



Les pièges des pays riches:
Les défis de la prospérité

High Income Traps:
The challenges of delivering secular prosperity

Colloque à l'occasion du 5e anniversaire
du
Québec économique

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Montréal

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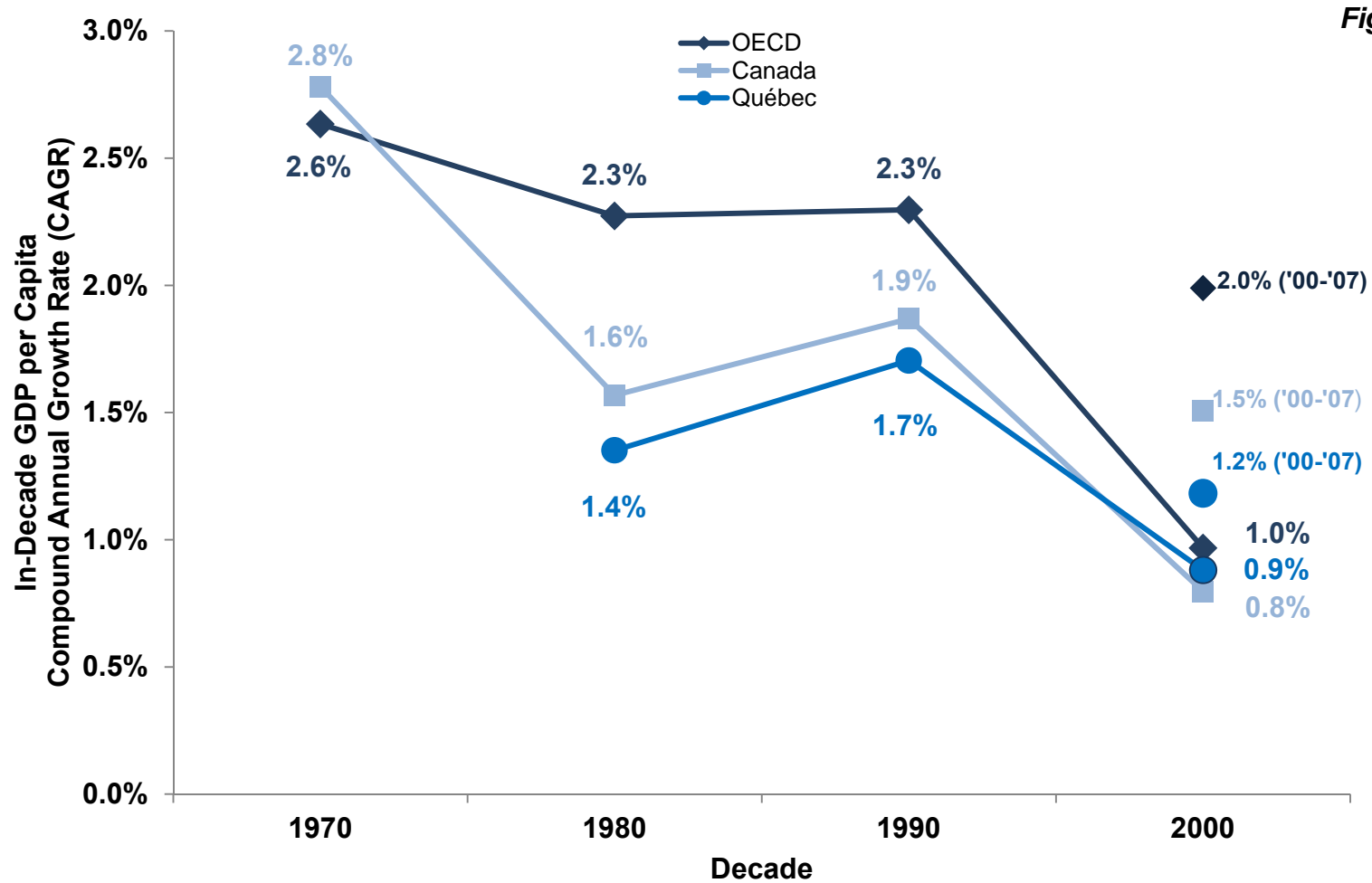
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Real GDP per capita growth by decade in the OECD^{1,2}



1. Unweighted average of 26 OECD member countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.
2. GDP per capita measured on a real basis (USD, constant prices, 2005 PPPs).

Source: OECD, Statistics Canada, Conference Board of Canada

Why is GDP per capita growth slowing?

Secular Stagnation

- **L. Summers**
“On secular stagnation”
- **P. Krugman**
“Why weren’t the alarm bells ringing?”

Jobless & Low Wage Innovation

- **R. Gordon**
“Is U.S. economic growth over? Faltering innovation confronts the six headwinds”
- **E. Brynjolfsson & A. McAfee**
“The Second Machine Age: Work, progress and prosperity in a time of brilliant technologies”

Institutional Failures

- **N. Ferguson**
“The Great Degeneration”
- **J.A. Robinson and D. Acemoğlu**
“Why Nations Fail”

Income Inequality

- **B. Cynamon & S.M. Fazzari**
“Inequality, the Great Recession, and a stagnant recovery”
- **T. Piketty**
“Capital in the Twenty-First Century”

Debt

- **A. Mian & A. Sufi**
“House of Debt”: How they (and you) caused the great recession and how we can prevent it from happening again”
- **M. Wolf**
“The Shifts and Shocks: What we’ve learned and still have to learn from - the financial crisis”

We propose another explanation – High Income Traps (HITs)

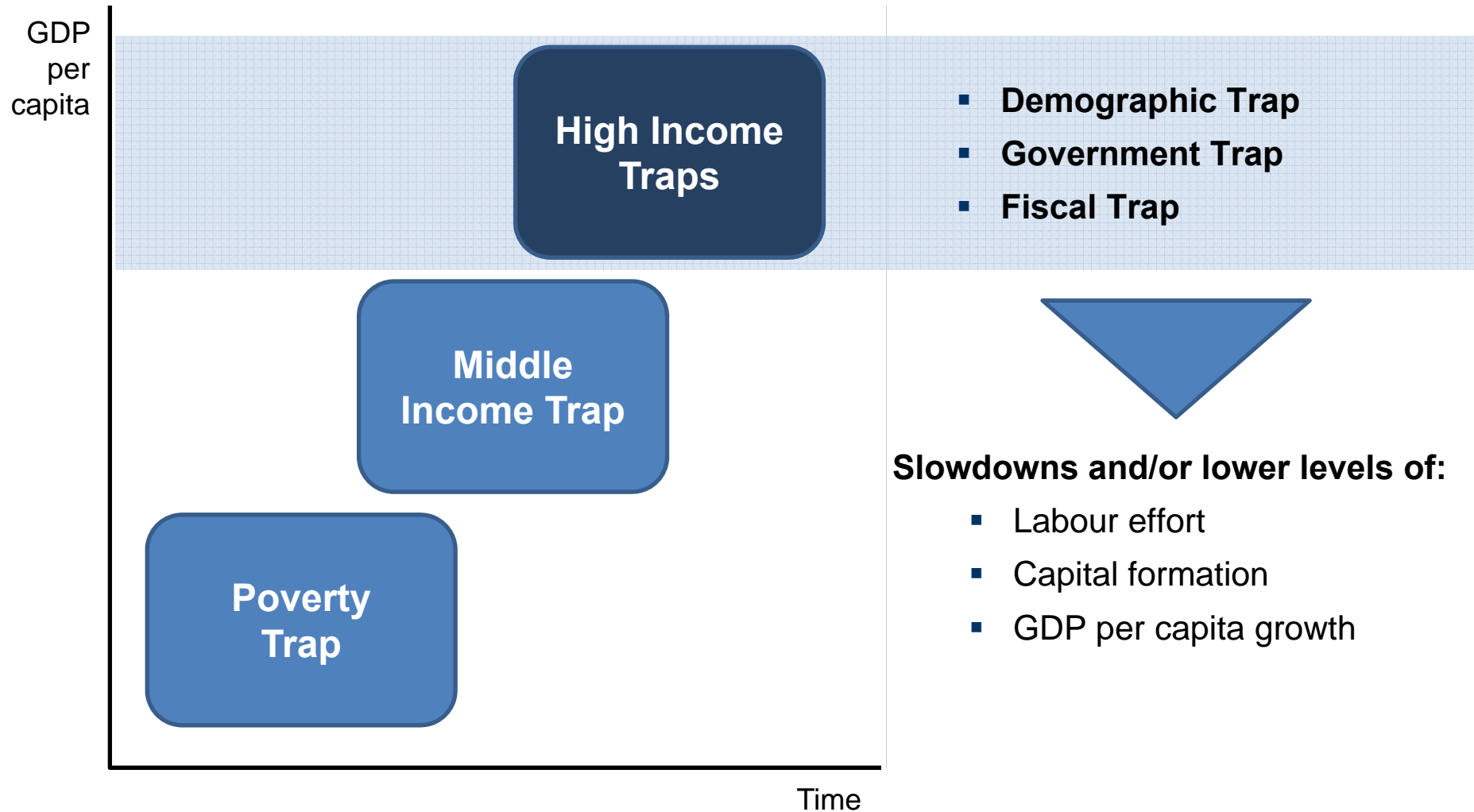


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Three High Income Traps

1 THE DEMOGRAPHIC TRAP

Over generations, richer societies tend to become older societies

2 THE GOVERNMENT TRAP

Over business cycles, richer and older societies tend to have bigger governments

3 THE FISCAL TRAP

Over time, richer and older societies tend to finance government expenditure more by taxes on labour and capital income than by fees, specific duties or consumption taxes

1 Demographic Trap: a long cycle

As the standard of living improves

A demographic transition takes place

Early	Middle	Late
Young Workforce <i>Falling</i> <i>Dependency ratio</i>	Mature Workforce <i>Stable</i> <i>Dependency ratio</i>	Aging Workforce <i>Rising</i> <i>Dependency ratio</i>

