

Redefining Prosperity Project

Confronting Structure – Achieving Economic Sustainability

Managing without Growth¹

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Introduction

Following World War, the pursuit of economic growth became the over-arching economic policy objective of governments around the world, a position it holds to this day even among the most developed countries. (OECD 2008) For reasons that are being explored in other parts of the Redefining Prosperity Project, it is timely to reconsider reliance on economic growth for creating employment, generating increased revenue for public services without increasing taxes, and delivering company profitability, international competitiveness, and investment.

Similar issues have been examined in the Canadian context. (Rosenbluth and Victor 2004; Victor and Rosenbluth 2007; Victor 2008). A distinguishing feature of this research is the use of LowGrow, an interactive systems model of the Canadian economy designed specifically to answer the question: can we have full employment, no poverty, fiscal balance, and reduced greenhouse gas emissions without relying on economic growth?

This paper begins with a brief description of LowGrow and illustrative simulations of low/no growth that relate directly to the issues most relevant to the Redefining Prosperity Project. Brief comments on policy directions suggested by the simulations are followed by a more detailed consideration of employment in a no/low growth economy and revenue generation for public services.

¹ This paper relies heavily on Victor 2008 including some sections which are verbatim extracts.

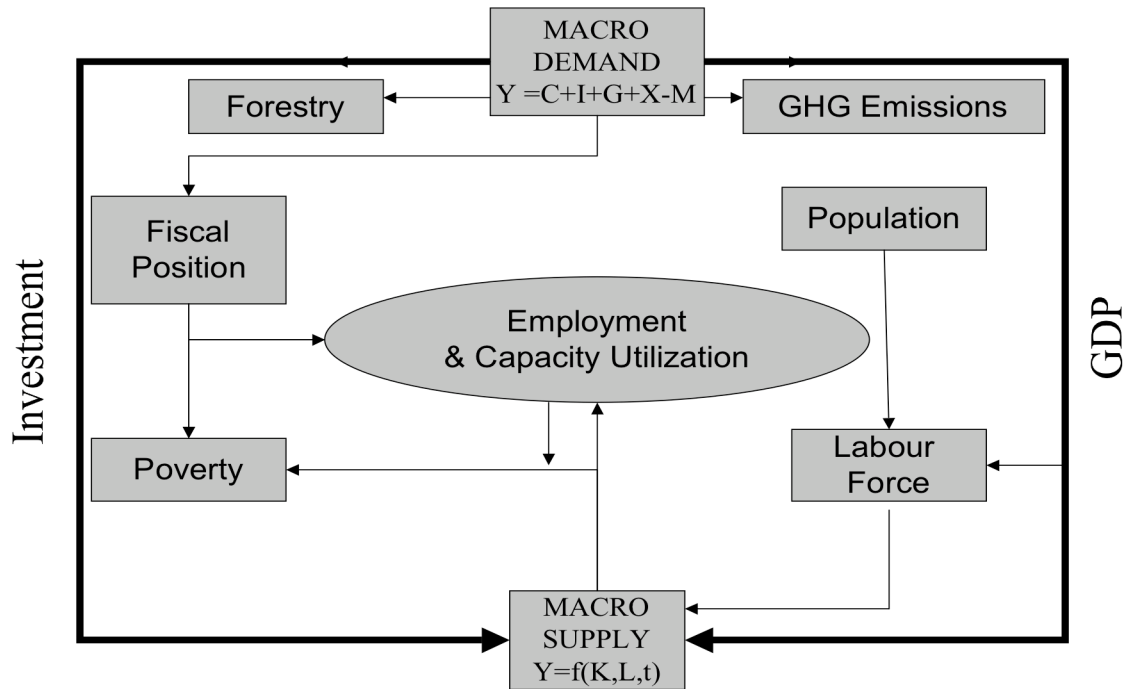
Exploring low and no growth in Canada with Lowgrow

LowGrow is a quantitative model of the Canadian economy designed to make it easy to explore different assumptions, objectives and policy measures. Figure 1 shows the simplified structure of LowGrow. Aggregate (macro) demand is determined in the normal way as the sum of consumption expenditure (C), investment expenditure (I), government expenditure (G), and the difference between exports (X) and imports (I.) Their sum total is GDP measured as expenditure. There are separate equations for each of these components in the model, estimated with Canadian data from about 1981 to 2005 depending on the variable. Production in the economy is estimated by a Cobb-Douglas production function in which macro supply is a function of employed labour (L) and employed capital (K). The time variable (t) represents changes in productivity from improvements in technology, labour skills and organization. The production function is shown as macro supply at the bottom of figure 1. It estimates the labour (L) and employed capital (K) required to produce GDP allowing for changes in productivity over time.

