Costs, Benefits and Risks of Growth: Region of Peel

An exercise in regional socio-economic risk management

Executive Summary
May 2015

Canadian Centre for Economic Analysis

About the Centre for Economic Analysis

The Canadian Centre for Economic Analysis (CANCEA) provides objective, independent and evidence based analysis dedicated to a comprehensive and collaborative understanding of the short and long term risks and returns behind policy decisions and economic outcomes.

CANCEA serves municipalities, regions, provinces and industries that seek a best-of-breed understanding of the issues facing them using expertise combined with a multi-variable computational socio-economic policy evaluation platform.

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About This Report

In keeping with Canadian Centre for Economic Analysis's guidelines for funded research, the design and method of research, as well as the content of this study, were determined solely by the Canadian Centre for Economic Analysis. The research was conducted by CANCEA.

Statistics Canada data, data obtained from the Region of Peel, and relevant literature were used to inform the computer simulation models used to produce the results of this report. All quantitative methods used are documented herewith.

The interpretation and reporting of the results of the mathematical modelling contained within this report do not necessarily represent the policy position or the opinion of the Region of Peel.

Forecasts and research often involve numerous assumptions and data sources, and are subject to inherent risks and uncertainties. This information is not intended as specific investment, accounting, legal, or tax advice.

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EXECUTIVE SUMMARY

PREFACE

The Region of Peel, having experienced robust growth in previous decades, is currently home to over 1.4 million residents and 88,000 businesses. The Region of Peel, comprising Mississauga, Brampton, and Caledon, is expected to continue to experience rapid growth into the decades to come and must carefully plan its investments today in order to chart the trajectory of its development into an increasingly vibrant and prosperous economy. Planning to accommodate significant growth within the Region, however, is a complex task that must be approached with appreciation not only for its objectives for the future; Peel's current socio-demographic, economic, and geographic characteristics—along with the relationship between Peel and its surrounding areas—form the foundation on which Peel will build, develop, and grow.

KEY PEEL RESULTS:

BETWEEN 2014 AND 2041

- Regional population expected to grow by 41%
- Number of employed residents of Peel expected to grow by 35%
- Jobs in Peel at risk of growing only 23%
- Provincial and federal tax revenues increase by 62% and 68%, respectively
- If Peel plans and services growth according to *Places to Grow* expectations, overcapitalization on employment lands may leave Peel with over $2 billion in stranded debt

The Region of Peel is planning and investing to sustain a projected population growth of 41% by 2041. If this population growth is accommodated with appropriate investments in infrastructure today, Peel can expect to reap significant rewards by 2041, such as an increase of 35% in the number of its employed residents, and a 47% increase in its real, annual regional GDP. The province and the federal government will benefit with respective real, annual tax revenue increases of over 60%. However, Peel's strategic planning must take into consideration the costs associated with sustaining such strong growth, and must acknowledge the risks posed to the process by dependencies in relation to internal and external policies, the national and international macroeconomic climate, and even the planning process itself, particularly the projections to which Peel must plan, which may leave Peel with an inability to pay for its growth.

In addition, Peel must acknowledge the fiscal tools to which it has access and how they allow Peel to stimulate and benefit from growth. Because the region cannot tax consumption, production, or income unlike the provincial and federal orders of government, it relies upon some growth to fund all other types of growth. In relying upon revenue tools such as user fees, property taxes, development charges, and utilities, the region has limited ability to ensure that the revenues it generates equitably correspond to the economic capacity of residents and other non-resident participants in Peel's economy to pay. This lack of correspondence of regional fiscal tools to other measures of economic growth, such as increases in income, allows for misalignment between Peel's revenue streams and the prosperity of the region.

Similarly, on the supply side, these tools must also take into consideration the differential costs associated with developing different service areas. In order to fairly price development, growth in desired areas must be incentivized by means of market-driven forces rather than legislated boundaries. For example, if development charges are uniform across the region, as opposed to varying in price across locations, then there are no economic incentives for growth to manifest as intensification rather than as urban sprawl. If low-density areas are developed at the expense of high-density areas, then growth may cost the region more than it would if development was oriented to more efficient use of existing infrastructure.