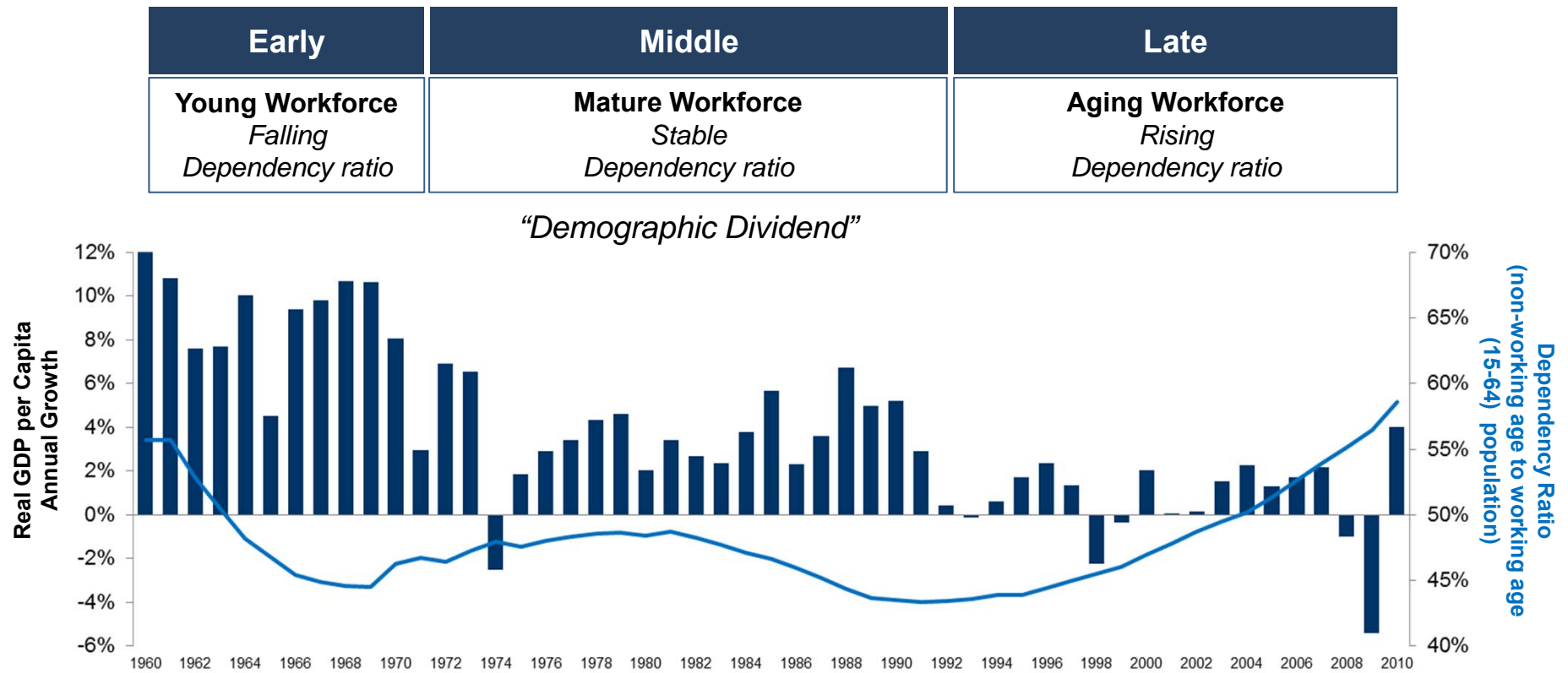
“Demographic Dividend”

While some countries, like the United States, are able to escape the demographic trap...

... others, like Japan and many European countries, are not

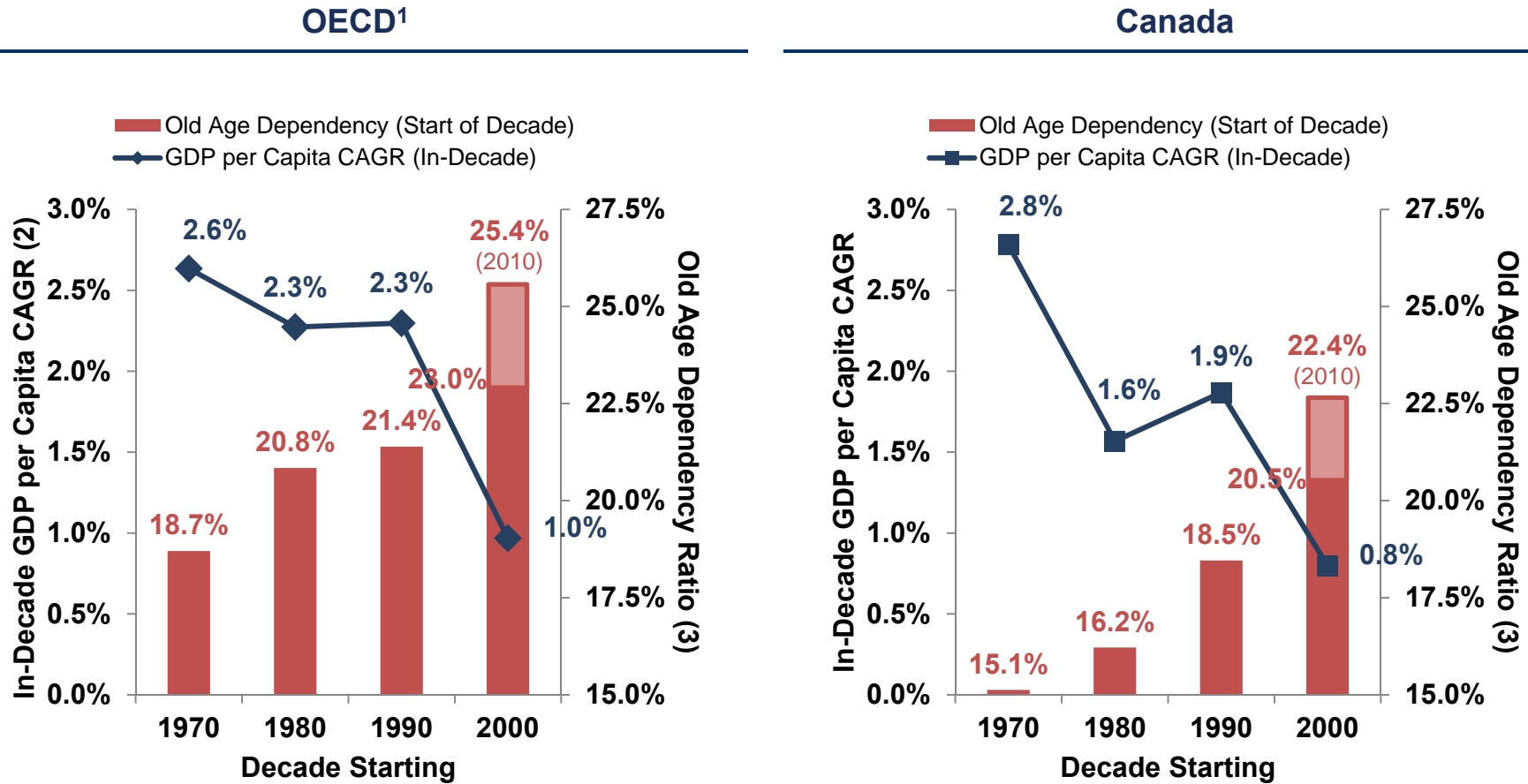
1 Evolution of GDP growth and dependency in Japan (1960 - 2010)

Figure 2



1 Aging in the OECD

Figure 3



1. Unweighted average of 26 OECD member countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.
2. GDP per capita measured on a real basis (USD, constant prices, 2005 PPPs)
3. Old Age Dependency Ratio defined as the ratio of the population aged 65+ to the population aged 15-64.

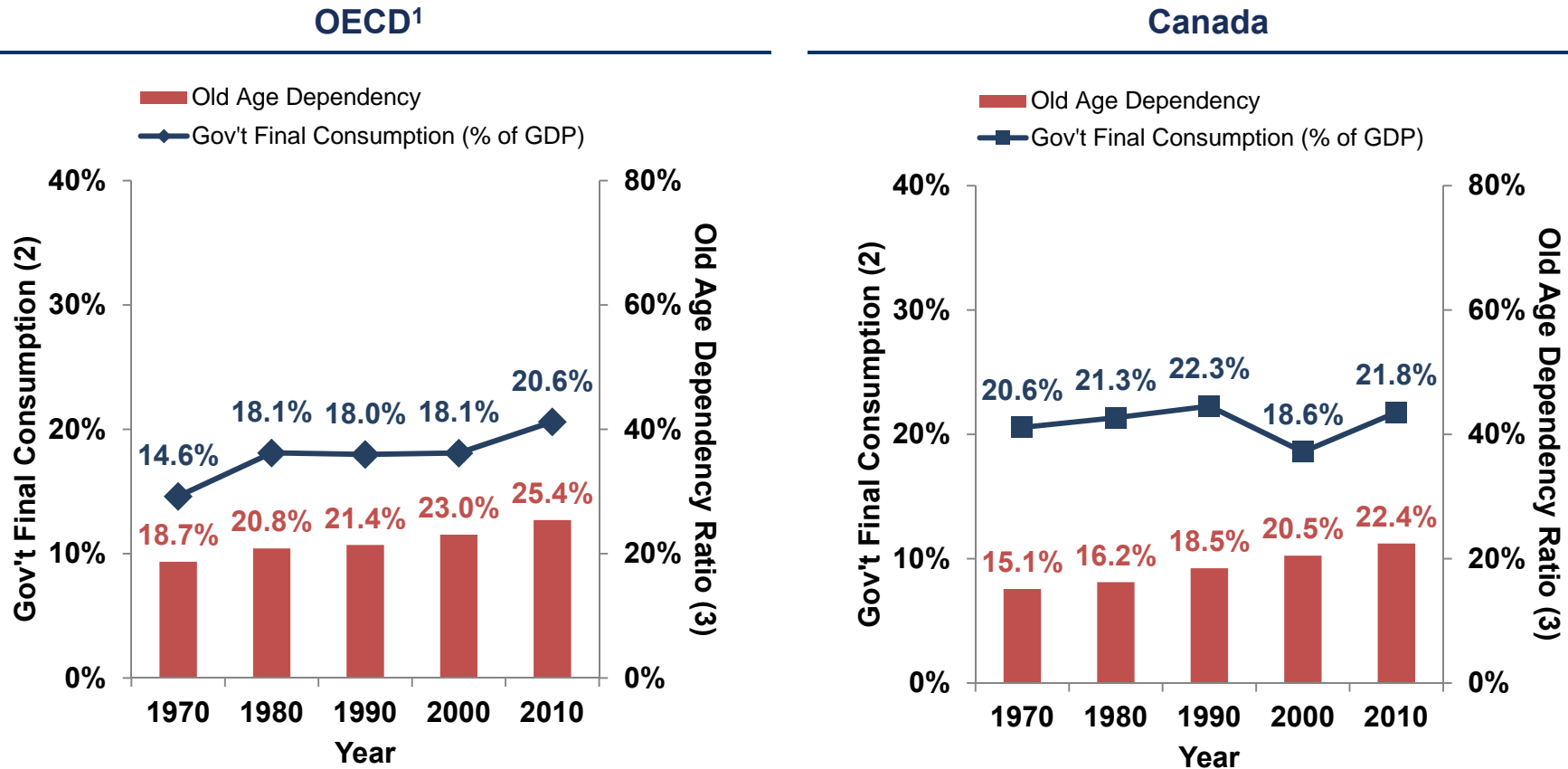
Source: OECD

2 Government Trap: Wagner's Law

- Over time, richer and older societies tend to have bigger governments
- As GDP per capita grows over business cycles, so does the size of government in the economy
- Demographic changes occur over generations, a longer timeframe than the period during which economic growth is positively impacted by increases in the size of government

2 Growth of government expenditures

Figure 4



1. Unweighted average of 26 OECD member countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.
2. Government Final Consumption (GFC) is expressed as a percentage of GDP. GFC includes all government current expenditures for purchases of goods and services (including compensation of employees). It also includes most expenditures on national defense and security, but excludes government military expenditures that are part of government capital formation. GFC excludes economic transfers. By contrast, Government Expenditure, an alternative measurement of government activity, considers economic transfers.
3. Old Age Dependency Ratio defined as the ratio of the population aged 65+ to the population aged 15-64.