There is a second important link between aggregate demand and the production function. Investment expenditures (net of depreciation) which are part of aggregate demand, add to the economy's stock of capital increasing its productive capacity. Also, capital and labour become more productive over time. It follows that, other things equal, without an increase in aggregate demand these increases in capital and productivity reduce employment. Economic growth (i.e. increases in GDP) is needed to prevent unemployment rising as capacity and productivity increase.

Population is determined exogenously in LowGrow which offers a choice of three projections from Statistics Canada. Population is also one of the variables that determines consumption expenditures in the economy. The labour force is estimated in LowGrow as a function of GDP and population.

Figure 1
The high level structure of LowGrow



Source: Victor 2008

There is no monetary sector in LowGrow. For simplicity it is assumed that the Bank of Canada, Canada's central bank, regulates the money supply to keep inflation at or near the target level of 2% per year. LowGrow includes an exogenously set rate of interest that remains unchanged throughout each run of the model. A higher cost of borrowing discourages investment, which reduces aggregate demand. It also raises the cost to the government of servicing its debt. The price level is not included as a variable in LowGrow although the model warns of inflationary pressures when the rate of unemployment falls below 4% (effectively full employment in Canada).

LowGrow includes features that are particularly relevant for exploring a low/no growth economy. LowGrow includes emissions of carbon dioxide and other greenhouse gases, a carbon tax, a forestry sub-model, provision for

redistributing incomes, and measures poverty using the UN's Human Poverty Index (i.e. HPI-2 for selected OECD countries. See United Nations Development Programme 2006). LowGrow allows additional funds to be spent on health care and on programs for reducing adult illiteracy (both included in HPI-2) and estimates their impacts on longevity and adult literacy with equations from the literature.

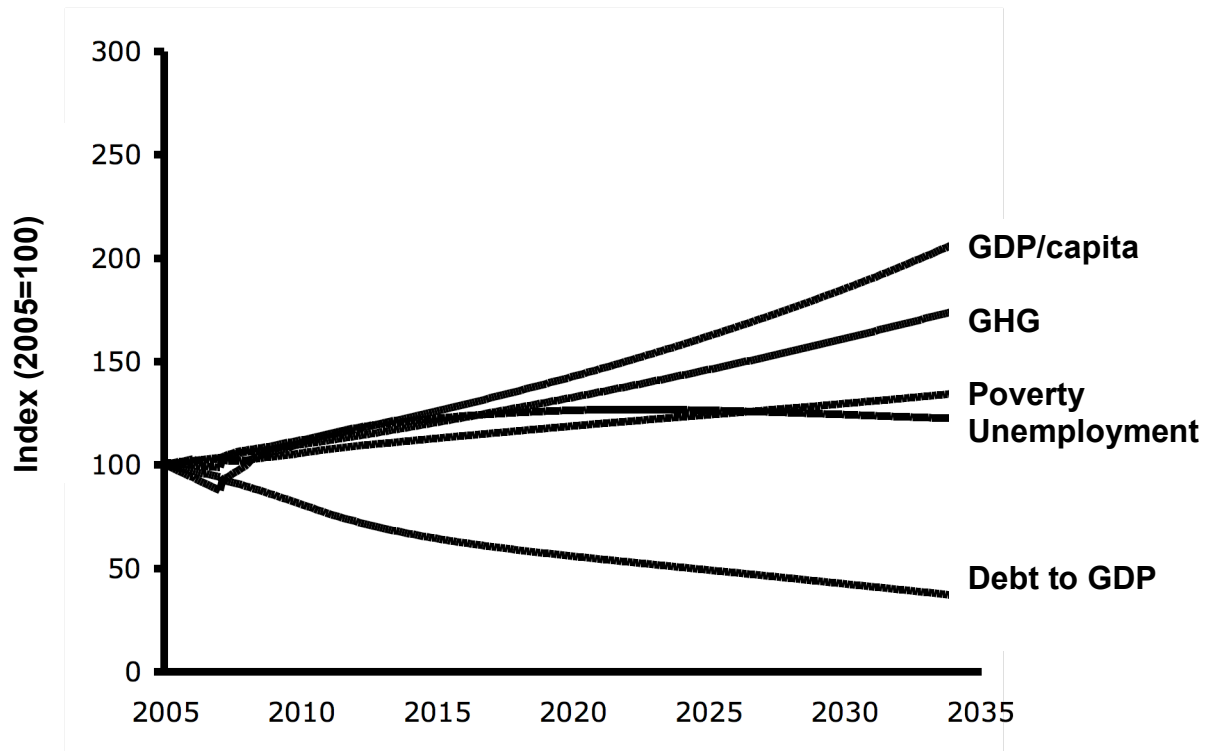
Implications of changes in the level of government expenditures can be simulated in LowGrow through a variety of fiscal policies including: an annual percentage change in government expenditure that can vary over time and a balanced budget. LowGrow keeps track of the overall fiscal position of all three levels of government combined (federal, provincial and municipal) by calculating total revenues and expenditures and estimating debt repayment based on the historical record. As the level of government indebtedness declines the rates of taxes on personal incomes and profits in LowGrow are reduced endogenously, broadly consistent with government policy in Canada.

