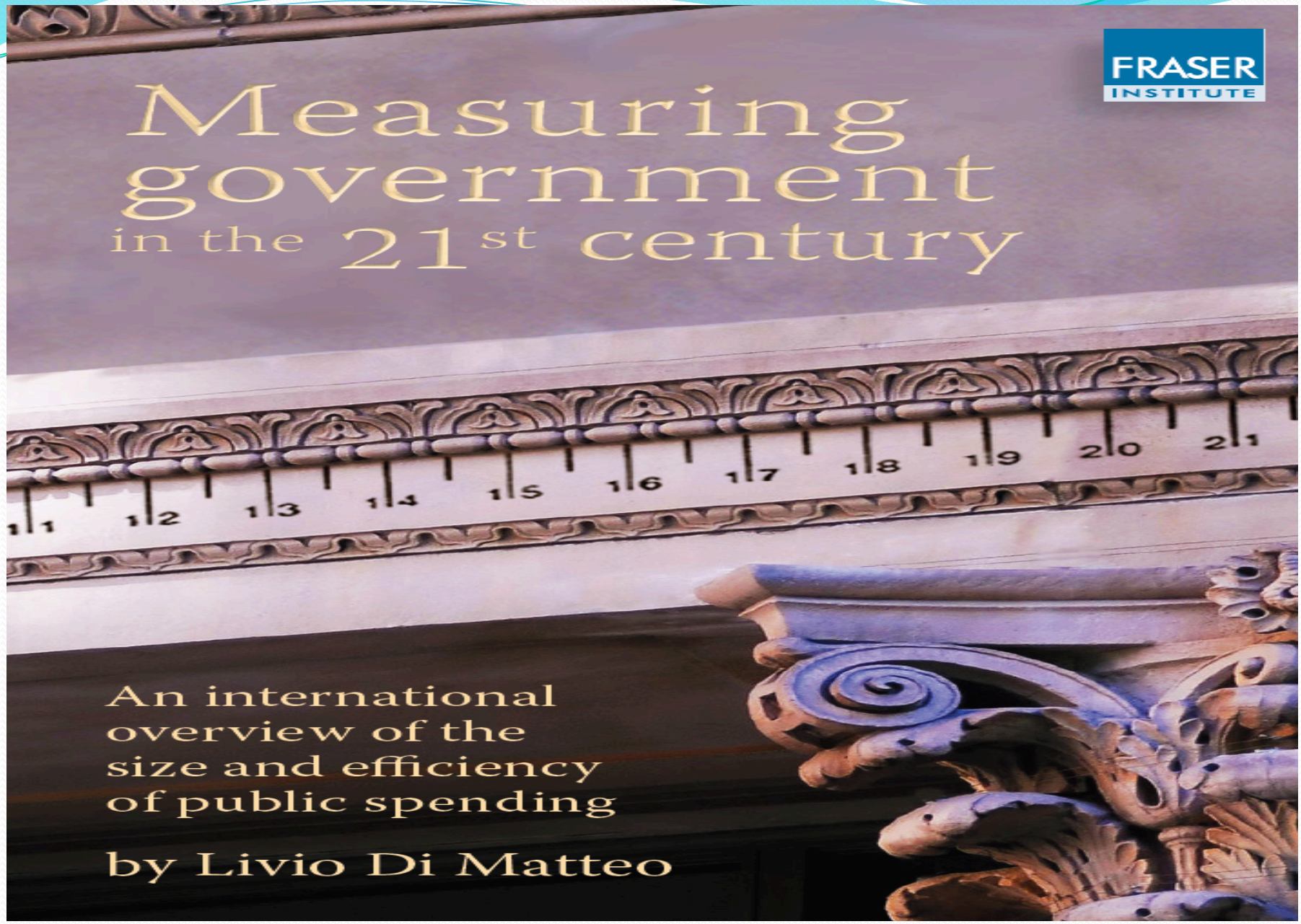
- **Luke 2:1** - And it came to pass in those days, that there went out a decree from Caesar Augustus, that all the world should be taxed.
- **Oliver Wendell Homes Jr.** – Taxes are what we pay for civilized society.
- **Old Hungarian Proverb** – Don't tax you, don't tax me, tax the person behind the tree…

Spending…

- **BNA 1867** – …to make Laws for …Peace, Order and good Government…
- **Pierre Trudeau** – The state has no business in the bedrooms of the nation.
- **P.J. O'Rourke** – Giving money and power to government is like giving whiskey and car keys to teenage boys.
- **Herbert Hoover** – Blessed are the young for they will inherit the national debt.

So that brings us to the following quote:

L. Di Matteo – Studying government revenues and expenditures can be a great deal of fun for children of all ages.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Measuring government in the 21st century
An international overview of the size and efficiency of public spending
by Livio Di Matteo

Main Points of Study

- Government is the single most pervasive institution of modern life and its programs are important to our quantity and quality of life.
- Government spending around the world has grown both in terms of spending per capita and as a share of national output.
- However, more and larger government is not always associated with better outcomes.
- Moreover, across countries some public sectors are more efficient in achieving a given outcome than others.

Measuring the Public Sector

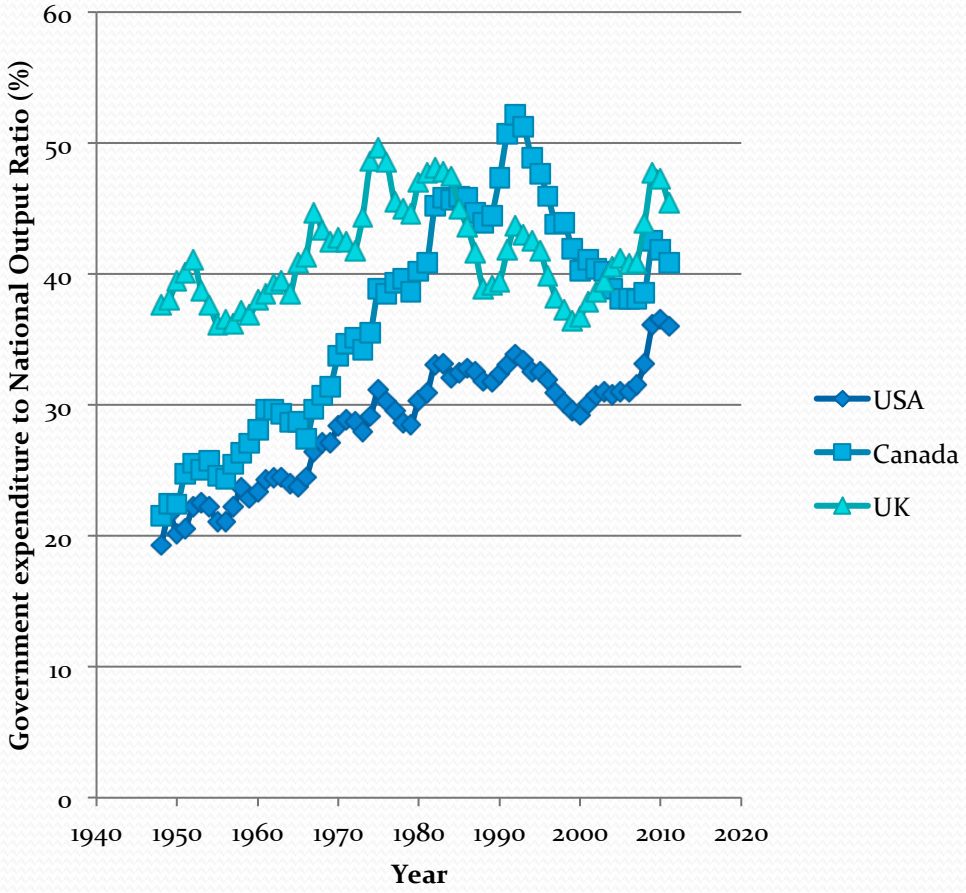
- Measuring public sector size is complex - no single quantitative indicator conveniently summarizes the entire impact of government on the economy.
- Measuring the relationship between public sector size, economic growth and public sector outcomes is complicated by the quantity and quality of data.
- Other issues: expenditure composition, tax expenditures, borrowing, government regulation.
- Nevertheless, two of the most common measures of government size relative to the economy are:
  - government spending as a share of national output or GDP and
  - government revenues as a share of GDP.