2 Government Trap

The causal relationship between government size and economic growth, along with the magnitude of impact is difficult to assess because of an identification problem summed up in two different but related questions:

- A. What is the impact of economic growth on the size of government?
- B. What is the impact of bigger government on economic growth?

Some initial observations

- In poor countries, public sectors are typically small, and the relationship between government size and growth is positive
- In rich countries, public sectors are typically large and the relationship between government size and growth is less positive than in poor countries, and possibly negative according to Bergh & Henrikson (2011)

2 Government trap

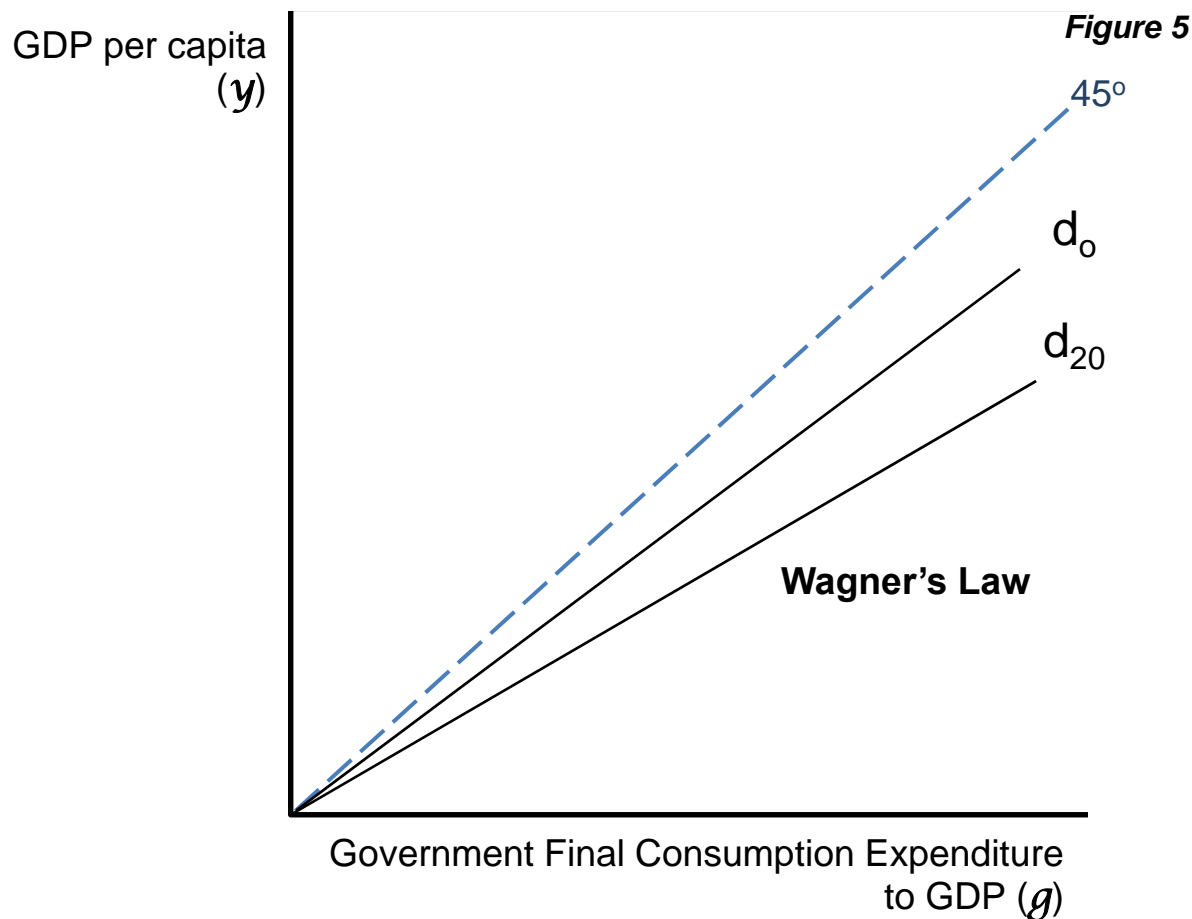
Generally speaking, the literature is divided into demand accounts and supply accounts for the size of government

- **Demand:** Increasing affluence, demands of increased openness of economy, heterogeneity of large populations, etc.
- **Supply:** Ease/efficiency in tax collection, tax 'invisibility', poor productivity of public goods, etc.
- Wagner (1883 & 1891) asserts that public spending is an endogenous variable determined by the growth of national income, which can be explained by three causes:
 - Social activities of state (defence, law and order)
 - Welfare functions (education, welfare)
 - Administrative and protective actions (public goods, regulation)
- Others suggest that government is 'sticky'
 - Displacement Effect (Peacock and Wiseman, 1961): Incremental taxes collected to finance episodic spending (e.g. war) remain part of an increased public budget even after the original reason for the spending has ended
 - Ratchet Effect (Higgs, 1987): Previously private rights and activities are taken over by the government

1 2 Demographic & Government Traps

Over many business cycles, the richer the society, the greater the government expenditures (Wagner's Law)

Over generations, the richer the society, the higher the Old Age Dependency Ratio ($d_{20} > d_0$), increasing the cyclical impact of GDP per capita growth (y) on the size of Government Final Consumption (g)



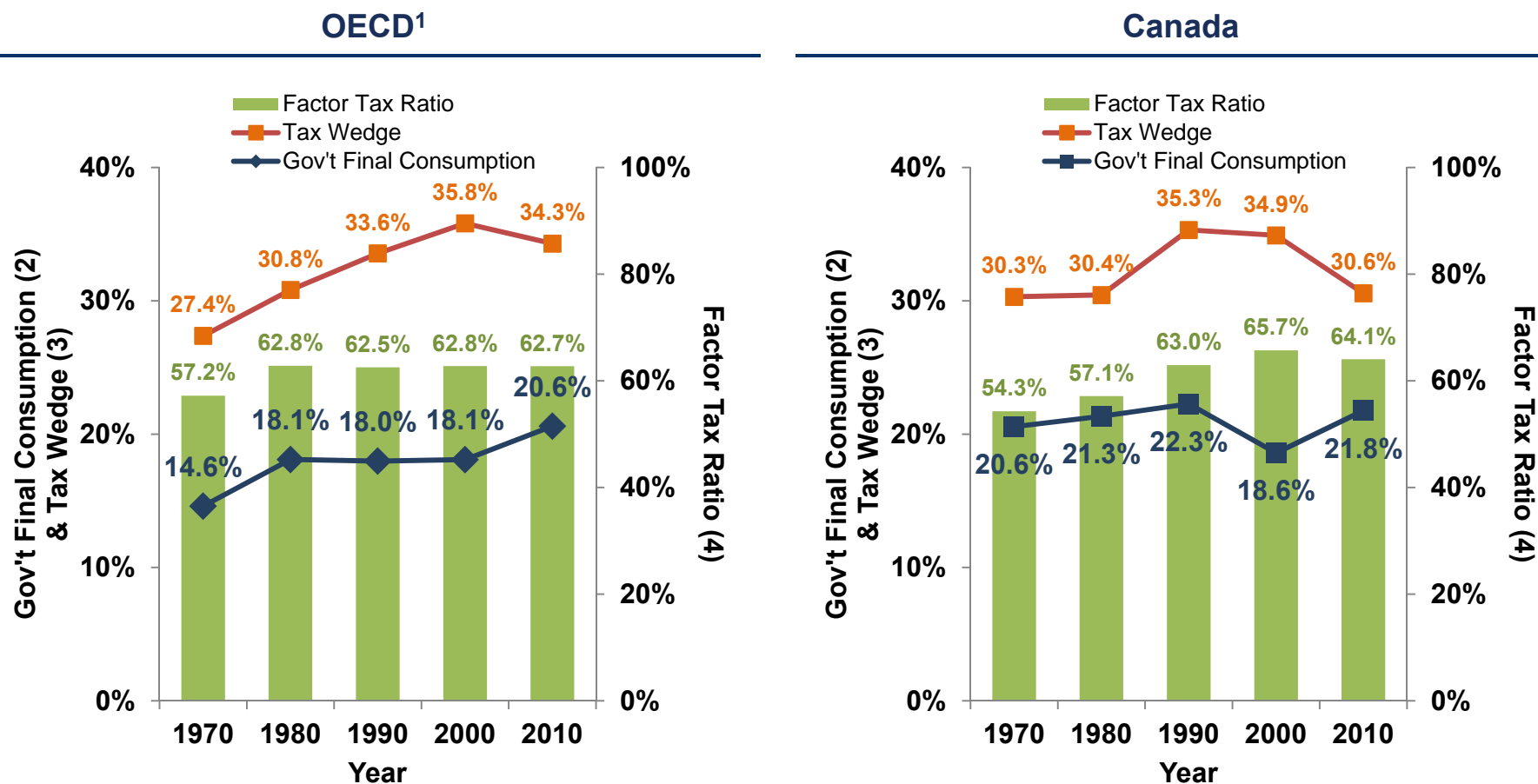
3 Fiscal Trap

As the size of government increases:

- A. Tax Revenue to GDP (the Tax Wedge) increases**
 - B. The share of taxes coming from labour and capital income (the Factor Tax ratio) increases relative to consumption taxes and other government fees**
-
- The tax structure of the economy is usually explained by reference to:
 - 1) the scale of the public sector;
 - 2) the size of the tax base;
 - 3) the cost of administering a given tax; and
 - 4) income redistribution policies
 - These factors tend to favour taxes on labour and capital over fees, specific duties or consumption taxes
 - Tosun & Abizadeh (2005) as well as Kenney & Winer (2006) offer good surveys on these issues and convincing evidence on the determinants of tax structure

3 Taxation and government final consumption

Figure 6



1. Unweighted average of 26 OECD member countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.
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3. Tax Wedge is the Tax Revenue expressed as a percentage of GDP.
4. Factor Tax Ratio is the proportion of tax revenues that come from labour and capital income.