In order for Peel to plan for its population to grow according to the projections legislated through the *Places to Grow* Act, which expects that Peel will have a population of over 1.97 million people by 2041, it must incrementally invest in infrastructure as it continues to support its current population. Peel plans for this through its capital and operational budgets which feature investment schedules that are aligned to *Places to Grow* population projections. Therefore, in order to accrue the benefits of growth, Peel must incur the associated costs as well. Furthermore, the dependencies that Peel faces both within its own economy and in its relationships to the economies of surrounding areas and the province pose systematic risks to the ability of Peel to achieve the benefits of growth. Managing these risks in relation to the costs and benefits begins with identifying and quantifying them. To quantify the costs, benefits, and risks of growth, the economy of Peel and its surrounding regions must be modeled as an interconnected system.

ANALYSIS

In order to determine and analyze the benefits, costs, and risks associated with growth, the Region of Peel has sought the use of the Canadian Centre for Economic Analysis' *Prosperity at Risk* simulation platform. Because the Region of Peel must simultaneously manage and balance its development across multiple, interconnected avenues, including the continued provision of diverse resident services alongside the support of its economic growth, a holistic approach to planning must be undertaken. For this reason, agent-based modeling was employed. Agent-based modeling animates individual agents—comprising businesses, governments, people, and others—using empirically informed behavioural heuristics, historical data, and complete financial accounting against geographic locations in one country-wide consistent model.

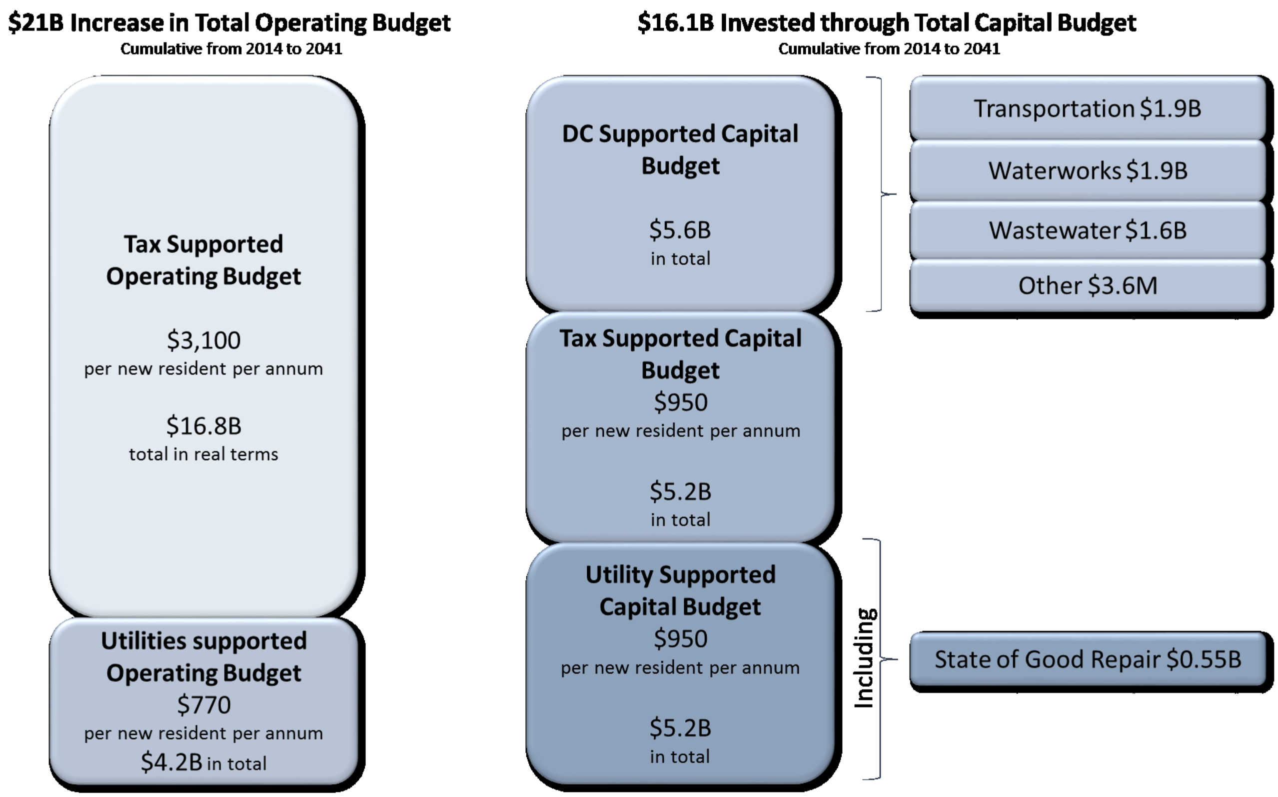
Any decision must be made in the context of its impacts on the entirety of the system. Without a holistic appraisal of the complete profile of risks and benefits associated with planning decisions, traditional economic analysis, no matter how accurate, will only capture a fraction of the consequences. A failure to appreciate the complex interdependencies between agents and their environments will generate results that may be inaccurate over the long term, and fail to capture the true value of these connections. Central to overcoming this issue is the understanding that the economy and society are one complete system that must be understood relative to that cohesion. In order to fully understand, therefore, the effects and dependencies of planning decisions on the whole system over time, it is paramount that the analysis emerges from an internally consistent model.