The Growth of the Public Sector

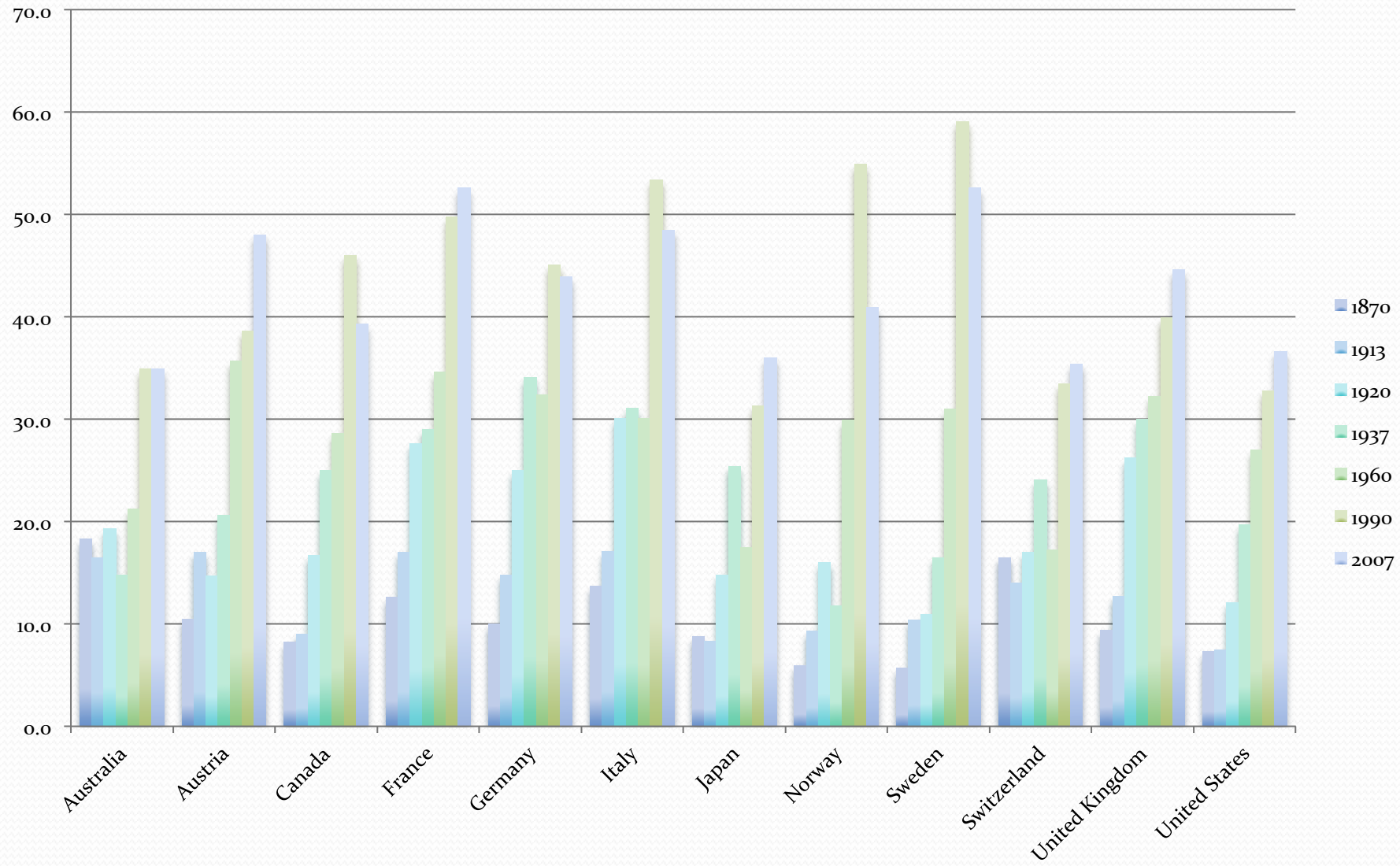
Growing Government

- Public sectors were small during the nineteenth century.
- During the course of the 20th century and particularly after the Second World War, the public sector grew dramatically in most developed and industrialized countries.
- After growing for much of the twentieth century, public sectors around the world began to decline in size after 1980.

Ratio Of General Government Expenditure to National Output for Canada, the United States and the UK, 1948-2011

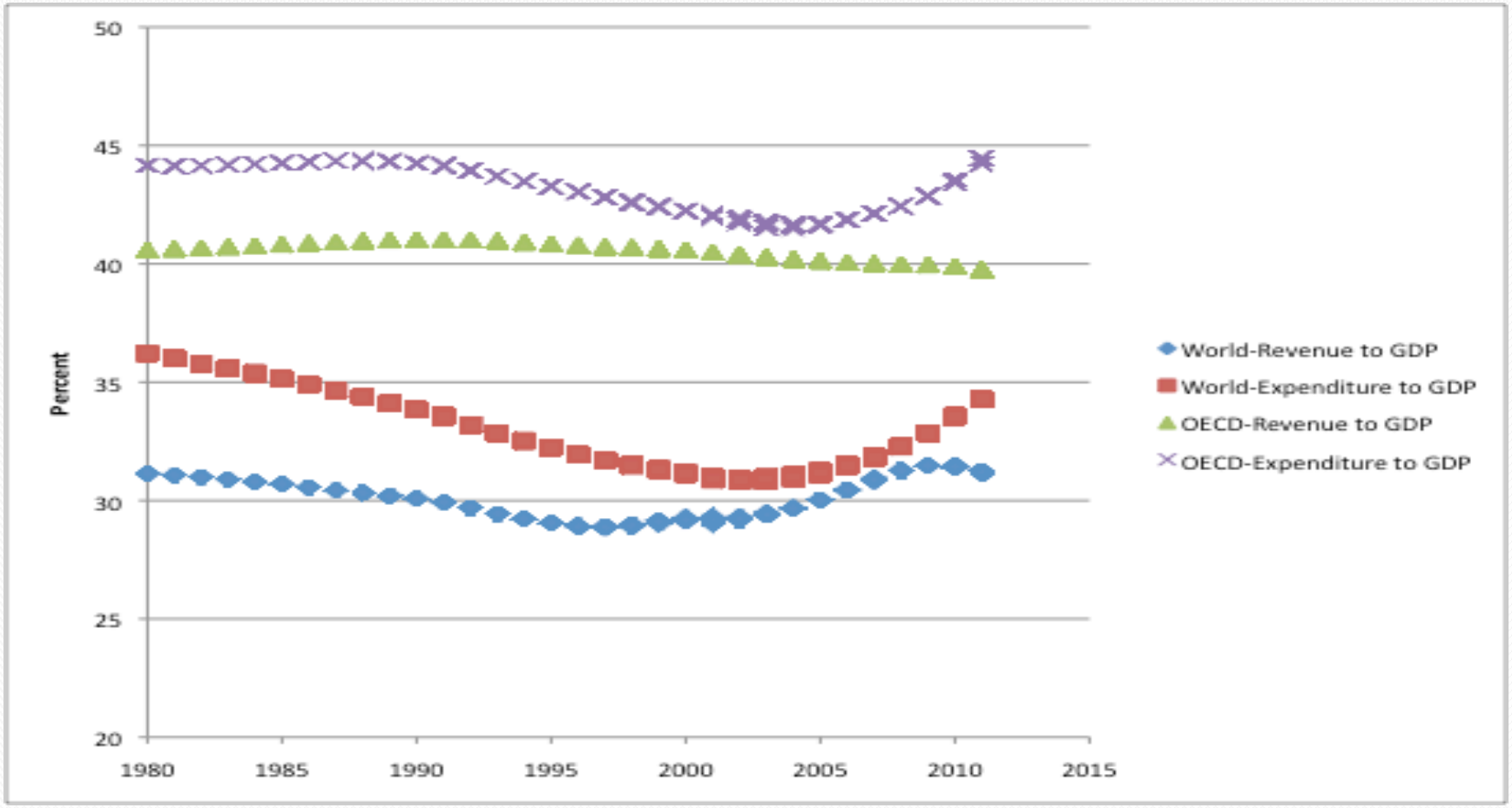


General Government Expenditure as a Percent Share of GDP 1870-2007 (Source: Tanzi, 2011, 9)

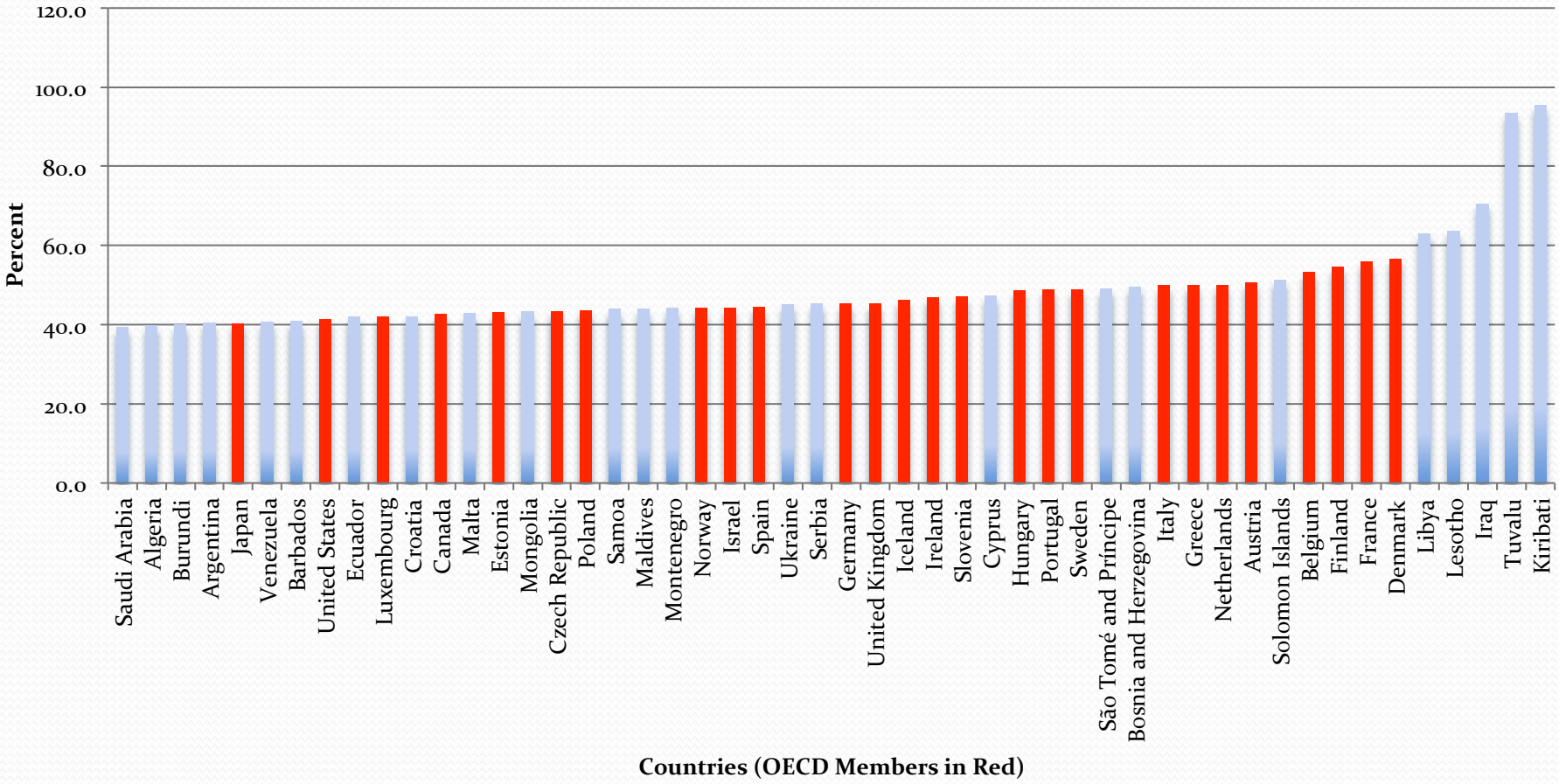


Recent Public Sector Growth, 1980-2011

(LOWESS smooths)