Source: OECD

3 Fiscal Preference Function

Richer and older societies tend to have larger government expenditure that they finance by a larger proportion of Tax to GDP (Tax Wedge) and by a larger proportion of taxes on labour and capital income (Factor Tax Ratio), together (t)

Figure 7

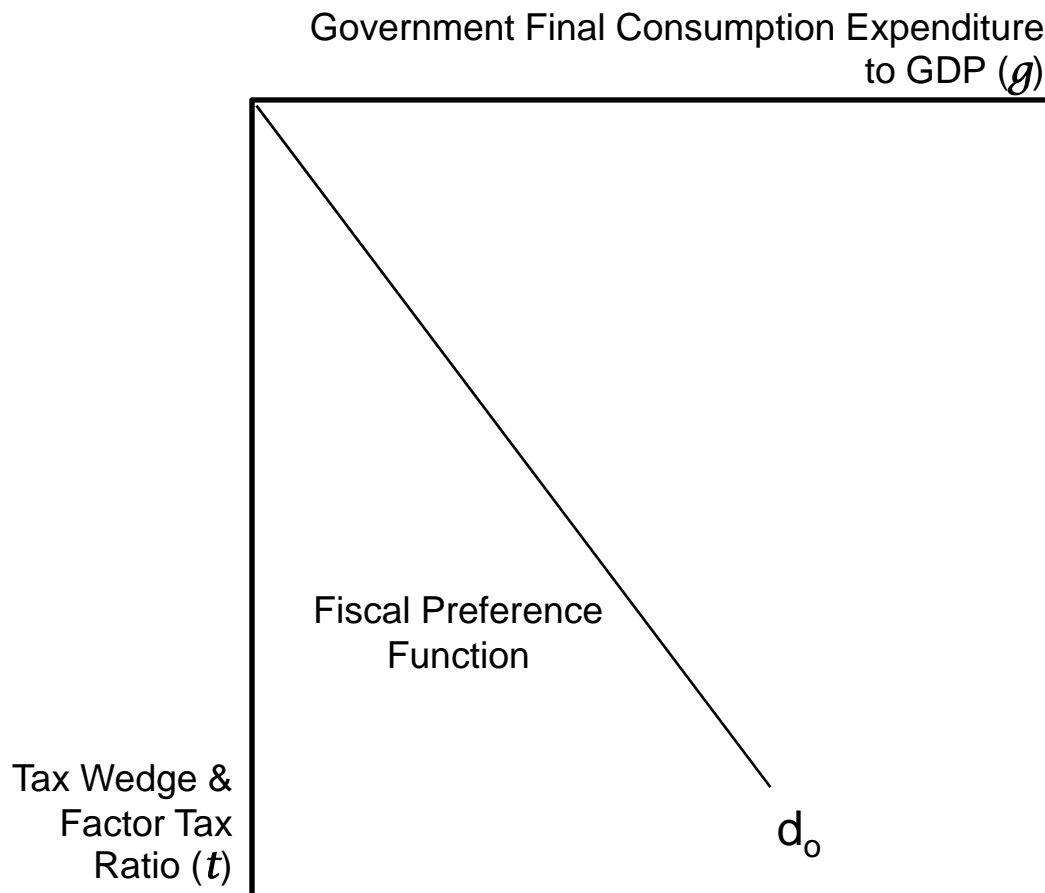


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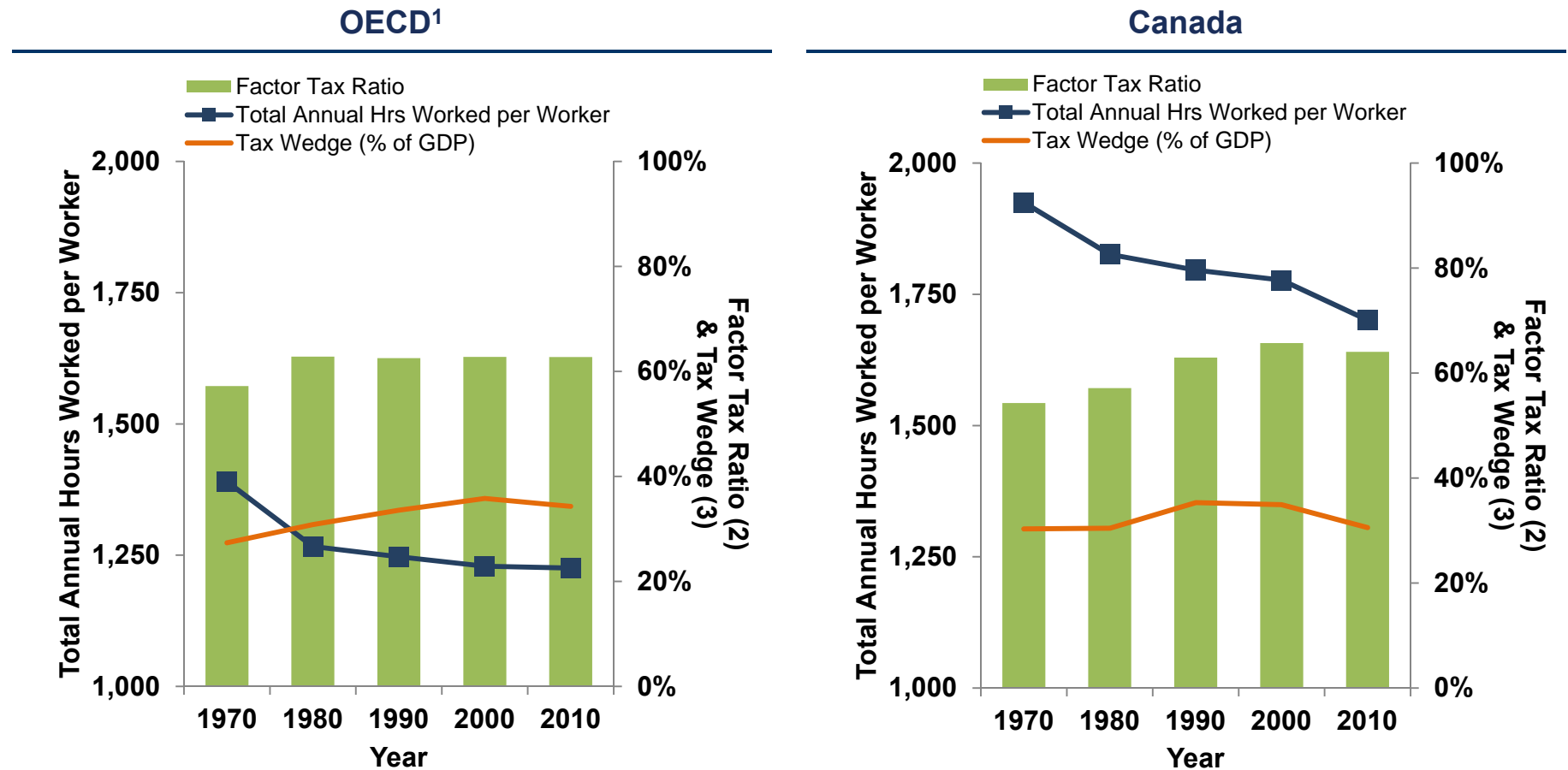
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On Labour Supply: Taxation and Hours worked in the OECD

Figure 8



1. Unweighted average of 26 OECD member countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.

2. Factor Tax Ratio is the proportion of tax revenues that come from labour and capital income.

3. Tax Wedge is the Tax Revenue expressed as a percentage of GDP.

On Labour Supply: Econometric literature

The literature is divided into micro- and macro-econometric accounts

- Micro-econometric studies find, generally speaking:
 - For males, labour supply elasticities that are small, though a sizeable minority of studies find large elasticities
 - For females, labour supply elasticities that are large, especially on the participation margin
- Macro-econometric studies reflect the observations of Prescott (2004)
 - “I am surprised that virtually all the large differences between the U.S. labour supply and those of Germany and France are due to differences in tax systems.”
 - “I have estimated the elasticity of labour supply and have found it to be large, nearly 3 when the fraction of time allocated to the market is in the neighbourhood of the current U.S. level”

On Labour Supply: Econometric literature (continued)

The negative impact of taxes on labour supply is observed in econometric studies using aggregate and disaggregate data

Ohanian, Raffo and Rogerson (2006)

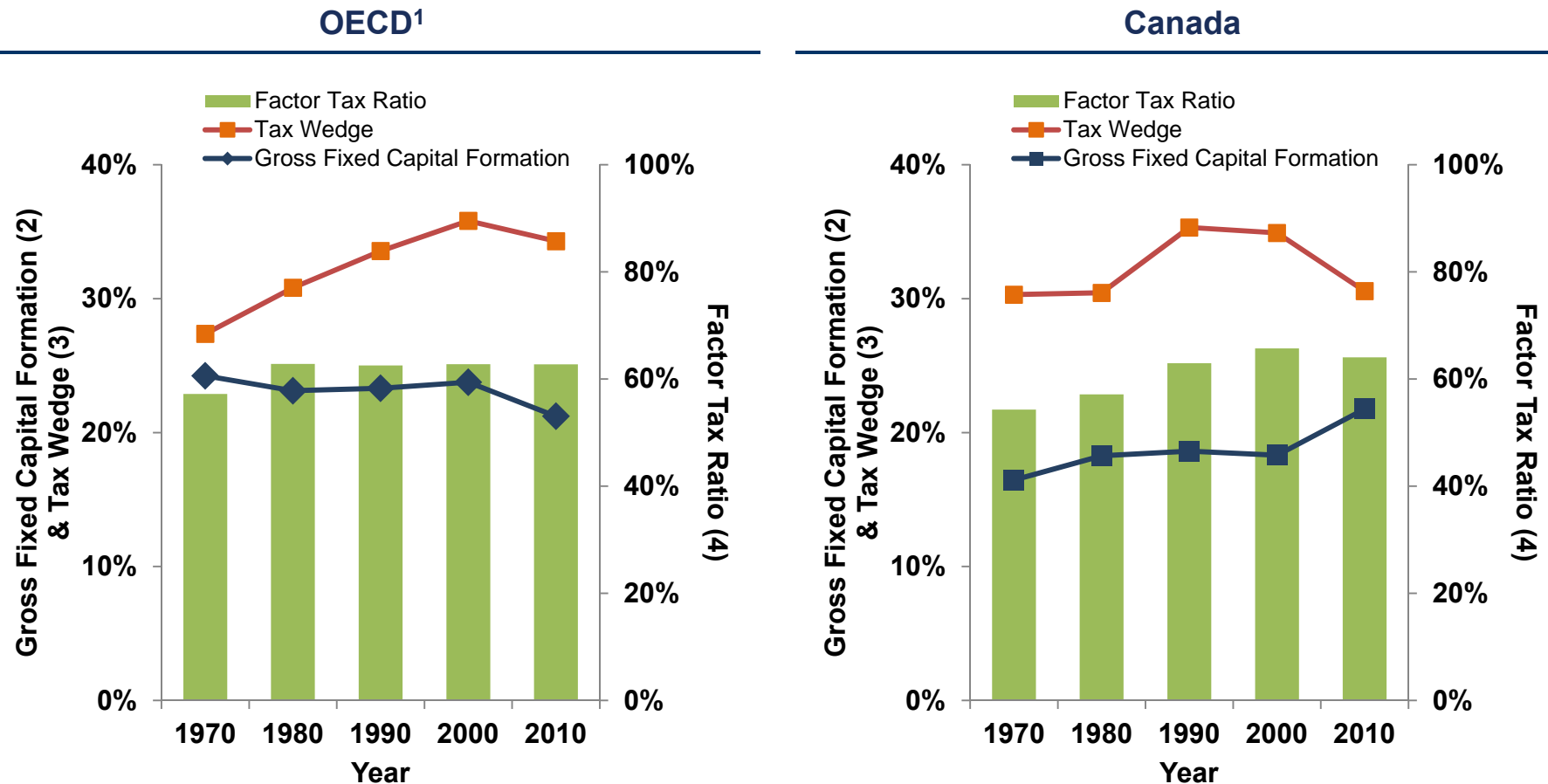
- “Most of the changes in hours in the model are due to changes in taxes and not to other factors in the model impacting hours worked”
- “The individual country results are consistent with the group results”
- “Other factors like employment protection, union density, bargaining coordination, have very little additional explanatory power and do not change the size of the impact of taxes on labour supply”

Keane and Rogerson (2012)

- “If one takes into account the presence of human capital accumulation or labour supply decisions that allow for adjustment along both the fraction of life spent in employment and the time devoted to working when employed, then previous estimates of small labour supply elasticities based on micro data are fully consistent with large aggregate labour supply elasticities”

On Capital Formation: Gross Fixed Capital Formation in the OECD

Figure 9



1. Unweighted average of 26 OECD member countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.
2. Gross fixed capital formation (formerly gross domestic fixed investment) is a measure of gross net investment (acquisitions less disposals) in fixed capital assets by enterprises, government and households, expressed as a percentage of GDP. It includes land improvements; plant, machinery, and equipment purchases; and the construction of roads, railways, etc.
3. Tax Wedge is the Tax Revenue expressed as a percentage of GDP.
4. Factor Tax Ratio is the proportion of tax revenues that come from labour and capital income.