In LowGrow, as in the economy that it represents, economic growth is driven by: net investment which adds to productive assets, growth in the labour force, increases in productivity, growth in the net trade balance, growth in government expenditures and growth in population. Low and no growth scenarios can be examined by reducing the rates of increase in each of these factors singly or in combination.

Business as usual

It is convenient to start analysing low and no growth scenarios by establishing a base case with no new policy interventions. This is the 'business as usual' case illustrated in figure 2.

Figure 2
Business as usual



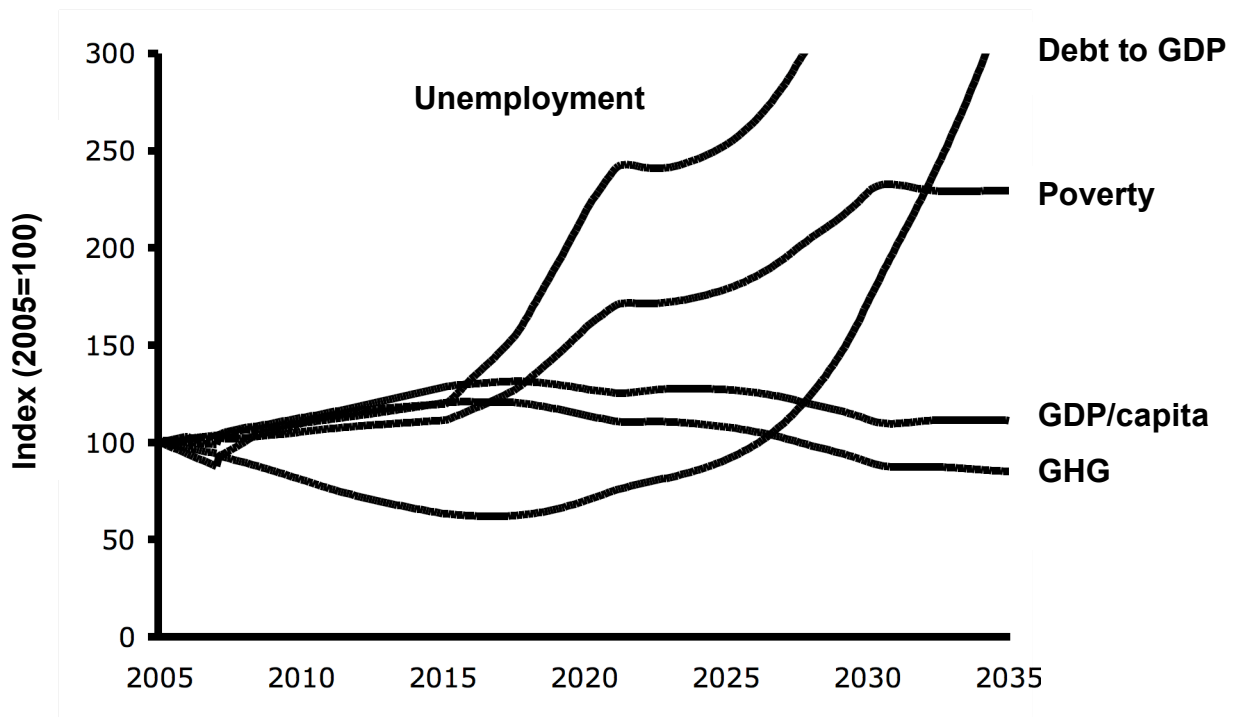
Source: Victor 2008

In the business as usual scenario, between the start of 2005 and 2035 real GDP per capita more than doubles, the unemployment rate rises then falls ending above its starting value, the ratio of government debt to GDP declines by nearly 40% as Canadian governments continue to run budget surpluses, the Human Poverty Index rises, largely due to the projected increase in the absolute number of unemployed people, and greenhouse gas emissions increase by nearly 80%.

A No Growth Disaster

Economic growth is desired not only for what it offers in terms of increased living standards but also out of fear of what might happen if a modern economy deliberately tried to wean itself off growth. Such fears are well-founded. Modern economies and their public, private and not for profit institutions, as well as individual citizens, have come to rely on growth. They expect it, they plan for it, they believe in it. Adjusting to life without economic growth could be a wrenching experience and a lot could go wrong as shown in figure 3. In this scenario, zero growth in GDP and GDP per capita is achieved around 2030 by eliminating growth in government expenditure, productivity, and population, and achieving zero net investment and net trade balance over a period of years starting in 2010. GDP per capita rises slightly until all the factors contributing to growth are extinguished and then drops back to the same level as at the start of 2005. Meanwhile, the unemployment rate literally goes off the chart, causing a dramatic rise in poverty. The debt to GDP ratio also rises to untenable heights largely because of the massive increase in income support paid to the rising number of unemployed. Certainly, the human misery entailed in such a scenario is to be avoided if at all possible.