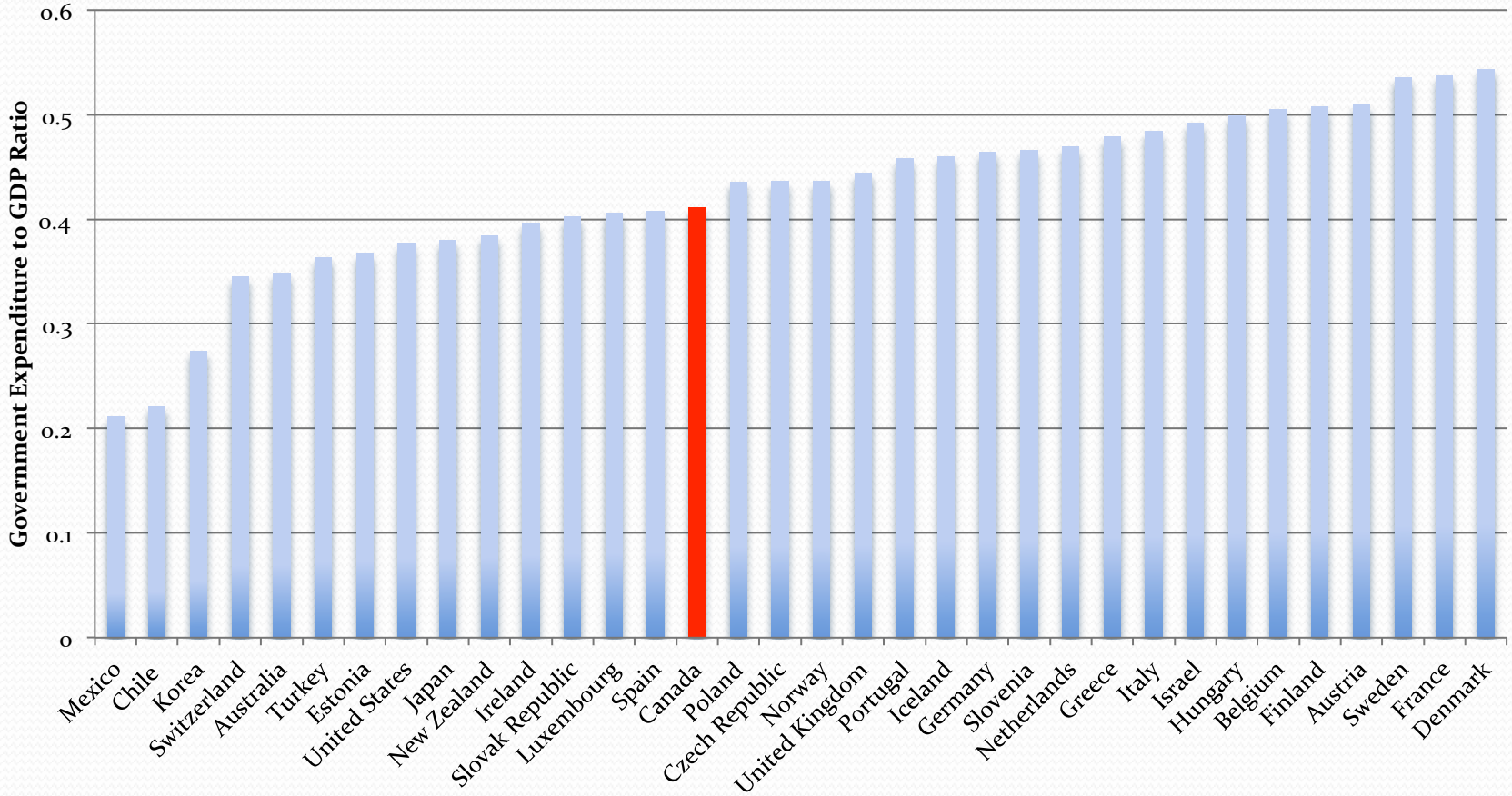
50 Largest Government Expenditure to GDP Ratios, 2011 (Data Source: IMF WEO 2012)



Public Sector Size Facts

- Average government spending per capita in 2011 across 186 countries in US PPP$ was 5,333 dollars and ranged from a low of 101 to a high of 33,878 dollars.
- For the highest spending 50 countries, spending ranges from a low of 6,744 dollars per capita for South Korea to a high of 33,878 for Luxembourg.
- For the bottom spending 50 countries, spending per capita ranges from a low of 101 dollars for the Democratic Republic of the Congo to a high of 929 dollars for Djibouti.
- In 1980, per capita government spending in the OECD countries was 4,006 dollars (US PPP) whereas by 2011 it was 14,977 dollars. For the world as a whole the comparable figures for 1980 and 2011 are 2,153 and 5,333 dollars.

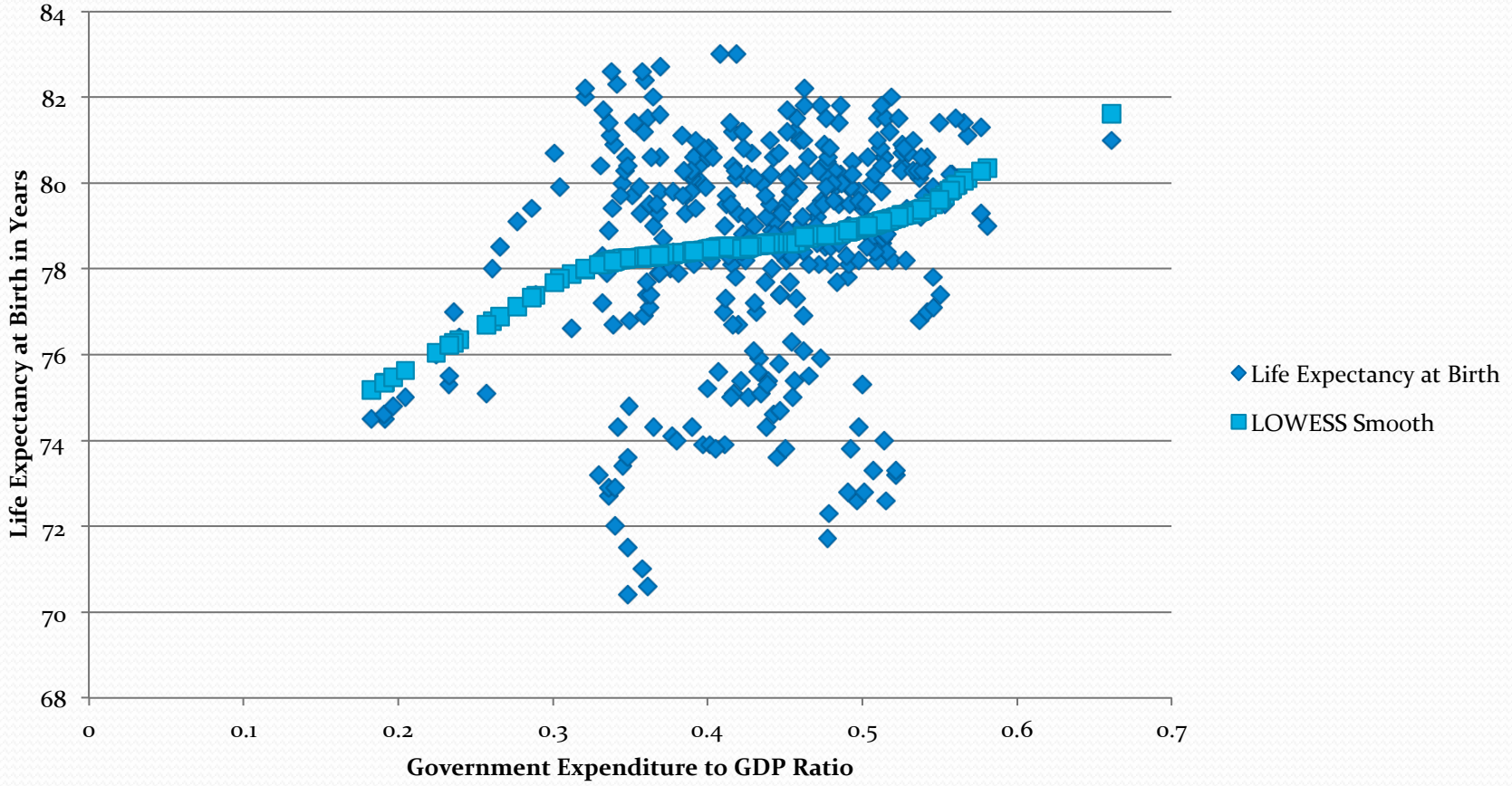
Average Annual Government Expenditure to GDP Ratio, OECD, 2000-2011