On Capital Formation: Recent literature

The literature is evolving

- Early work on the empirical determinants of investment showed that this is highly correlated (via Accelerator Effect) with changes in output, which for many years was the most popular explanation
 - The measured impact of the taxation of capital on investment was generally insignificant
- More recent analyses of cross-sectional variations of disaggregated data rather than time series variations of aggregated data show that taxes may have a large effect on firm's investment decisions
 - Likely arising through the user cost of capital
 - Until recently, no clear consensus on the magnitudes of these effects
 - Vartia (2008) & Liu (2011)

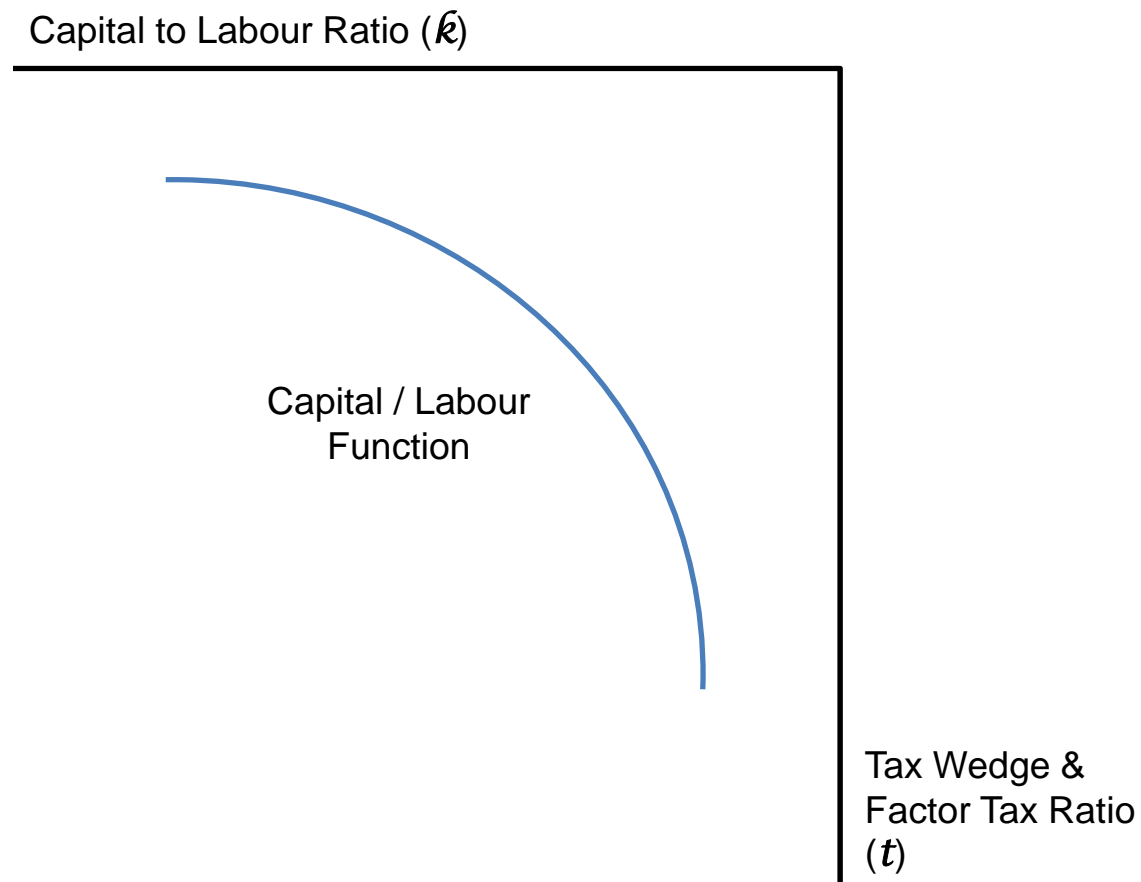
Recent studies using disaggregate data have found a negative impact of taxes on capital formation

- “Corporate income taxes can be expected to be the most harmful for growth as they discourage the activities of firms that are most important for growth: investment in capital and in productivity improvements” (Arnold *et.al.*, 2011)
- “In contrast with a small user-cost elasticity found in early studies, results of recent work... imply that the elasticity of aggregate investment with respect to user cost of capital is approximately -1 ” (Liu, 2011)

Capital / Labour Function

For simplicity, we use the following hypothesis: In any given period, the impact of an increase in tax wedge and proportion of factor taxes (t) is larger on capital than on labour, thus reducing the ratio of Capital to Labour (\hat{k})

Figure 10



On GDP Growth: Production Function

GDP per capita (y) is a function of the ratio of Capital to Labour (\hat{k}) and Total Factor Productivity (A).

As the Capital to Labour ratio (\hat{k}) increases, GDP per capita increases at a decreasing rate of return.

An increase in exports ($X_1 > X_0$) increases Total Factor Productivity (A) over time as A is favourably impacted on the efficiency of resource use, innovative activity and the rate of technological progress.