Figure 3
A no growth disaster



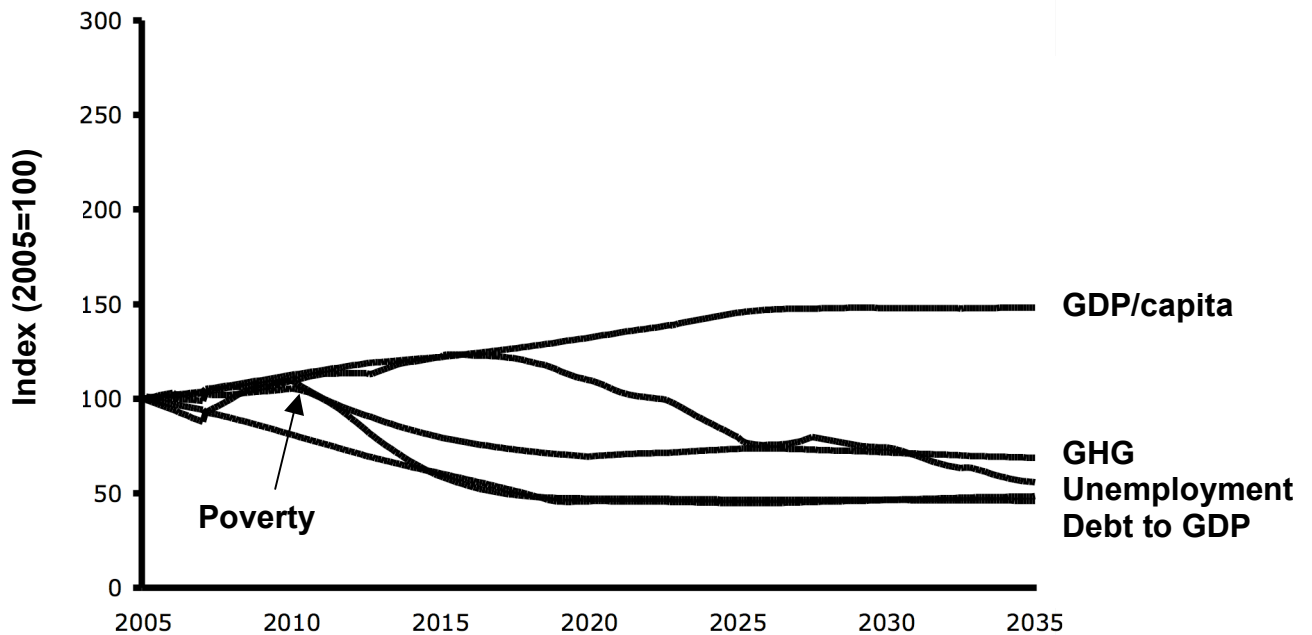
Source: Victor 2008

A better low/no growth scenario²

A wide range of low and no growth scenarios can be examined with LowGrow. Some are not much better than the no growth disaster just described but others offer more promise. One such promising scenario is shown in figure 4.

² Several other low/no growth scenarios are described in Victor and Rosenbluth 2007 and Victor 2008.

Figure 4
A better low/no growth scenario



Source: Victor 2008

Compared with the business as usual scenario, GDP per capita grows more slowly, leveling off around 2028 at which time the rate of unemployment is 5.7%. The unemployment rate continues to decline to 4.0% by 2035. By 2020 the poverty index declines from 10.7 to an internationally unprecedented level of 4.9 where it remains, and the debt to GDP ratio declines to about 30% to be maintained at that level to 2035. Greenhouse gas emissions are 31% lower at the start of 2035 than 2005 and 41% lower than their high point in 2010. These results are obtained by slower growth in government expenditure, net investment and productivity, a positive net trade balance, cessation of growth in population, a reduced work week, a revenue neutral carbon tax, and increased government expenditure on anti-poverty programs, adult literacy programs and health care.

Policy Directions for a Low/No Growth Scenario

The contrast between the scenarios in figures 3 and 4 is striking and naturally raises questions about what makes the difference. The no growth disaster scenario is based on a systematic elimination of all of the factors represented in LowGrow that contribute to growth without any compensating adjustments. The better no/low growth scenario results from a wide range of policy measures, some more controversial than others, that would be required to transform the business as usual scenario in figure 2 into the kind of scenario illustrated in figure 4. In summary these policy measures include:

- *Investment*: reduced net investment, a shift from investment in private to public goods through changes in taxation and expenditures.
- *Labour force*: stabilization through changing age structure of the population and population stabilization.
- *Population*: stabilization through changes to immigration policy.