Results at a Glance

Costs of Growth

The population of the Region of Peel is expected to grow by 41% between 2014 and 2041. In order to sustain this population growth, the Region of Peel must increase its operational budget and invest in capital accumulation, financing its expenditures through taxes, utilities, development charge revenues, and other sources, such as user fees and external grants. **If Peel grows according to these projections, it can expect $71 million in outstanding DC debt by 2041, and no DC debt by 2042, and requires the following increases in the various components of its budget as a result of growth only**:

Figure 1 Cumulative Operational and Capital Costs of Growth[1]



Benefits of Growth

Providing adequate and appropriate infrastructure generates systematic benefits throughout the provincial economy. It provides Peel with the framework that is conducive to growth, as opportunities for development are discovered by individuals and businesses alike. If growth occurs according to expectations, then revenue streams from development charges will relieve Peel from capital debt over

[1] Operational costs of growth is the sum of the annual excess of the 2014 levels, cumulative over the period 2014 to 2041. SOGR represents estimate of expenditure for new capital build in 2014 and later, only. All sums in Figure 1 represent the budgetary increases as a result of growth only, and excludes budgetary allocations to sustaining the current population levels.

the course of decades. The development of infrastructure creates jobs through direct, indirect, induced, and system impacts, which leads to additional purchasing power for residents of Peel and Ontario. Private capital further strengthens the positive impacts, stimulating additional economic activity. The federal and provincial orders of government receive additional tax revenue as a result of that economic activity, as well. Table 1 outlines the cumulative benefits attributable to growth from 2014 to 2041, for Peel, as well as the percent changes in annual levels between 2014 and 2041.

Table 1 Benefits of Growth: Peel (in Real, 2014 dollars)

	Economic Indicator		*Cumulative Benefit of Growth*	*Percent Change from 2014 to 2041*
If Peel Grows According to Current Expectations	Population	+569,400	Grows from 1.40M to 1.97M, 390,000 more Peel residents aged 60 and younger relative to no growth	41%
	Regional GDP	+$176.3B	Total growth in Peel economy 15% higher than no growth. For every dollar in regional GDP due to growth in Peel, Ontario's GDP increases by $1.63 (inclusive of Peel)	47%
	Employed Residents	+216,200	For every new employed resident in Peel, Ontario gains 1.65 employed residents (inclusive of Peel)	35%
	Jobs in Region	+127,300	For every job created in Peel, 2 are created in Ontario (inclusive of Peel)	23%
	Private Non-Residential Capital Investment	+$46.3B	Grows from $7.8B in 2014 to $14.7B in 2041. $363,700 of private capital per new Peel job.	87%
	Private Residential Capital Investment	+$10.4B	Grows from $4.3B in 2014 to $6.0B in 2041. $18,300 of private residential capital per new Peel resident.	40%
	Federal Tax Revenue Generated	+$31.5B	For every dollar of municipal revenue (operating and DC) in Peel due to growth, Federal revenue increases by $6.22	68%
	Provincial Tax Revenue Generated	+$28.6B	For every dollar of municipal revenue (operating and DC) in Peel due to growth, Provincial revenue increases by $5.70	62%