Figure 10

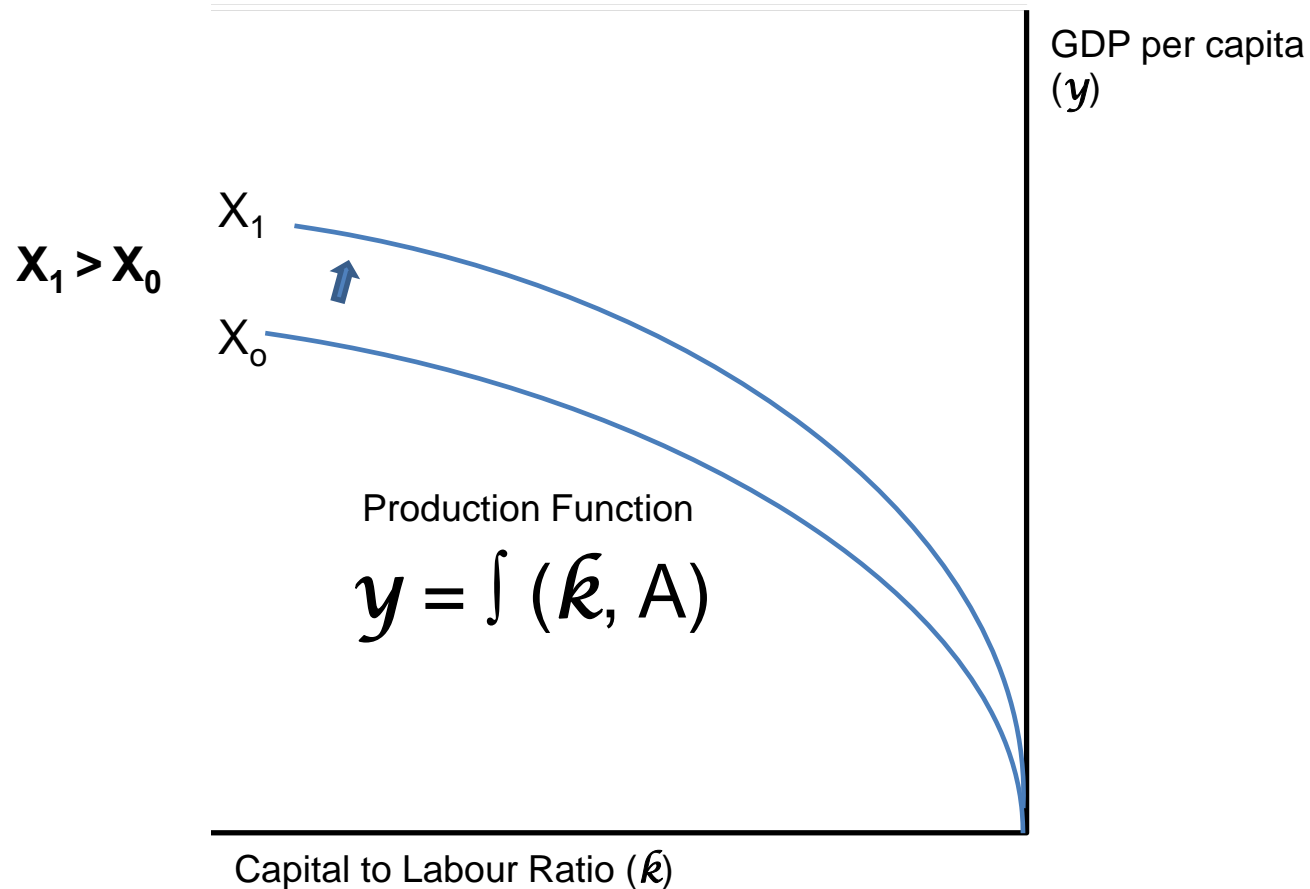


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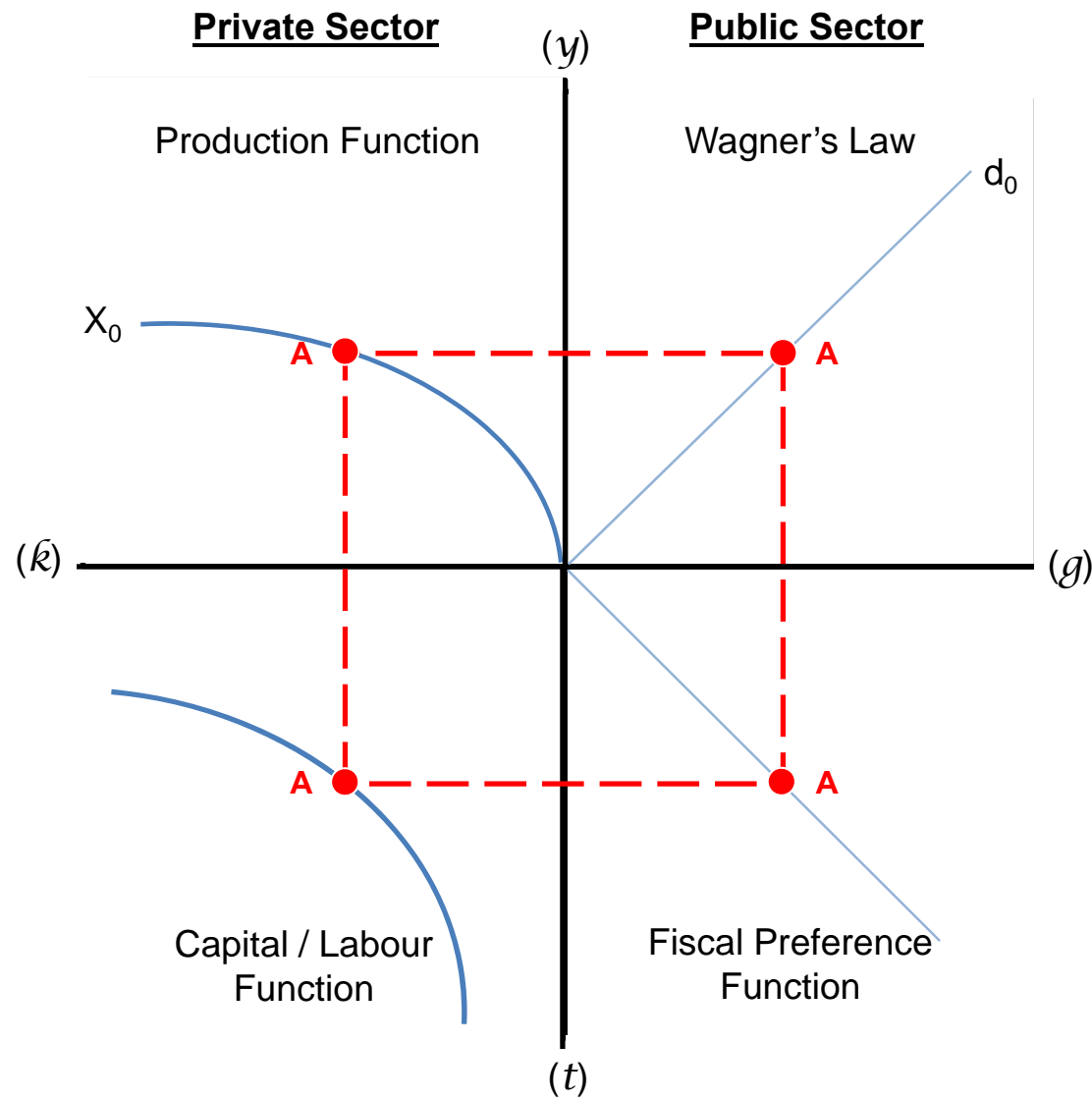
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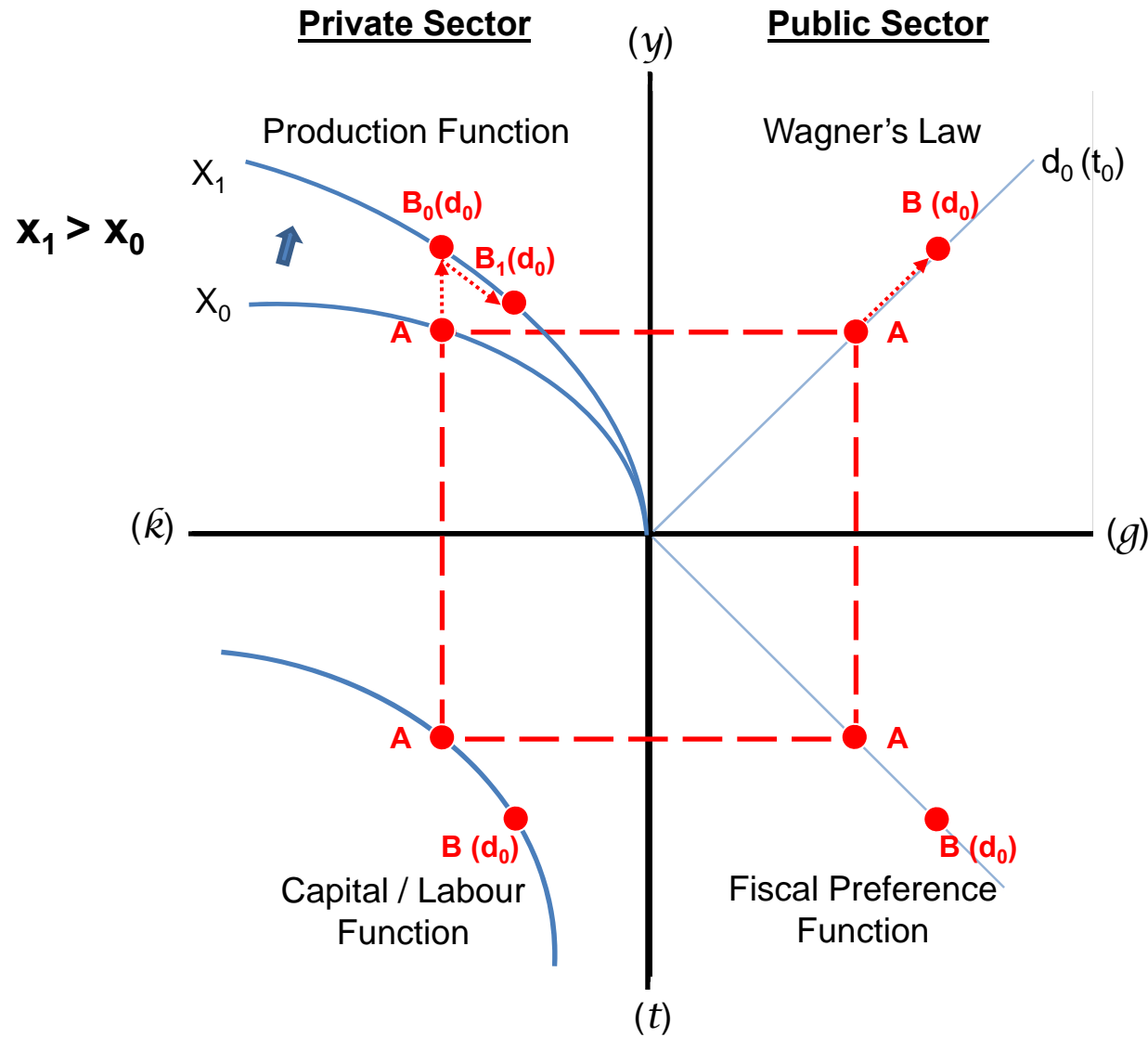
High Income Traps: A graphical illustration

Figure 11



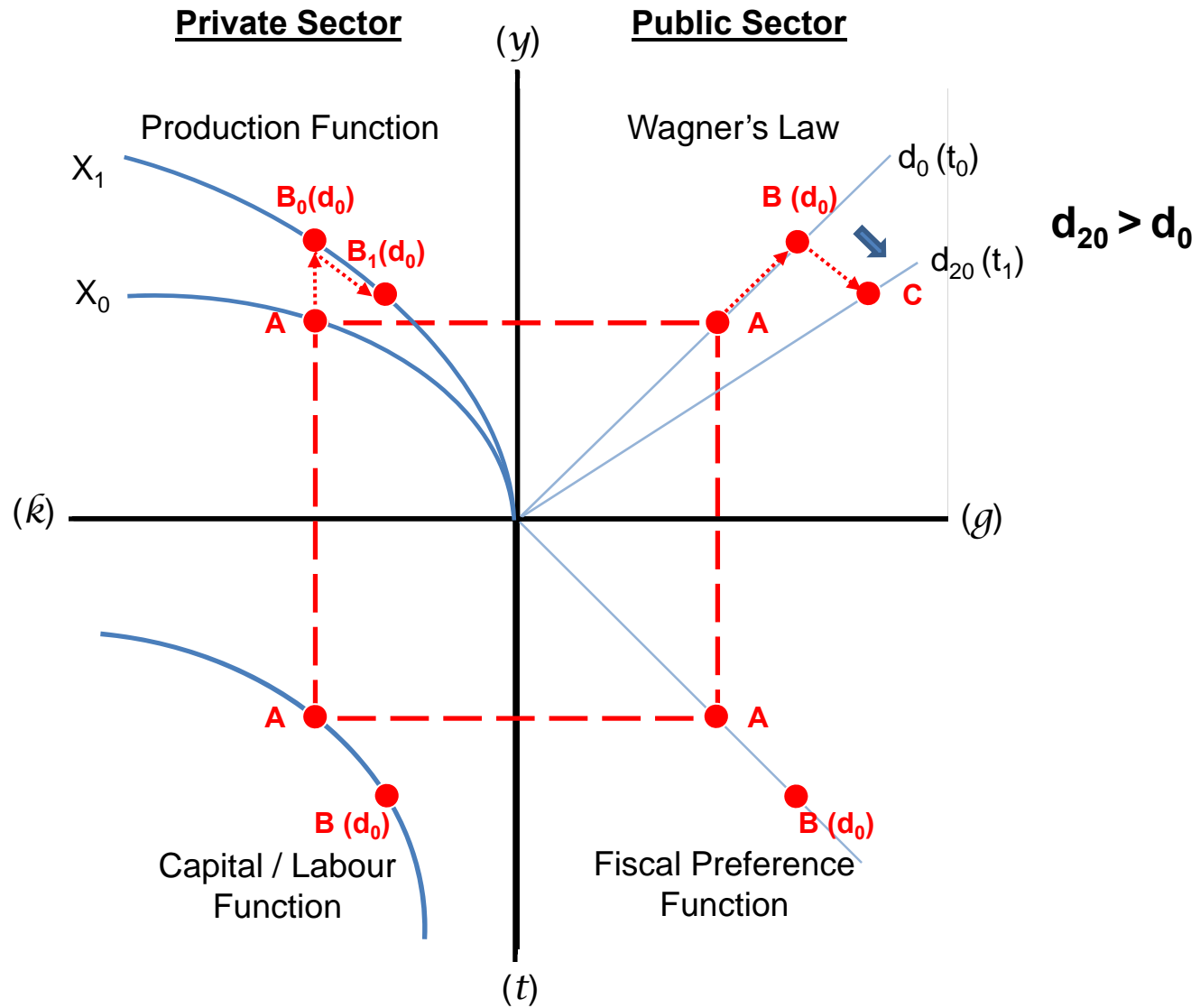
High Income Traps: Exogenous increase in exports