- *Poverty*: trickle down replaced with focused anti-poverty programs that address the social determinants of illness and provide more direct income support.
- *Technological change*: slower, more discriminating, preventative rather than end of pipe, through technology assessment and changes in the education of scientists and engineers.
- *Government expenditures*: a declining rate of increase.
- *Trade*: a stable, positive net trade balance (and diversification of markets).
- *Work week*: shorter, more leisure through changes in compensation, work organization and standard working hours, and active market labour policies.
- *Greenhouse gases*: a revenue neutral carbon tax.

To complement these policies:

- *Consumption*: more public goods fewer positional (status) goods through changes in taxation and marketing.
- *Environment and resources*: limits on throughput and use of space through better land use planning and habitat protection and ecological fiscal reform.
- *Localization*: fiscal and trade policies to strengthen local economies.

The next two sections look more closely at two specific policy areas in relation to the low/no growth scenario: strategies for full employment and funding government programs.

Economic growth and employment

'There is in fact hardly a trace of interest in economic growth as a policy objective in the official or professional literature of western countries before 1950'. (Arndt 1978, quoted in Victor 2008.) This situation changed in the 1950s such that in 1960 the *UN World Economic Survey* stated that 'the reinterpretation of the objective of full employment under the United Nations Charter to embrace the goal of economic growth marks a second fundamental change in public policy thinking.' (United Nations 1960, quoted in Arndt 1978 and Victor 2008)

This statement from the UN is based on the insight derived from the early work on economic growth by Harrod, Domar and others that if aggregate expenditure required for full employment in the short run expands the productive capacity of the economy, further increases in aggregate expenditure will be required in future if full employment is to be maintained. This relationship between growth and employment is accentuated if the size of the labour force is increasing as well.