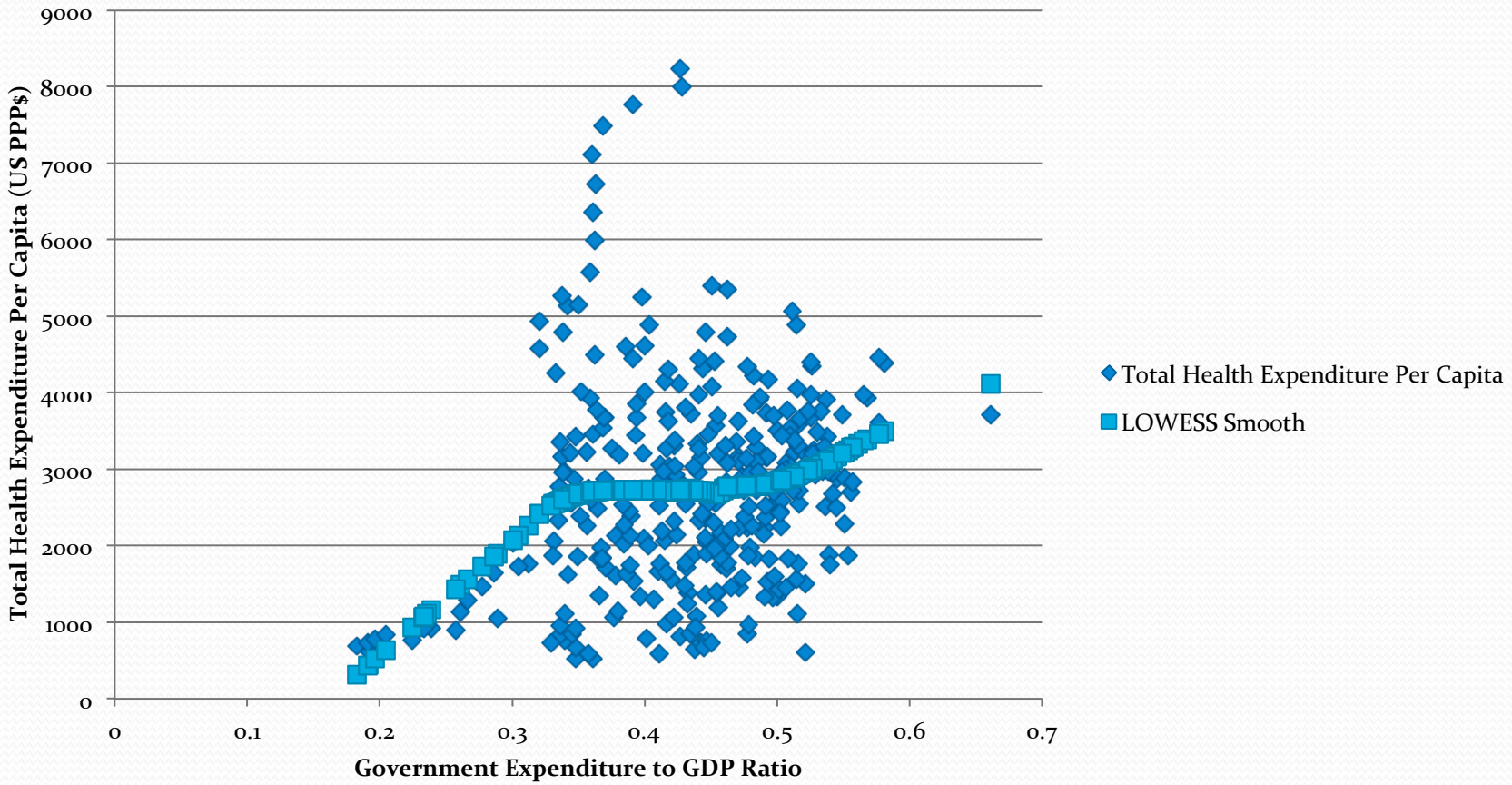
Public Sector Size and Performance

Is a larger public sector associated with better performance outcomes?

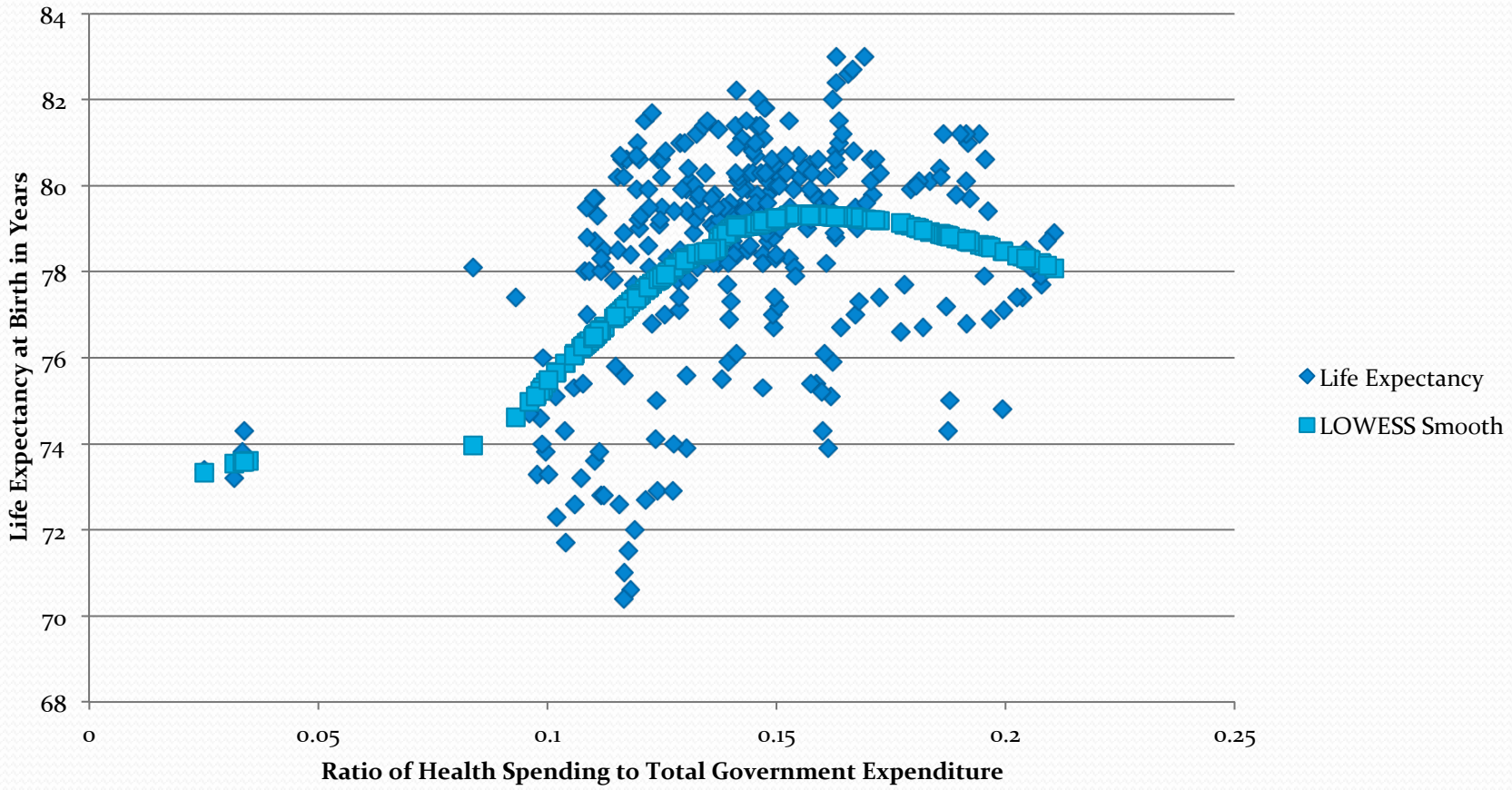
Public Sector Size and Life Expectancy in the OECD Countries, 2000-2011



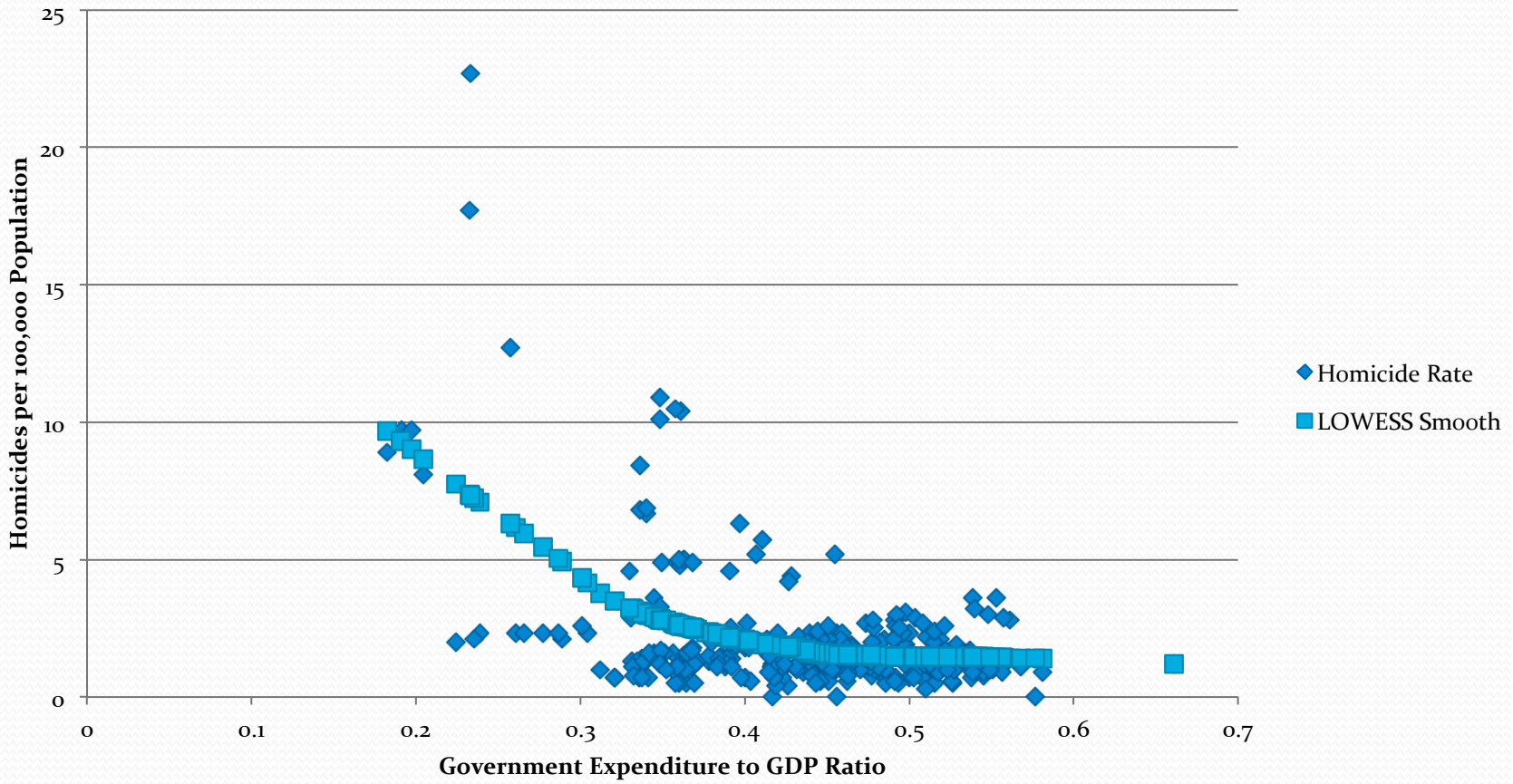
Public Sector Size and Per Capita Total Health Expenditure in the OECD, 2000-2011