Risks of Growth

Prosperity at Risk (*PaR*) simulations of the GTAH had found that evidenced-based job growth expectations across several municipalities could not support *Places to Grow* reported planning projections. For Peel, the *PaR* and *Places to Grow* divergence grows to over 171,000 fewer jobs by 2041. If Peel planned and serviced to *Places to Grow* numbers and such a measured overestimate of job growth was to materialize, Peel would be at risk of carrying over $2 billion in stranded debt by 2041. Such a risk would eventually be passed onto Peel residents and businesses, unnecessarily reducing Peel's socio-economic affordability.

Aside from the internal planning risks associating with servicing growth that may not occur, the Region of Peel experiences significant external risks to its growth as a result of the policies and investment participation of the provincial and federal orders of government. In order for the GTAH to realize its projected growth potential by 2041, the approach to its socio-economic prosperity must be framed like a "neighbourhood watch" process. That is to say, growth in Peel will not manifest without like-minded co-ordination, planning, asset investment and economic development across the GTAH, which must be spearheaded by the provincial government. Therefore, the ability of the provincial government to enact public policy that promotes co-ordinated socio-economic planning and development poses another key risk to Peel's sustainable growth. This includes the appropriate participation of the provincial and federal orders of government in infrastructure investment. Intergovernmental funding and planning co-ordination do not have a history of promoting sustainable growth and equitable distributions of risks and rewards (Smetanin, Stiff, & Kobak, 2014). Therefore, the risks to sustainable regional growth that are associated with co-ordinated planning across multiple regions and orders of government cannot be ignored.

From 2014 to 2041, Peel is expected to invest $16 billion in capital, of which 35% is in direct response to growth. Over that time, to encourage sustainable growth:

- The province will need to invest $55 billion in (or around) Peel, of which $4.2 billion is directly due to Peel's growth, $38.7 billion is invested in asset replacement and other GTAH growth that depends upon Peel, and $12 billion is invested in maintenance.
- The federal government should invest $23 billion in (or around) Peel, of which $1.8 billion is directly due to Peel's growth, $15.9 billion is due to federal assets in Peel and other GTAH growth, and $5 billion is invested in maintenance.

Hence, for every real $1 invested in public capital by Region of Peel for growth:

- Ontario needs to invest $7.65 in (or around) Peel for Peel & GTAH growth in addition to maintaining current assets, and
- The federal government needs to invest $3.16 in (or around) Peel for Peel & GTAH growth in addition to maintaining current assets

Despite these shares of infrastructure investment that allow for sustainable growth, past studies have highlighted that current federal government policies surrounding the contribution to infrastructure investment puts Ontario infrastructure funding and co-ordination at risk (Smetanin, Stiff, & Kobak, 2014).

Table 2 Risks to Growth: Peel

Risks to Growth in Peel	*Risk*		*Economic Impact of Risk*
	Defunding Waterworks Infrastructure	Waterworks defunded by $1.90B	141,700 (18%) fewer jobs in Peel in 2041. 59,300 (7%) fewer employed residents of Peel in 2041. Peel economic activity lower by 21% by 2041. For every dollar in municipal revenue lost as a result of defunding waterworks, provincial government loses $2.90 and federal government loses $2.27.
	Defunding Wastewater Infrastructure	Wastewater defunded by $1.56B	92,500 (12%) fewer jobs in Peel in 2041. 34,900 (4%) fewer employed residents of Peel in 2041. Peel economic activity lower by 14% in 2041. For every dollar in municipal revenue lost as a result of defunding wastewater, provincial government loses $2.39 and federal government loses $1.99.
	Defunding Transportation Infrastructure	Transportation defunded by $1.94B	55,800 (7%) fewer jobs in Peel in 2041. 40,600 (5%) fewer employed residents of Peel in 2041. Peel economic activity lower by 8% in 2041. For every dollar in municipal revenue lost as a result of defunding transportation, provincial government loses $1.77 and federal government loses $1.41.
	Tax Rates	Increase by 10%	21,700 (3%) fewer jobs in Peel in 2041. Peel economic activity lower by 3% by 2041. This represents approximately the same GDP impact as increasing interest rates by 2.5% above current rates.
	National Immigration	Decrease by 10%	15,100 (2%) fewer jobs in Peel in 2041. Peel economic activity lower by 2% by 2041.
	Imports	Increase by 10%	48,700 (6%) fewer jobs in Peel in 2041. Peel economic activity lower by 5% by 2041.
	Exports	Decrease by 10%	55,900 (7%) fewer jobs in Peel in 2041. Peel economic activity lower by 6% by 2041.
	Places to Grow Projections	Job projections overestimate by 171,000 jobs	Over $2B in stranded debt by 2041 as a result of overcapitalization on employment lands