Figure 12



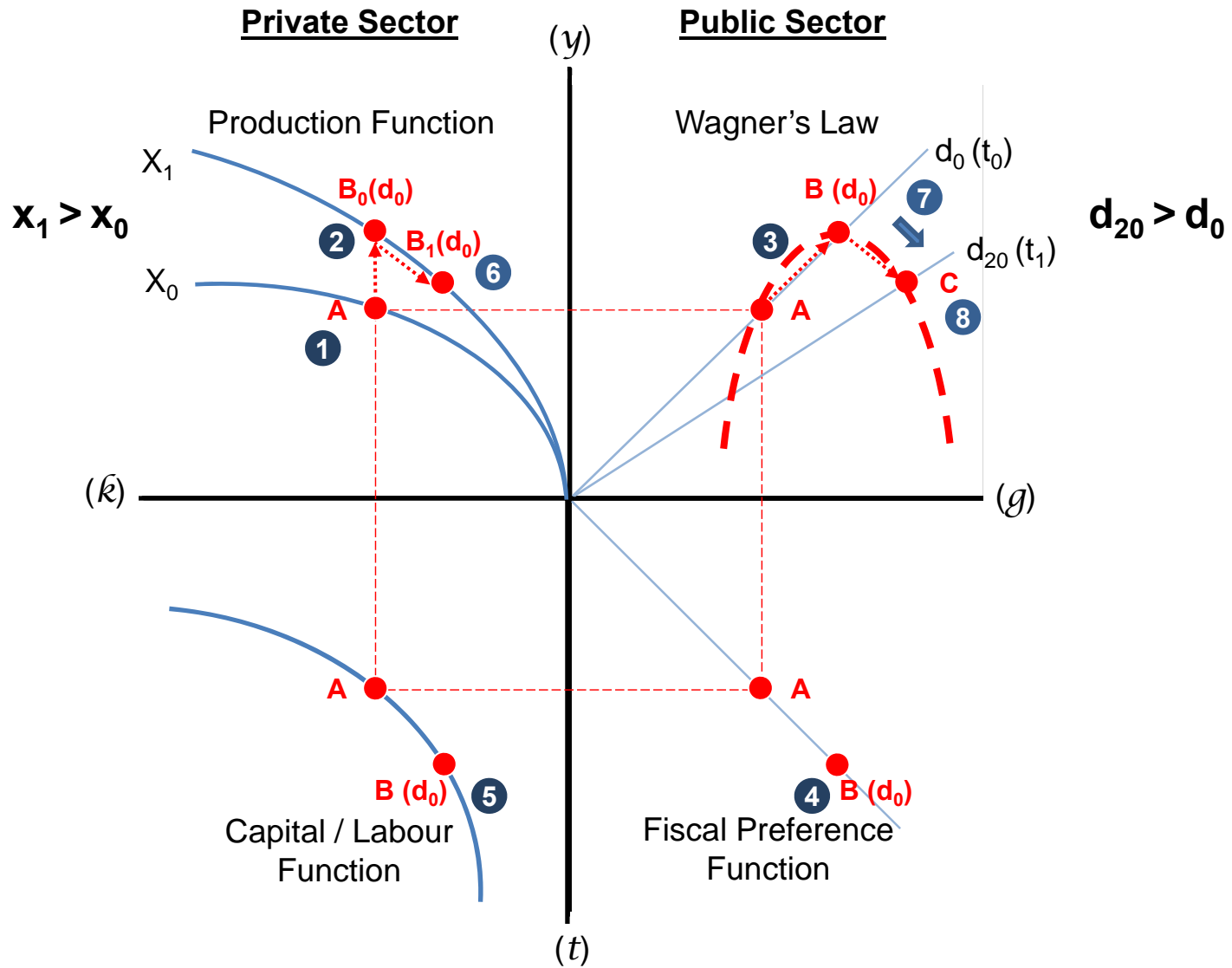
High Income Traps: Long term dynamics

Figure 13



High Income Traps: Long term dynamics

Figure 14



On Long-Term GDP Growth: Observations

- The empirical literature is numerous and complex, with recent contributions of importance converging on very strong and, in some cases, surprising conclusions
- High Income Traps (HITs) have an impact on economic growth through a long-term process
 - As societies become richer and older, the size of the government increases and the use of taxes on factor income increases, thereby reducing the supply capacity of the economy
- The impact of HITs focuses attention on a current and controversial issue: the long-term impact of the government size on the rate of growth of GDP per capita

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Government Expenditure and GDP Growth: Recent literature

Bergh and Henrekson (2011) survey and interpretation of the evidence on government size and economic growth:

- Most recent studies find a significant negative correlation: An increase in government size by 10 percentage points is associated with a 0.5% to 1% lower annual growth ratio in GDP per capita.
- Direct taxes on income are worse than indirect taxes, and social transfers are worse than public expenditure on investment, including human capital, which, if anything, increases growth.
- Why are some countries with high taxes, like the Scandinavian ones, able to enjoy above average growth?
- One hypothesis is that countries with higher social trust levels are able to develop larger government sectors without harming the economy, reducing the slope and position of the factor supply function
- Another explanation is that countries with larger governments compensate for high taxes and spending by implementing market-friendly policies in other areas

Government Expenditure and GDP Growth: Recent literature

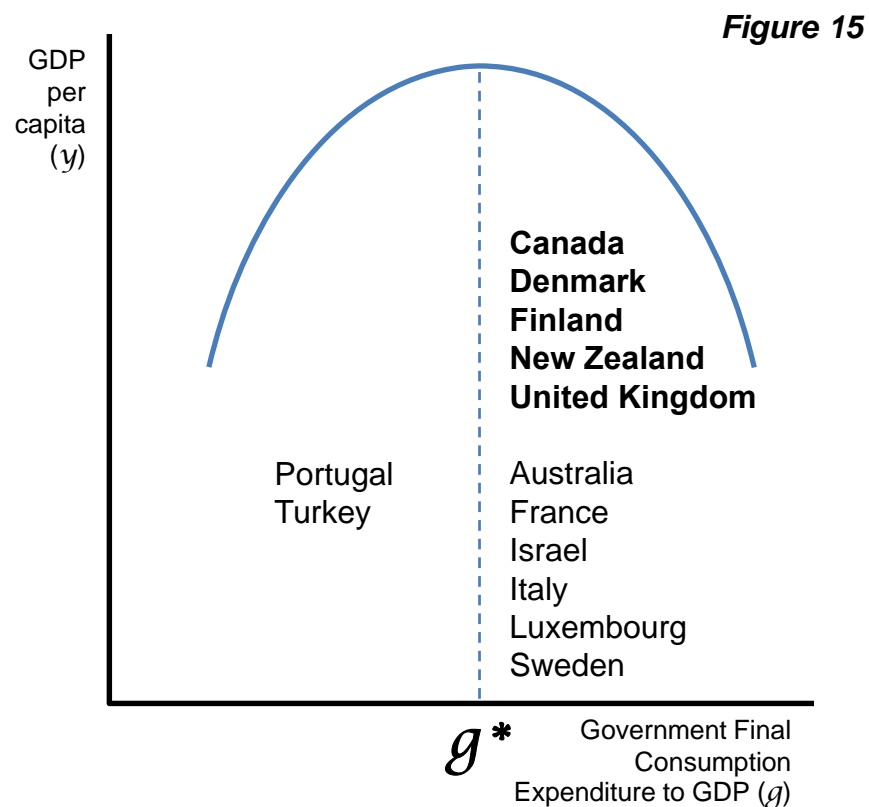
Obben (2013) regressions based on data for 24 OECD countries from 1973 to 2011:

- “A check with a panel fixed effects model found that economic growth is significantly negatively related to government size.”
- “The introduction of the quadratic term of the government size variable revealed that the relationship has an inverse-U shape for the whole sample which provided a basis for the estimation of a growth-maximising size of government.”
- “Checks of the individual sampled countries’ data yielded almost an equal mixture of countries with U-shaped and inverse-U shaped relationships. This suggests that increases in government size are not uniformly detrimental to economic growth for all countries.”
- “Quantile regression models for the whole sample revealed that the impact of government size on economic growth is positive and insignificant at low rates of economic growth. This impact decreases as economic growth increases and eventually turns negative and significant at relatively high rates of economic growth.”
- “The study decomposed the government size time series of the sampled countries into the permanent/trend and transitory/cycle components. For the whole sample, and for 23 out of the 24 countries, it was estimated that the shocks to government size were more of the permanent type than the transitory type.”

Government Expenditure and GDP Growth: Recent literature

Obben (2013) observed the following **BARS (Barro-Armev-Rahn-Scully) Curve** whereby the economic benefits of incremental government expenditure are declining and turn negative after g^*

- 13 of 24 countries have significant results
- Threshold (g^*) varies from a minimum of 11.0% (Turkey) to a maximum of 23.1% (Denmark)
- 11 of 13 have average expenditure greater than threshold ($\bar{g} > g^*$), including Canada ($\bar{g} = 21.0\%$ vs. $g^* = 19.7\%$)



Government Expenditure and GDP Growth: Recent literature

Obben (2013) observed the following Inverted BARS (Barro-Armev-Rahn-Scully) Curve whereby the economic benefits of incremental government expenditure are increasing and turn positive after g^{**}

- 11 of 24 countries have significant results
- Threshold (g^{**}) varies from a minimum of 12.0% (Czech Rep.) to a maximum of 36.7% (Netherlands)
- 3 of 11 have average expenditure greater than threshold ($\bar{g} > g^{**}$) and are expected to generate growing economic benefits from incremental government expenditure

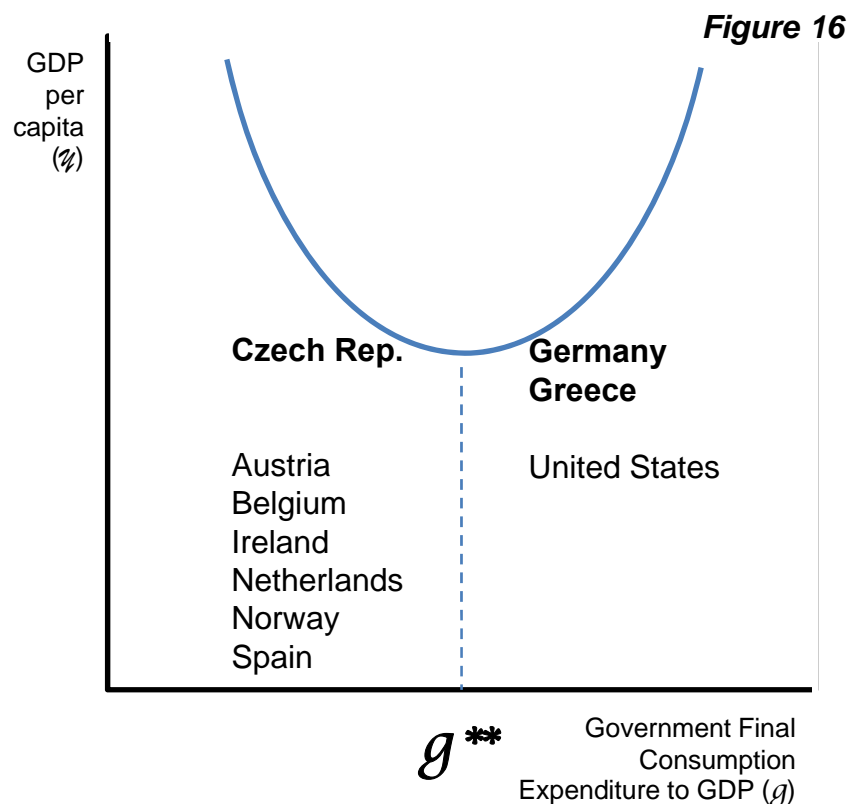


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High Income Traps: Fundamental challenges to economic growth

- The challenges to economic growth are well-documented within distinct literatures that, when integrated, present a novel and nuanced picture of economic development – the High Income Traps
- Avoiding or navigating the demographic, government and fiscal traps is likely to be challenging
 - Each unfolds on a different timescale and each is likely to be influenced by the others via feedback loops
 - Rich and old societies have their own economic and political dynamics, defined by the balance between public/private sectors and the interactions between the two
- A collective slowdown in growth of GDP per capita may occur if many older and richer countries fall into HITs at the same time, mimicking a secular slowdown
 - Low global effective demand may be the result of contagion across deeply integrated economies
- The optimal size of government is resistant to generalization but recent studies point to potentially important explanations of inter-country variation
 - Role of culture and values
 - Role of competition in delivery of government services
- While the High Income Traps may cause low growth, the complexity of the “growth” issue is such that even if countries avoid this HITs, they may still face low growth
 - For example, accounting for countries with valuable natural endowments

High Income Traps: Conclusion

Ils ne mouraient pas tous, mais tous étaient frappés.

They died not all, but all were sick.