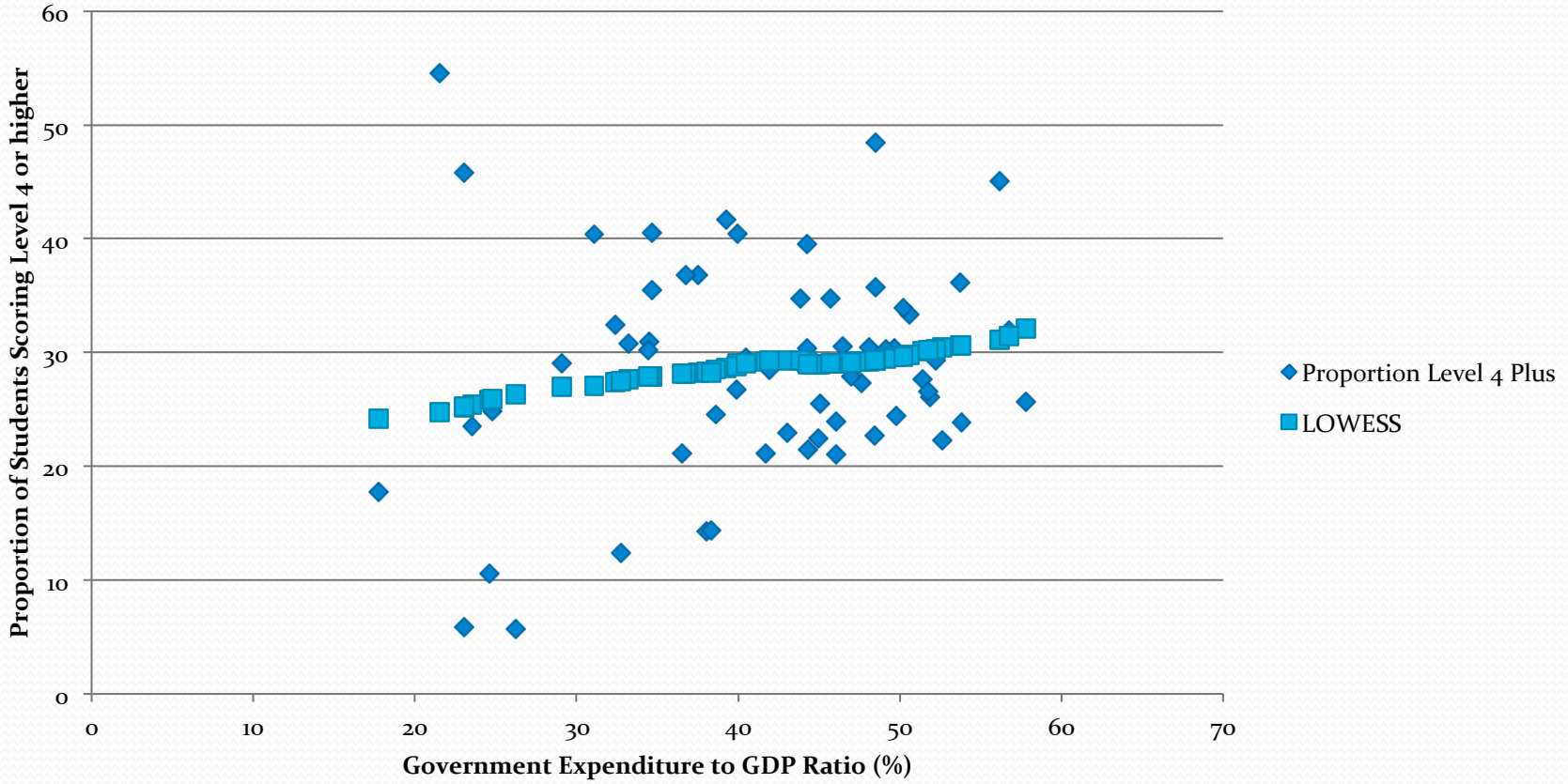
Public Health Expenditure Share of Total Government Expenditure versus Life Expectancy in the OECD Countries, 2000-2011



Public Sector Size and Public Safety in the OECD, 2000-2011



Public Sector Size and Educational Success (PISA scores for reading levels, 2006 & 2009)



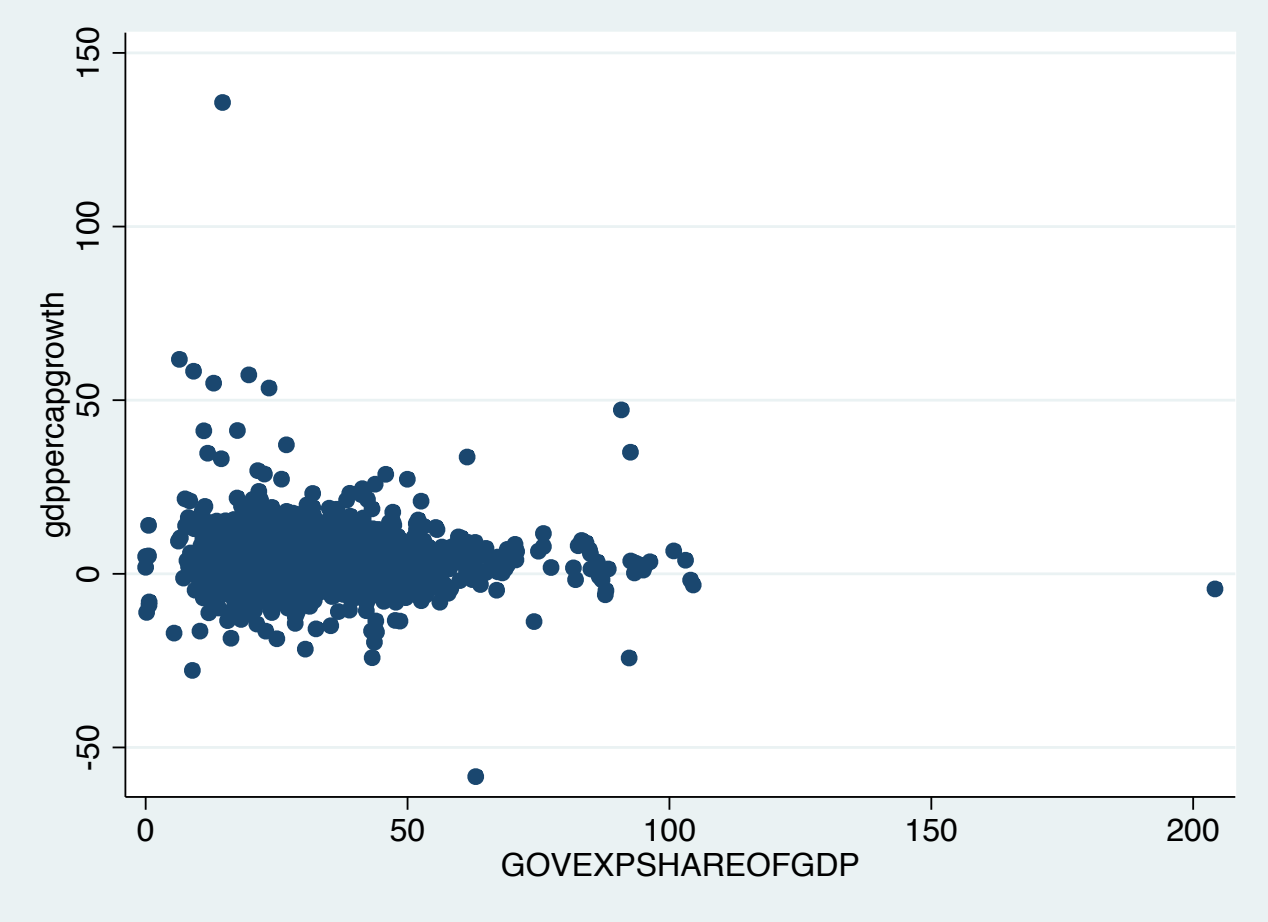
Performance Summary

- While there is a positive association between government spending and favorable societal outcomes, much of the relationship is for lower amounts of spending.
- *Diminishing returns*?
- A larger public sector is not necessarily always associated with a lot more positive health, social and education outcomes.
- The evidence suggests fewer benefits once the public sector reaches the 30 to 35 percent of GDP range.