Currently, the federal government supports approximately 12% of the infrastructure funding in Ontario, whereas *PaR* socio-economic simulations suggest a more sustainable policy of a 39% funding contribution. This means that the federal government investment has a shortfall of $7.2B annually (over the next 10 years in constant dollars), which creates risk to the provincial government's plans for much-needed public infrastructure investment. In fact, the current *status quo* places the Ontario government in the precarious situation of not earning a sustainable rate of return on its infrastructure investments. This fiscal pressure, in turn, creates additional challenges to the ability of the provincial government to engage with Peel's growth policies in a sustainable fashion.

Peel's other risks to growth also arise from the interdependencies within the region, and between the region and the province and country. Central to the risks associated with growth is uncertainty regarding future increases in the population, and therefore the ability of Peel to attract growth to protect the strength of its labour force, its economy, and its financial health because debt must be incurred in anticipation of growth in order to fund it. Table 2 above summarizes some of the risks associated with growth in the Region of Peel. Table 3 below summarizes the participation from government and industry that Peel needs to attain its growth objectives.

Table 3 Investment Dependencies Associated with Peel's Growth

	Risk	*Investment needed*	
Other Dependency Risks to Growth in Peel	Provincial Capital Investment	$55B in or near Peel	For every dollar invested by Peel in capital, provincial government should invest $7.65 in or near Peel
	Federal Capital Investment	$22.7B in or near Peel	For every dollar invested by Peel in capital, the federal government should invest $3.16 in or near Peel
	Residential Private Capital Investment	$139B	For every dollar invested by Peel in capital to sustain growth, $6.18 is needed in residential private capital investment
	Non-residential Private Capital Investment	$305B	For every dollar invested by Peel in capital to sustain growth, $13.53 is needed in non-residential private capital investment
	Private Capital Investment Industry Mix	Mix of Industries needed	Attracting only transportation and warehousing, only retail, or only office space capital investment has negative implications for Peel's GDP. A portfolio mix of industry sectors' private capital investment should be encouraged.

CONCLUSIONS

Modeling the Region of Peel as a cohesive system is integral to capturing the dependencies that give rise to a more comprehensive measurement of costs, benefits, and risks associated with the growth in Peel's population and economy between 2014 and 2041. Agent-based modeling was employed in order to analyze the value of Peel's growth-oriented investments in the present as they allow the region to develop according to growth objectives. This systems-oriented approach combines the Region of Peel's internal budget projection methodology, the long-term financial model, and complete data on Peel's financial accounts with *Prosperity at Risk*'s vast databases on historical economic trends, behavioural heuristics, and geographic mapping, in the context of its interconnected analytical framework. This holistic approach has allowed for results to appreciate that plans and decisions made today not only have pervasive impacts over time, but also across many individuals, firms, government organizations, and other stakeholders both within and outside the Region of Peel.