Equation 1 expresses the relationship between GDP, productivity, the labour force and unemployment.:

$$\text{GDP} = P(1-u)L \quad (1)$$

Where:

GDP is real gross domestic product

P is productivity (real GDP per employed person)

L is the labour force (employed plus unemployed persons)

U is the unemployment rate (unemployed/labour force)

Between 1976 and 2005, real GDP in Canada rose by 127.6 percent, productivity by 37.2 percent and the labour force by 65.3 percent, while the unemployment rate fell from 7.1 percent to 6.8 percent. The substantial growth in GDP had a small impact on the unemployment rate because both productivity and the labour force grew as well. The absolute number of unemployed persons actually rose by 27.7 percent. In the UK over the same time period, real GDP rose by 133.3 percent, productivity by 102.9 percent and the labour force by 14.4 percent, while the unemployment rate fell from 5.4 percent to 4.9 percent with an increase of 4.4 percent in the number of unemployed.³

One possible way out of the dilemma created by these opposing influences on employment is to reduce the average number of hours worked by an employed person: to convert unemployment for a few into more leisure for many. If more people worked fewer hours it should be possible to have full employment without relying so much on economic growth.

From 1976 to 2005 the average hours worked per year by a Canadian employee decreased by 6.3 percent. If the decrease in average hours worked had been 9.1 percent rather than 6.3 percent the rate of unemployment would have been 4 percent not 6.8 percent in 2005 given the same increases in GDP and the labour force. Employees in Canada would still have been working more

³ These comparisons are based on the longest and most recent time series data available for Canada and the UK. Sources are Statistics Canada (Cansim), UK National Statistics Online, and OECD (average hours worked)

hours on average in 2005 than in many OECD countries including Austria, Belgium, Denmark, France, Germany, Ireland, Norway, Sweden, and the U.K. Had there been no decrease in the average hours worked between 1976 and 2005, the rate of unemployment would have been 12.7 percent for the same increases in GDP, productivity and the labour force.

In the UK, the average number of hours worked per year decreased by 10.7 percent between 1976 and 2005. If the decrease in average hours worked had been 11.5 percent the rate of unemployment would have been 4 percent in 2005 given the same increases in GDP, productivity and the labour force.

The average length of the work week, which includes vacation days, can have a marked impact on the rate of unemployment. By spreading the same amount of work among a larger number of employees the unemployment rate can be lowered and the relationship, as shown by the above examples, is strong. It is in this context that researchers have examined the potential for reductions in the average number of hours worked per employee to contribute to full employment. From the standpoint of redefining prosperity, the benefits of increased productivity would be experienced as increases in leisure and reduced impacts on the environment rather than as increases in output, consumption and environmental impacts.

A declining work week is one of the factors included in the low/no grow scenario illustrated in figure 3. Over the 30 years of the scenario, the work week declines by 14.1 per cent from 2010 to 2035 so that the average hours spent in employment in Canada decline from 1737 in 2005 to 1492 in 2034. This compares with levels already approached or surpassed in 2006 in Sweden (1587), France (1546), Germany (1437), the Netherlands (1367) and Norway (1360). (OECD 2007)

European countries have been more pro-active than Canada and the USA in reducing working time as an instrument of employment policy. The arithmetic of reducing the rate of unemployment by reducing the average hours each employed person works is compelling. Achieving such gains in employment in the real world is another matter but in a review of studies of the employment

effects of working time reductions Bosch finds that most show a gain of '25-70 percent of the arithmetically possible effect'. (Bosch 2000, p.180) Bosch has examined the European experience and the six conditions he identified as particularly important for the success or failure of this policy are summarized in Table 1. He points out that the general political conditions must be suitable for a policy of reducing work time to reduce unemployment. There must be acceptance from employees, trade unions, and employers and support of the State.