Jean de la Fontaine (1621–1695)
Les Animaux Malades de la Peste

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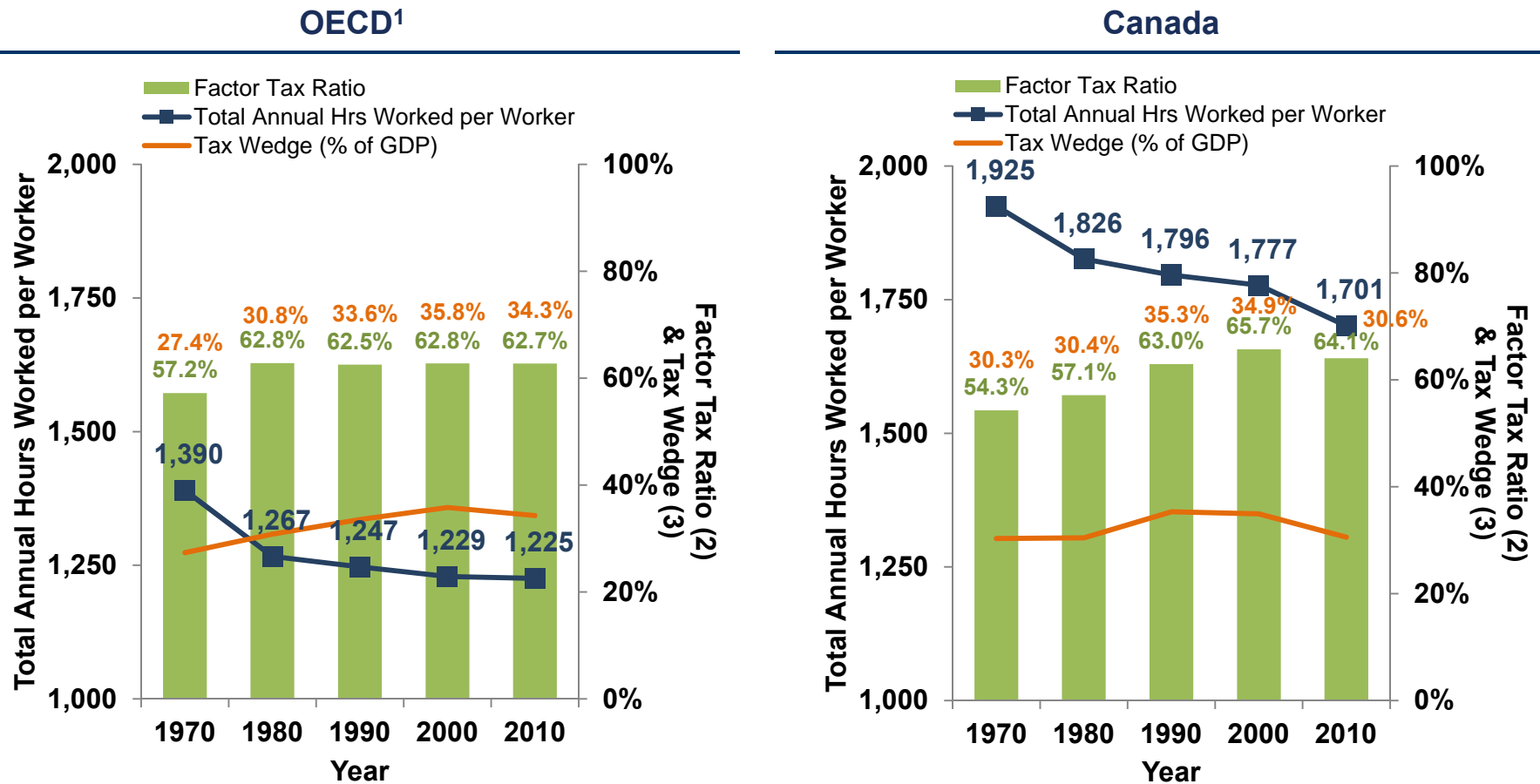
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On Labour Supply: Taxation and Hours worked in the OECD

Figure 8



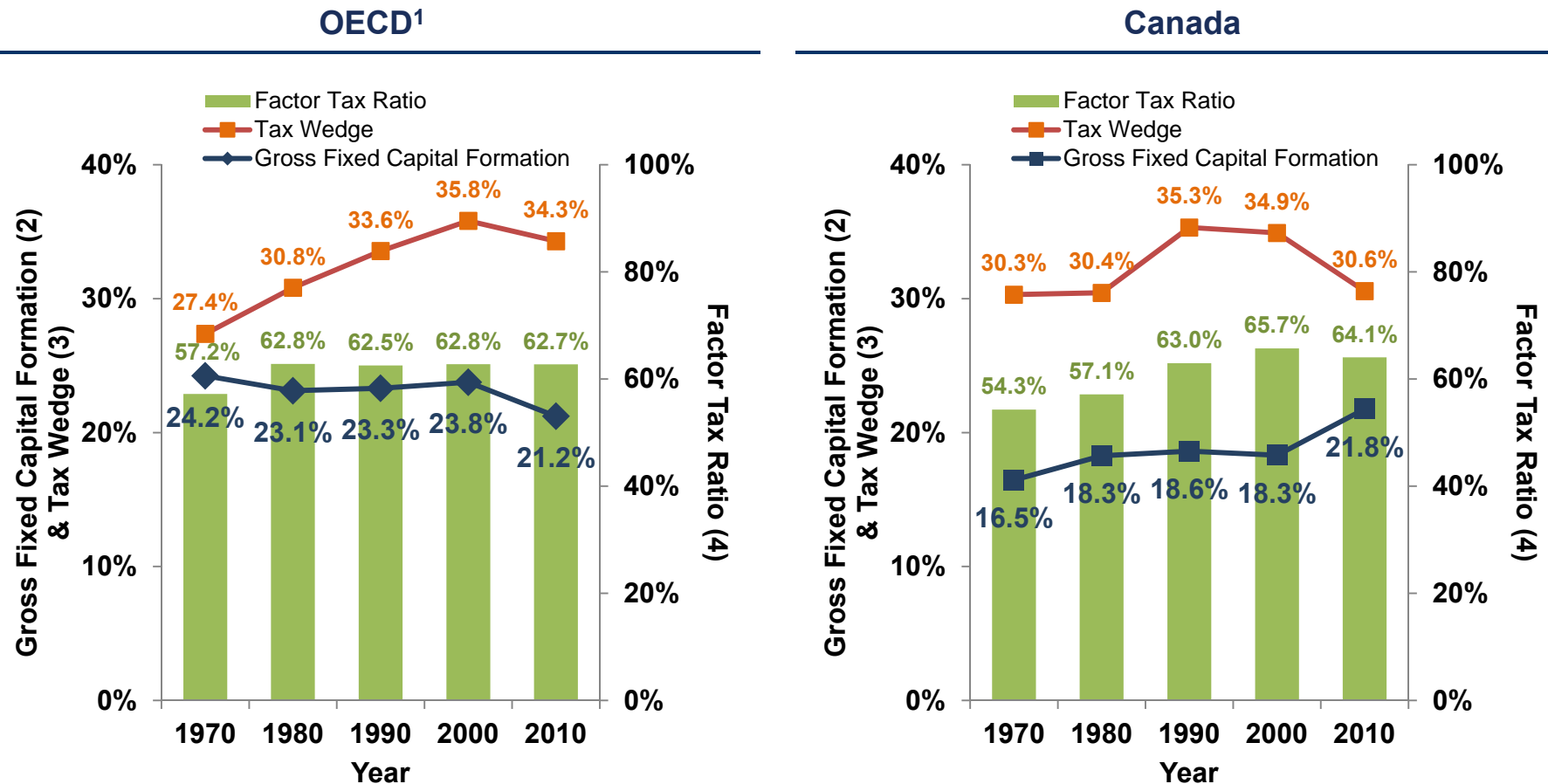
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2. Factor Tax Ratio is the proportion of tax revenues that come from labour and capital income.

3. Tax Wedge is the Tax Revenue expressed as a percentage of GDP.

On Capital Formation: Gross Fixed Capital Formation in the OECD

Figure 9



1. Unweighted average of 26 OECD member countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.
2. Gross fixed capital formation (formerly gross domestic fixed investment) is a measure of gross net investment (acquisitions less disposals) in fixed capital assets by enterprises, government and households, expressed as a percentage of GDP. It includes land improvements; plant, machinery, and equipment purchases; and the construction of roads, railways, etc.
3. Tax Wedge is the Tax Revenue expressed as a percentage of GDP.
4. Factor Tax Ratio is the proportion of tax revenues that come from labour and capital income.

Government Expenditure and GDP Growth: Recent literature

In a review of recent evidence, Gemmell and Au (2013) conclude that:

“Despite some remaining ‘big issues’, results from aggregate level studies are now much more robustly in favour of identifiable effects of government size on income growth rates, provided these conclusions are carefully circumscribed”

“In general, positive output effects from increases in at least some public expenditures and negative output effects from higher tax rates are supported”

“Plausible orders of magnitude are also beginning to emerge suggesting that the impacts of fiscal policy may be sizeable in the short-run (but depend, among other things, on the degree of excess capacity in the economy), and are probably moderate or small in the longer-run”

“Importantly, long-run *net* fiscal effects on output are often small or negligible when the more sizeable effects of taxes, expenditures or deficits measured in isolation, are instead considered in *combination*, as they should be”

Impact of Taxation on GDP Growth: Recent Literature

Arnold *et al.* (2011) on estimated cross-country effects of the tax mix on long-run GDP per Capita:

Dependent variable: log GDP p.c.	(1)	(2)	(3)	(4)	(5)
<i>Baseline model</i>					
Physical capital	0.18*** (0.05)	0.25*** (0.05)	0.18*** (0.05)	0.16*** (0.05)	0.21 (0.45)
Human capital	1.19*** (0.13)	1.30*** (0.12)	1.18*** (0.13)	1.40*** (0.11)	1.57*** (0.11)
Population growth	-0.08*** (0.01)	-0.08*** (0.01)	-0.07*** (0.01)	-0.07*** (0.01)	-0.07*** (0.01)
<i>Control variable</i>					
Overall tax burden (Total revenues/GDP)	-0.27*** (0.05)	-0.24*** (0.05)	-0.26*** (0.05)	-0.22*** (0.04)	-0.14*** (0.04)
<i>Tax structure variables</i>					
Income taxes	-0.98*** (0.20)				
Personal income taxes		-1.13*** (0.19)			
Corporate income taxes		-2.01*** (0.32)			
Consumption and Property taxes			0.93*** (0.20)		
Consumption taxes (excl. property taxes)				0.74*** (0.18)	0.72*** (0.19)
Property taxes				1.45*** (0.43)	
Property taxes: recurrent taxes on immovable property					2.47*** (0.84)
Property taxes: other property taxes					-0.34 (0.51)
Observations	696	675	696	696	698
Revenue-neutrality achieved by adjusting	Cons. and Prop. Taxes	Cons. and Prop. Taxes	Income taxes	Income taxes	Income taxes

Notes. * Significant at 10 % level; ** at 5% level; *** at 1 % level. †All equations include short-run dynamics, country-specific intercepts and country-specific time controls. Standard errors are in brackets.