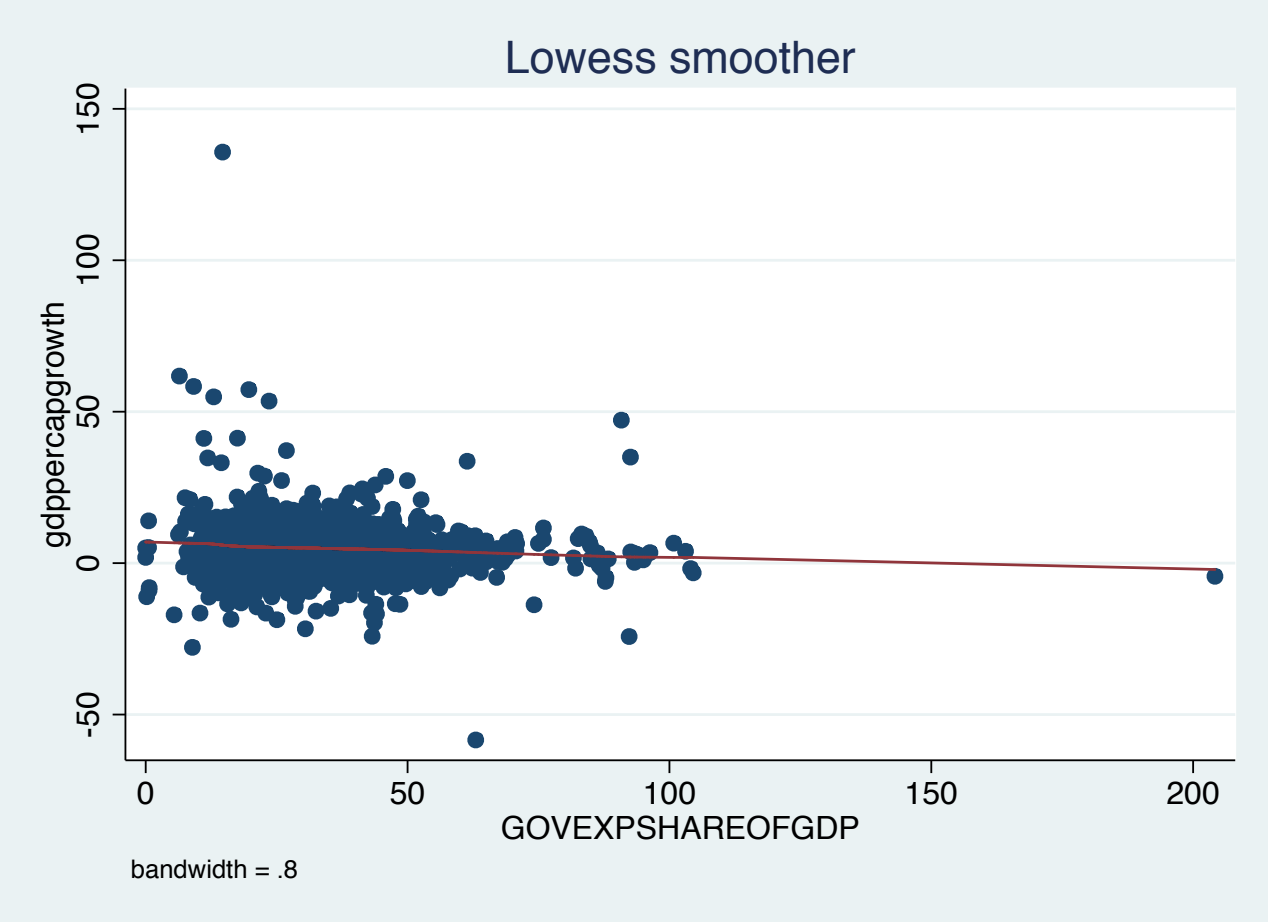
Public Sector Size and Economic Growth

Do larger public sectors promote or hinder economic growth?

Per Capita GDP Growth Rates (%) versus Government Expenditure to GDP Ratio(%), IMF WEO 1980-2011



Per Capita GDP Growth Rates versus Government Expenditure to GDP Ratio, 1980-2011, LOWESS Smooth



Growth and Public Sector Size

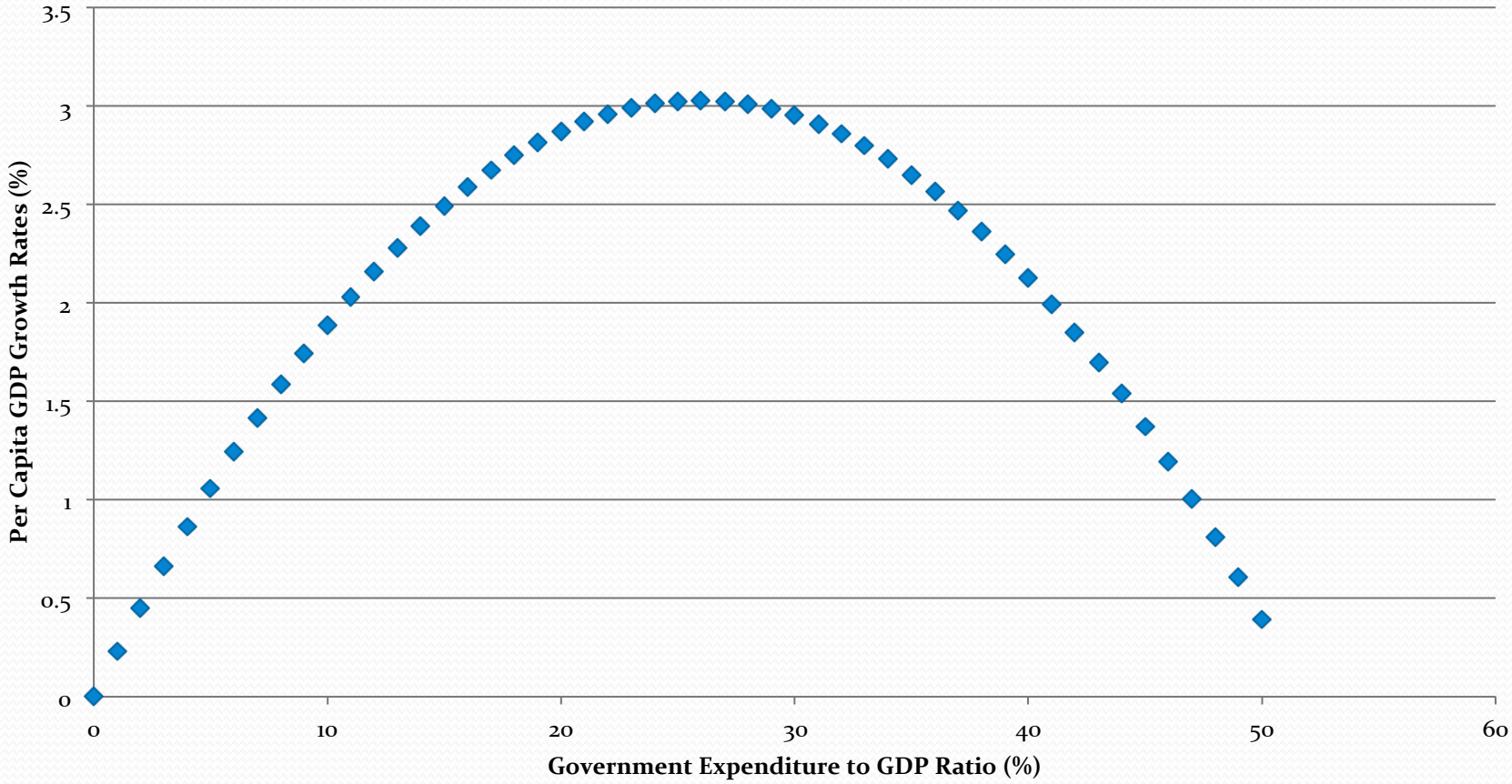
- Regression approach
- IMF WEO data for period 2000-2011
- Dependent Variable
  - Growth rate of per capita GDP in US PPP$
- Independent Variables
  - G/GDP, Population, Per Capita GDP, Net Debt to GDP, Governance, Economic Freedom, Year
- Region Fixed Effects
  - OECD vs Non-OECD
  - Regions

Regression Analysis

Dependent Variable	**Per Capita GDP Growth Rate**		
	I (Narrow)	**II (Broad)**	**III (Broad & Outlier Adjusted)**
Independent Variables			
Government expenditure to GDP ratio	**-0.0767**	**0.2341**	**0.1993**
Government expenditure to GDP ratio squared	-0.0001	**-0.0045**	**-0.0038**
Net debt to GDP ratio		**-0.0107**	**-0.0108**
Population		**0.0071**	**0.0069**
Per Capita GDP Lagged One Year	**-0.0001**	**-0.0002**	**-0.0002**
Governance Indicator		**1.2045**	**1.0585**
Fraser Economic Freedom Index		***0.5757***	**0.7025**
Europe		**1.8530**	**1.7237**
Asia		0.5828	0.7256
Pacific		**-2.5308**	**-2.3444**
Australia & New Zealand		-0.3223	-0.1991
North America		0.1356	0.1407
South America		0.2741	0.3411
Central American & Carribean		0.4299	-0.3218
Middle East		**2.0857**	**2.2305**
OECD		0.6579	0.3620
Year	-0.0335	**-0.1008**	**-0.0966**
Constant	**9.5426**	2.3289	1.5862
n	2126	683	630
Countries	182	70	70
Wald chi2(14)	179.42	158.85	164.72
Square of Correlation Coefficient: Actual vs Fitted	0.03	0.20	0.19

Estimation Technique: Generalized Least Squares

ESTIMATED SCULLY CURVE FROM REGRESSION (Equation II)



Public Sector and Economic Growth

- After controlling for confounding factors such as population, lagged per capita GDP, net debt to GDP, the institutional factors of governance and economic freedom and regional variations, there is a hump-shaped Scully Curve relationship between the government expenditure to GDP ratio and the growth rate of per capita GDP.
- The estimated Scully Curve shows an inverse-U shaped curve that maximizes annual per capita GDP growth at 3.0 percent at the government expenditure to GDP ratio of 26 percent.

Implications of Scully Curve

- All other things given: Government expenditure to GDP of 30 percent is associated with a per capita GDP growth rate of just under 3 percent, while a ratio of 40 percent brings the growth rate down to 2.1 percent.
- All other things given, over the course of a decade, the economy with a public sector size of 30 percent could see its per capita GDP in US PPP dollars grow by over a third while the public sector size of 40 percent would see smaller per capita GDP gains of only about one fifth.

Public Sector Efficiency

Approach to Estimating Efficiency of Public Sector

- Estimate of total performance
- Estimate of cost effectiveness

Methodology for Estimating Total Performance

- Data from 34 OECD countries was used to estimate measures of public sector performance and efficiency.
- Using the Min-Max methodology, a Total Performance Index over the period 2000 to 2011.
- Category scores range from 0 to 10.
- Four economic performance indicators, two health outcome performance indicators, five social outcome performance indicators and nine OECD better life indicators for a total of 20 comparison categories.