The Region of Peel is required to plan to population growth projections stipulated under the *Places to Grow* Act, 2005, which forecasts that Peel will grow by 41%, or an additional 569,400 individuals between 2014 and 2041, reaching total population of approximately 1.97 million. In order to accommodate these individuals, Peel must invest in its infrastructure to accumulate and maintain the necessary capital. Based on regional budget projections, growth-related capital spending between 2014 and 2041 will sum to approximately $5.6 billion for new capital, with an additional estimated $0.55 billion for state of good repair investments on the new infrastructure built within this timeframe. If these investments are made and growth occurs as expected, the Region of Peel will benefit from a strengthened economy, including a 47% increase in regional GDP between 2014 and 2041, a 35% increase in employed residents, an 80% increase in private non-residential capital investment, and a 40% increase in private residential capital investment.

In addition, the province and Canada overall are significant beneficiaries of Peel's growth. As a result of increased economic activity in Canada, the provincial government can expect an additional $35.5 billion in tax revenues that are directly attributable to the Region of Peel investing and growing according to expectations. Provincial GDP will increase as well; for every dollar increase of GDP in Peel, Ontario's GDP will increase by $1.63 (inclusive of the Region of Peel). Similarly, for every job created within the Region of Peel as a result of its growth, 2 are created within Ontario (inclusive of the Region of Peel). Demonstrably, the accommodation and attraction of population growth within Peel generates wide-reaching benefits; however, these benefits are not assured.

Peel's demographic and economic development faces internal and external risks. For instance, if Peel fails to allocate capital investment optimally across water, wastewater, and transportation infrastructure, it jeopardizes much of the benefits it stands to accrue from growth in terms of regional GDP, employment, jobs, and private capital investment. Particularly water and wastewater infrastructure are central to Peel's ability accommodate growth and prosper. Furthermore, Peel must ensure that it attracts private capital investment from the correct mix of industry sectors. The reason for this is that different sectors, such as offices and manufacturing, have different patterns of consumption of intermediate goods, and therefore have different impacts upon the economy once indirect, induced, and system effects are taken into consideration. Therefore, attracting the same quantity of private capital investment from different sectors may not generate the same number of jobs and the same quantity of other economic activity overall. Policy frameworks also pose risks to the economic development of Peel, with decreases in the national immigration rate and increases in national taxation rates inspiring dampened growth within Peel despite local adequate and appropriate growth-oriented investment. Finally, the budgetary structure in which Peel must accrue debt in anticipation of growth relies on the growth to occur for that debt to be paid. If growth does not occur as expected, the residents of Peel must bear the burden of increased tax levies and utility rates in order to repay the debt. As regional financial instruments must reflect appropriate pricing in order to encourage growth to occur in the right quantity, in the right location, and of the right type, such an increase in costs to residents may also pose extraneous risks in the ability of Peel to meet its future growth objectives if it manipulates its fiscal tools without assessing the associated impacts.

The federal and provincial government must also participate in supporting growth in Peel and surrounding areas in order to not only assist Peel in meeting its growth objectives, but also to ensure that the provincial and federal orders of government receive the full magnitude of taxation revenue benefits associated with Peel's growth. The current, suboptimal apportionment of risks and rewards with respect to infrastructure investment creates an inequitable distribution of investment risk between the municipal, provincial, and federal orders of government, and also threatens the sustainability of the municipal economies. In order to ensure continued development as well as equitable sharing of the benefits of infrastructure investment, the provincial and federal government must acknowledge their roles as stakeholders in the process of growth, whose participation in ensuring that growth occurs is invaluable to themselves, the municipal government, and most of all, individual residents across the province.

Limitations

Although all projections and analyses were completed with the best data and the appropriate methods, it is important to note that budgets were projected according to the Region of Peel's methodologies, and population projections were parameterized to align with existing *Places to Grow* legislation. Some of the projections—such as for jobs in Peel—that were stipulated under *Places to Grow* are far in excess of what results from *Prosperity at Risk* projections would suggest. The precision of these projections must be understood in this context.

Future Research

Additional work may be performed to model the process of land use allocation as the economy of Peel and surrounding regions evolve over time. Some features that would improve the precision and accuracy of economic impacts of development include adding friction into the current land use model. Additionally, *Places to Grow* legislation centres on environmental conservation in tandem with development. Expanding the existing model to take environmental impacts and trade-offs into consideration may expand the scope of analysis.

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