Table 1
Policies for reducing the work week

1. Wage compensation – ‘if working time reductions and pay increases are negotiated as a total package, then the compensatory increase for the working time reduction can be offset by lower pay rises.’ (ibid p.182) This could become more difficult with no or low growth.
2. Changes in work organization – ‘larger reductions in working time generally have to be accompanied by changes in work organization’ (ibid. p.183), otherwise firms will rely on overtime and the employment effects will not materialize.
3. Shortages of skilled labour – ‘an active training policy is an indispensable supplement to working-time policy’ (ibid. p.183) to ensure that there are people with the necessary skills to pick up the slack when skilled workers reduce their hours.
4. Fixed cost per employee – such as benefits paid on a per employee basis rather than an hourly basis are an obstacle to reducing working hours because it is costly to employers. Canada shares with most Western European countries the practice of financing statutory social programs through contributions that are usually a proportion of earnings or through taxation, minimizing this fixed cost problem.
5. The evolution of earnings – ‘the decreasing rate of real wage rises in most industrialized countries has reduced the scope for implementing cuts in working time and wage increases simultaneously.’ (ibid.p.184) This would be a serious obstacle unless there is widespread support for seeking prosperity without growth though it can be mitigated by a more equal distribution of income. “one fundamental precondition for the working time policy pursued in Germany and Denmark , for example, was a stable and relatively equal earning distribution.’ (ibid. p.185)
6. The standardization of working hours – any reduction in standard working hours must strongly influence actual hours worked. If it merely generates more overtime for those already with jobs it will fail to increase employment. Work reorganization will be required to allow more flexibility in hours worked.

Source: Victor 2008 summarized from Bosch 2000

Looking at working time policy in the future, Bosch concludes that 'shorter working hours are an indicator of prosperity'. (Bosch 2000, p.192) They have been in the past, though more recently we have seen the emergence of a sector of the labour force that is 'over-employed', working long hours and 'failing to achieve a desired balance in their lives between paid work, family life, personal, and civic time' (Figart and Golden 2000) These are usually men with higher-levels of education in management positions. Simultaneously there are people who are underemployed and poorly paid, more often than not women. These circumstances contribute to and accentuate rising income inequality.

Layard in his work on economics and happiness concludes 'that people over-estimate the extra happiness they will get from extra possessions' because of habituation. 'The required correction is towards lower work effort and thus lower consumption.' (Layard 2005) This means that a shorter work week would not only contribute to reducing unemployment but it may also increase the general level of happiness for employees who find themselves better off working fewer hours, for less income and consuming at lower levels.

Funding public services in a low/no growth economy

Economic growth provides government with increasing resources without increasing tax rates. In times of rapid growth, receipts from corporation profits taxes, personal income taxes and value added taxes tend to increase faster than the economy as a whole allowing governments to provide more services, invest more in infrastructure, redeem outstanding debt, reduce tax rates, or some combination of all these. These are circumstances that governments welcome and they have as much to gain from economic growth as anyone. How might this be different in an economy that eschewed economic growth as a policy objective?

We can gain some insight into this matter by examining the low/no growth scenario shown in figure 4 and comparing it to the business as usual scenario. Table 2 shows the values of some key variables in the base year (2004) and for

2028 and 2034 for each of the two scenarios.

Table 2
A comparison of business as usual
and low/no growth scenarios

	Units	Base year	BAU	BAU	Low/No Grow	Low/No Grow
		2004	2028	2034	2028	2034
GDP	\$97m	1,121,318	2,425,258	2,951,727	1,801,544	1,800,801
GDP per capita	\$97	35,053	63,201	74,474	51,894	51,873
Gov expenditure total	\$97m	242,772	501,666	600,285	413,781	438,507
Gov expenditure per capita	\$97	7,589	13,708	15,152	11,919	12,631
Debt/GDP ratio	percent	62.1	27.2	22.1	28.5	30.0
Rate of income tax	percent	23.4	17.1	15.7	17.9	20.8
Rate of profits tax	percent	24.3	17.7	16.3	16.1	19.6
Carbon tax	\$97/tonne CO2	0	0	0	200	200
GDP composition						
Consumption	percent	57.0	58.7	58.6	58.4	58.0
Business investment	percent	19.6	19.6	19.2	13.1	12.2
Government	percent	21.7	20.7	20.3	23.0	24.4
Net trade balance	percent	1.8	1.1	1.9	5.5	5.4