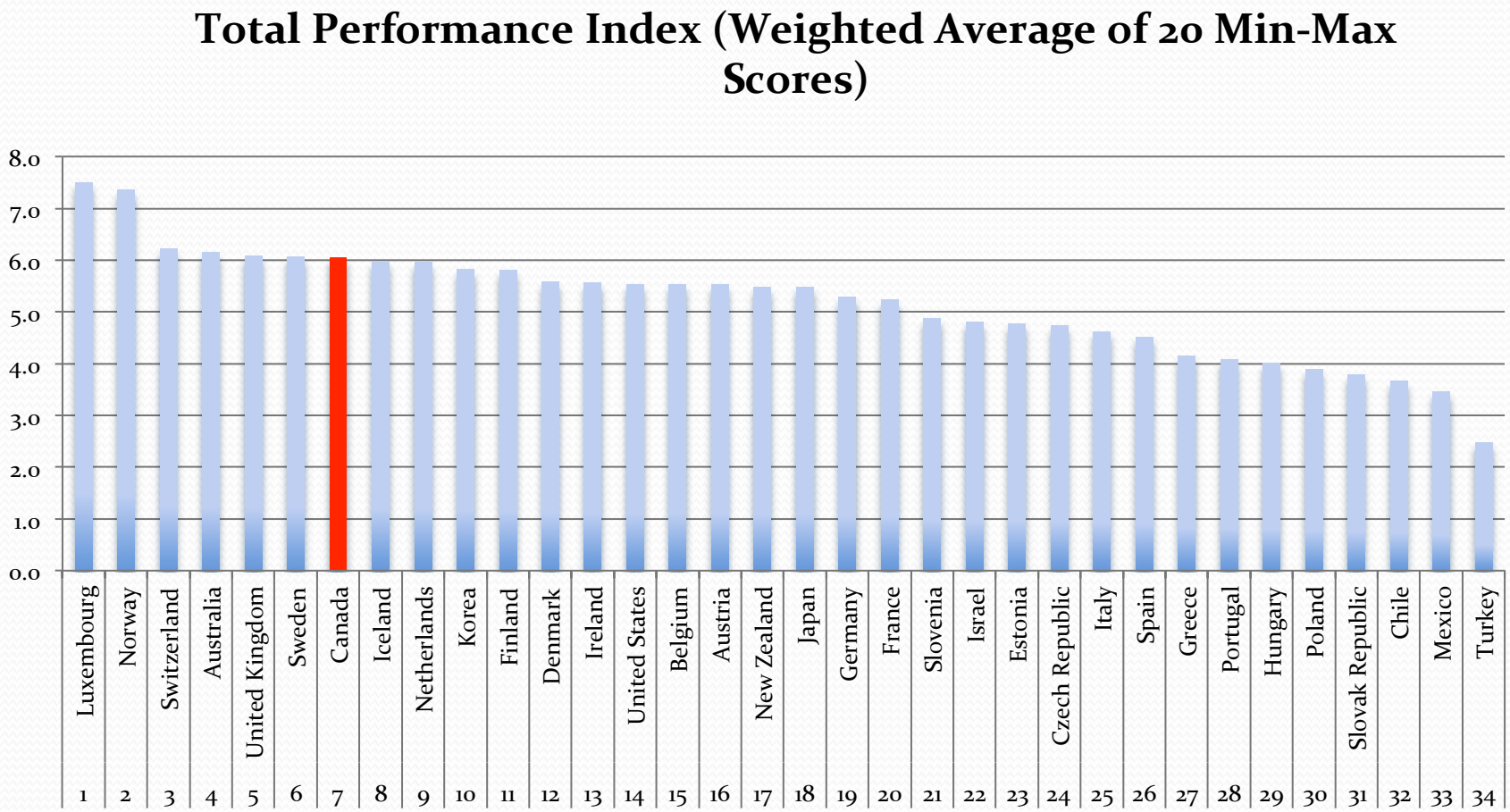
Indicators and Weighting

- Economic Indicators (50%)
  - Inflation, Unemployment Rate, Per Capita GDP (PPP$), Real Per Capita GDP Growth Rate
- Health Indicators & Social Outcome (30%)
  - Life Expectancy, Infant Mortality
  - Tertiary Education, *PISA Scores: Proportion Level4Plus, Gini Coefficient, Homicide Rate, Burglary Rate*
- OECD Better Life Indicators (20%)
  - *Rooms Per Person, Household Net Financial Wealth, Household Net Income, Life Satisfaction, Self Reported Health, Voter Turnout, Air Pollution,* Water Quality, Leisure Time

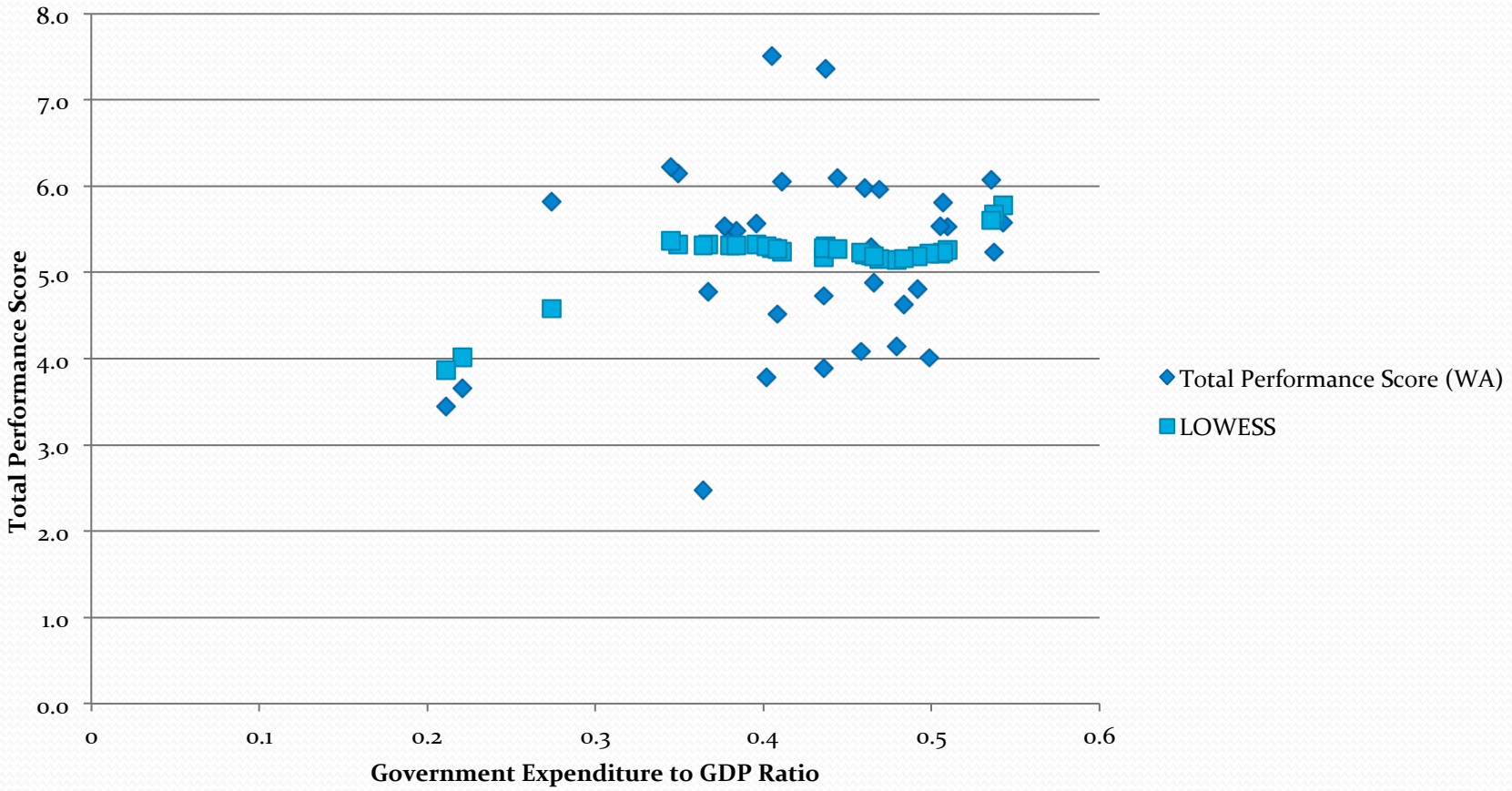
Min-Max Methodology

- Is used to generate a score from 0 to 10.
- Where a higher score is the more favorable outcome, the formula takes the form:
  - (National value-Min(Range of National Values))/(Max(Range of National Values)-Min(Range of National Values)) X 10
- Where a lower score is the more favorable outcome, the formula is as follows:
  - (Max(Range of National Values)-National Value)/(Max(Range of National Values)-Min(Range of National Values)) X 10