In this illustrative low/no growth scenario, GDP per capita rises by 48 percent from 2004 to 2028 after which it stabilizes. GDP follows a similar path, rising by 61 percent before stabilizing. The greater percentage increase in GDP is due to population growth which ceases around 2025. Table 2 shows how the composition of GDP changes over time in each of the scenarios. In the business as usual scenario the shares of each of the main components of GDP change very little, with a slight increase in the share of consumption expenditures matched by slight decreases in the shares of government and business investment expenditures. The net trade balance fluctuates between 0 and 2 percent of GDP.

In the low/no grow scenario the share of consumption expenditures remains about 58 percent, business investment expenditure declines to 12.2 percent as net investment declines towards replacement levels, government expenditure on goods and services including government investment, rises to 24.5 percent of GDP and the net trade balance rises to 5.3 percent. The increase in the share of government expenditures includes the increase in annual expenditures on adult literacy (\$0 in 2028 and 2034, high of \$831m in 2012⁴) and health care (rising to \$5b from 2019 onwards). In addition, poverty is eliminated by increasing transfers to households by \$10.3b in 2028, \$9.6b in 2034, and a high of \$15.0b in 2019⁵. The sum total of these expenditures is at its highest in 2019 at \$20.0b, declining to \$15.3b in 2028 and \$14.6b in 2034, representing 3.8%, 2.6% and 2.5% of total government outlays respectively⁶.

Table 2 also shows that the average rates of income and corporations tax required to generate revenues sufficient to maintain the debt to GDP ratio at about 30 percent are lower than they were in 2004 in the low/no growth scenario. This is because of the inclusion of a revenue neutral carbon tax of \$200/tonne

⁴ Expenditures on adult literacy peaks in 2012 and then decline on the assumption that adults enrolled in a one year literacy program become literate.

⁵ I.e. people with incomes below the Low Income Cut-Off as defined by Statistics Canada. The cost declines as unemployment is reduced.

⁶ Total government outlays includes transfers to households, business and non-residents, interest payments as well as government expenditure on goods and services. Only the last item is included in GDP to avoid double counting.

CO₂, phased in over 10 years starting in 2010.

These results suggest that a low/no growth future does not present insurmountable fiscal obstacles though several caveats are in order: 1) In comparison with other G8 countries Canada is starting from a comparatively strong fiscal position with annual budget surpluses for the past decade. 2) LowGrow analyzes Canada's overall fiscal situation in which the accounts of all three levels of government are combined. In doing so, it obscures some very real differences among the provinces and potential political obstacles pitting 'have' and 'have not' provinces against one another. 3) The implications of a stable population for government services are ambiguous. A stable population reduces the requirements for increases in publicly funded infrastructure and services. It also reduces the requirements for infrastructure and services aimed at the needs of young people such as new schools. Insofar as a stable population will also be an aging population it increases the requirements for infrastructure and services needed by older people. 4) At the termination of the low/no growth scenario in 2034 the economy is not in a steady-state since some of the determinants of growth are still positive (i.e. net investment and net trade), and government expenditure is still rising albeit more slowly than in the business as usual scenario. Further adjustments will be needed to maintain GDP per capita at a constant level after 2034. 5) The fiscal dimension of the low/no growth scenario is only a partial representation of what might be accomplished through a more comprehensive program of ecological fiscal reform. 6) Implications for international capital flows and international competitiveness and monetary policy have not been considered and present additional challenges.

Conclusion

There are many reasons for considering how rich economies might manage without growth: biophysical constraints to continued growth are becoming more apparent, mounting evidence indicates that higher incomes do not make people happier beyond a level of per capita incomes far surpassed in rich countries, and

despite decades of substantial economic growth many social and environmental problems remain. LowGrow provides a tool for examining possibilities for managing without growth specifically in Canada, but similar results would likely be obtained if the model was applied to other developed countries such as the UK.

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