Total Performance Ranking



Total Performance vs Public Sector Size



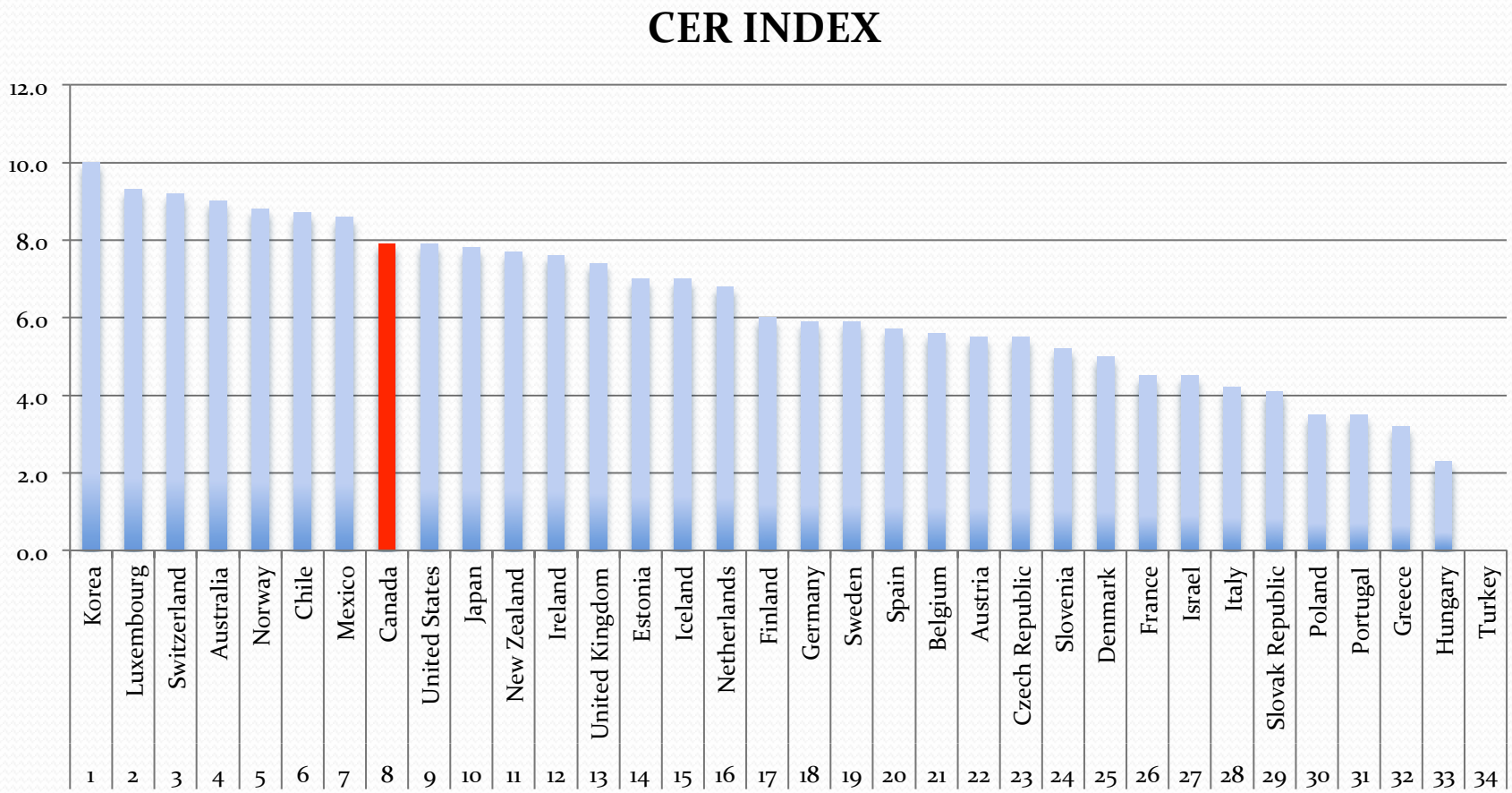
Methodology for Cost-Effectiveness

- Cost-effectiveness Measure
  - ratio of a resource cost measure to the outcome
  - total performance relative to public sector size
- A cost-effectiveness ratio (CER) is calculated for each country by taking the average ratio of government expenditure to GDP for the years 2000-2011, and then dividing it by the Total Performance Index:
- $CER_i=(G/GDP)_i/TPI_i$

Example

- Sweden and Switzerland. Their total performance scores are quite similar with Sweden at 6.1 and Switzerland at 6.2 .
- However, Switzerland accomplishes this performance with its average government expenditure to GDP ratio of 0.345 (approximately 35 percent)
- Sweden's is 0.536 (approximately 54 percent). Put another way, for an incremental 12 percent improvement in total performance, Sweden has a 55 percent increase in the size of its public sector relative to GDP.
- Therefore, Sweden can be considered less efficient than Switzerland.

Cost Effectiveness Ranking



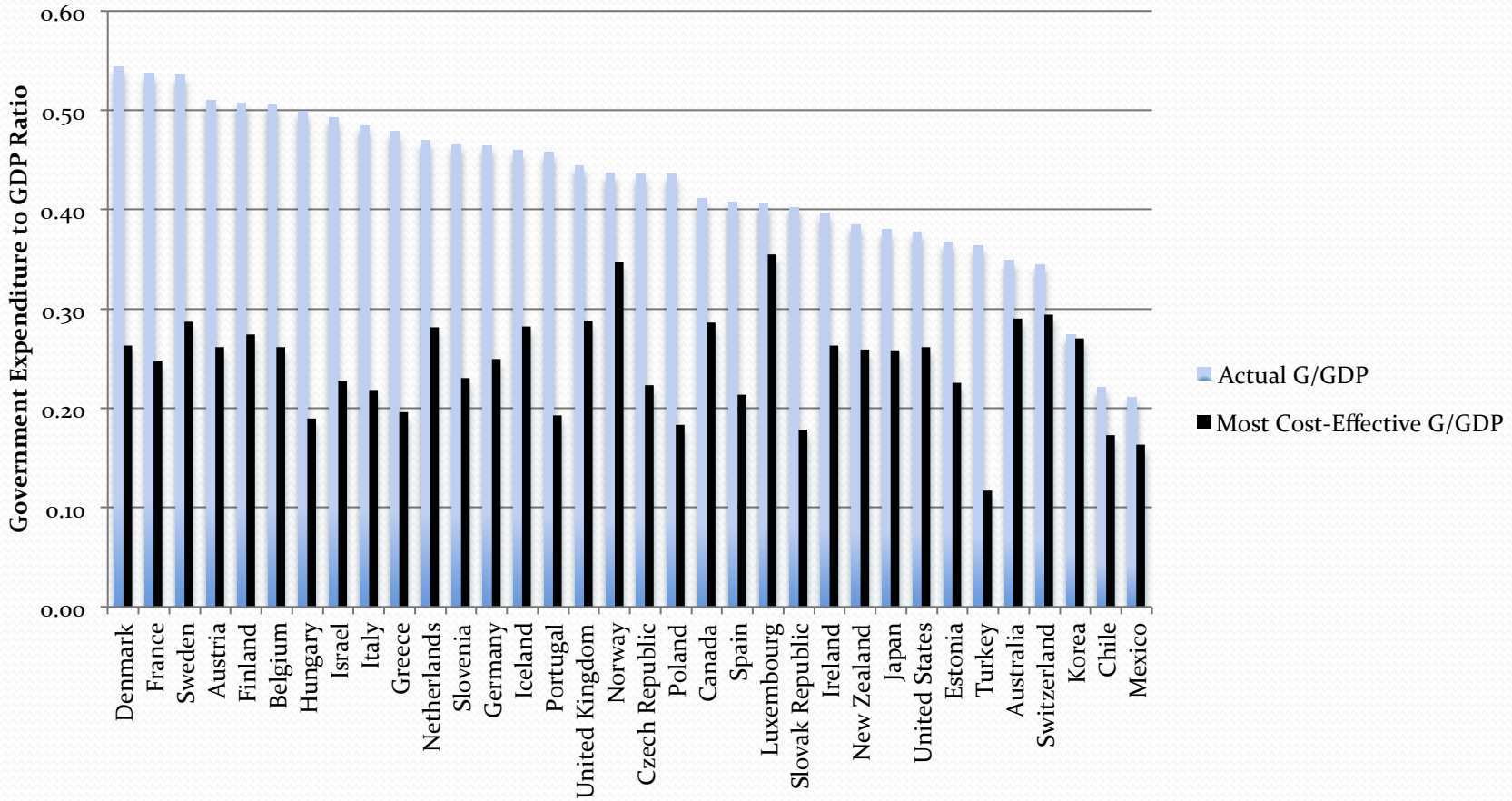
A Comparison

- Luxembourg and Korea result as the two most cost-effective countries.
- Luxembourg achieves the highest total performance score of 7.5 but does it with its government expenditure to GDP ratio at 40.5 percent.
- Korea scores 5.8 when it comes to total performance but does so with government expenditure to GDP ratio of 27.4 percent.
- While Luxembourg has a substantially larger public sector, it also has accompanied this with an increase in its total performance.
- Luxembourg ranks below South Korea in cost-effectiveness because its public sector is 48 percent bigger than South Korea's but its total performance score is only 29 percent better.

How Does Canada Compare?

- If Canada were as cost effective as South Korea in achieving its Total Performance Score, its government expenditure to GDP ratio would be 29 percent as opposed to the current estimate of 41 percent – all other things given.
- However, it should be acknowledged that the cost of government in such comparisons should take into account population density, geographical compactness & other factors.

Public Sector Size if OECD Countries as Cost-Effective as South Korea



Concluding Thoughts

Does a larger public sector improve societal outcomes?

- A comparison of public sector spending variables and outcome indicators such as life expectancy, infant mortality, crime rates and educational attainments finds the relationships to be complex.
- While there is indeed a positive association between public sector size and favorable societal outcomes, much of the relationship is for smaller government expenditure to GDP ratios.
- There is a leveling off of improvements as public sector size rises above a certain level.

Public Sector Size and Economic Growth

- There is a hump-shaped relationship between the government expenditure to GDP ratio and the growth rate of per capita GDP.
- All other things given, annual per capita GDP growth is maximized at 3.1 percent at a government expenditure to GDP ratio of 26 percent.
- Beyond government expenditure to GDP ratios of 26 percent, economic growth rates decline.

What should public sector size be?

- Public sector size is a function of economic factors, societal preferences and historical experience.
- Public sector size can affect economic performance outcomes.
- Naturally, what public sector size should be is also about broader societal outcomes.
- However, the evidence suggests declining economic growth rates beyond a G/GDP ratio of 26 percent and fewer societal outcome benefits once the public sector reaches the 30 to 35 percent of GDP range.

Conclusion

- Government is indeed very important and its programs are important to our quality of life.
- At the same time, the results in this study suggest that more and larger government is not always associated with improved outcomes.
- Moreover, across countries some public sectors are more efficient in achieving a given outcome than others.
- If your public sector size exceeds the 30 to 35 percent of GDP range, what is the value added?

Questions