Cost-Benefit Analysis of Ontario's Automotive Partnership Investments

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In Ontario, the manufacturing sector has always been a staple of the economy. The employment generated by Ontario's manufacturing industry has allowed countless Canadians to live successful and meaningful lives. Ontario's manufacturing sector employs 768,702 individuals, of which 111,236 are employed in the automotive industry.[1] Automotive industry workers represent an important share of the employed individuals in Ontario.

For years, the relative attractiveness for the automotive companies to invest in Ontario has been a highly productive and skilled workforce. Many hold the belief that the Ontario automotive industry is more productive than America's and that North America's most reliable cars are built in Ontario. This belief is held by the Canadian Auto Workers (CAW) union and their economist Jim Stanford, which according to them, Canada's higher productivity makes up for any cost disadvantages faced by Canadian automotive assembly shops (Keenan 2008a). Canada may very well build some of the most reliable vehicles in North America as Canadian assembly plants have frequently received prestigious international awards. For example, the General Motors (GM) Oshawa plant received the 2006 Gold and 2007 Silver Plant Quality Awards from J.D. Power and Associates, while the Windsor DaimlerChrylser plant received the Bronze award in 2006 (J.D. Power and Associates 2008). This productivity advantage may be due to the fact that 43% of Ontario automotive industry workers have completed some form of post-secondary education compared to 27% for the American automotive industry (Government of Ontario August 2006).

However, since the start of the twenty-first century, Ontario has faced increased competition from other vehicle producing jurisdictions, primarily in the southern United States,

[1] Based on April 2008 figures from Statistics Canada, CANSIM table 281-0023, series V1557546, V1557609 and V1557610.

as large investment incentives were being offered to the automotive companies. These investment incentives either came as large tax breaks or significant subsidies from the jurisdictions' government. From an automotive company's point of view, these were almost like gifts. The companies were going to build new assembly plants and replace or update the inefficient ones any way; it just depended where.

Faced with the prospects of losing much employment and its position in the North American automotive industry, the Government of Ontario embarked on a strategy with the hope of protecting and preserving the industry and its thousands of employees. In April of 2004, Dalton McGuinty's government established the Ontario Automotive Investment Strategy (OAIS) to defend Ontario's interests and attract new investments. The investment strategy set aside $500 million in provincial support for the automotive industry.

Since 2007, when the North American automotive industry downturn began, the Government of Ontario has been heavily criticized for its automotive subsidies. Politicians and the media have remarked that it serves no purpose to society to provide subsidies to the automotive companies, only to have them layoff a significant number of individuals (e.g. DeCloet 2008). However, this paper's analysis is not focused on the merit of providing subsidies to companies who simply layoff workers after receiving public funds. Rather, this cost-benefit analysis will focus on the automotive industry subsidies distributed by the Ontario and Federal governments, ex-ante the industry's recent struggles.

This paper will begin by providing the reader with an overview of the Government of Ontario's subsidy policy, followed by a closer examination of a selected few subsidies as well as an in-depth look into the literature and tools useful in constructing the analysis. The core of this

paper will constitute a cost-benefit analysis of the Ontario and Federal automotive industry subsidies, whereby two hypothetical scenarios will be matched up against the status quo scenario. Both hypothetical scenarios involve debt repayment and a subsequent permanent tax cut, though automotive workers will operate in different labour environments. In the first hypothetical scenario, workers adjust to the competitive market pressures, whereas they do not in the subsequent scenario and will thus face unemployment. The results from this cost-benefit analysis will demonstrate that if automotive workers are willing to provide financial assistance to the firms to make the new investments profitable, we would be better off by implementing a permanent tax cut rather than providing targeted subsidies to the automotive industry. However, if automotive workers are unwilling to provide the financial assistance required to make the investments profitable, then the optimal public policy would be to provide public funds to the automotive companies.

Description Of OAIS

The OAIS fund was designed to protect and defend Ontario's position as an industry leader in automotive assembly from the investment incentives offered by other jurisdictions. The fund had the added promise of attracting new investments to strengthen the economy. By making $500 million available to the automotive industry, the McGuinty government wanted to send a clear signal that it cared about the industry and its employees. OAIS is a five year policy program providing provincial financial support to automotive assemblers and automotive parts companies who undertake "...[L]arge-scale capital projects that contribute to the long-term competitiveness of the automotive industry"(Government of Ontario April 2004). According to the OAIS brochure, the investment projects must involve corporate innovation, advanced skills

and training, construction of public infrastructure, improved energy efficiencies and have an element of new environmental technology creation. Furthermore, an additional significant eligibility criterion is that the automotive investment projects must be worth at least $300 million or they create or retain a minimum of 300 jobs. The OAIS fund is thus intended for the largest investment projects undertaken by the automotive industry. The stated goal is to help Ontario's automotive industry remain competitive with the industries of other jurisdictions in North America.

Public information on the OAIS and the respective contracts is limited, due to the commercially sensitive nature of the information relating to the agreements. Moreover, each individual project or investment possibility appears to have been negotiated on a case by case basis, which gives the appearance that there exists no set standard for the size and terms of the subsidies. For example, company A may receive a sum of money for an investment project, then company B will undertake a similar investment project (in terms of the total amount of the investment and jobs) and will receive a larger subsidy than company A. The public is made aware when new agreements are reached between the parties, yet the extent of the information is more than often lacking. Snippets of information can be found through official government news releases and newspaper clippings, but even then, only the amount for provincial support and the total number of jobs saved or created are stated. Often times, there is no mention of the latter.

While the province's documents make no reference to this matter, personal communication with directorate in the Automotive Strategy Branch (ASB) of the Government of Ontario revealed that OAIS subsidies can be provided in the form of either a grant or a loan.

Both grants and loans are treated in similar fashion, although clearly, from a government's fiscal point of view, a loan would be significantly better than a grant, as the government will be receiving repayment at some time in the future. In addition to the format in which the subsidies can be issued, personal communication with directorate in the ASB also revealed additional pieces of information about OAIS. As set out in the agreements, in circumstances where investment targets are not met or achieved, subsidies are to be clawed-back in the case of a grant and repayment accelerated in the case of a loan. Additionally, OAIS agreements can vary in length from one agreement to another. For example, the minimum length of an agreement is 8 years and goes up in duration. Or alternatively, following the initial investment, the length of the agreement is of 1 to 2 product cycles.

In the span of a medium to long-term agreement, it is obvious that markets and their structure may change. As a result, some agreements incorporate allowances for companies to adjust to changing market demand. An additional aspect of the OAIS is that as the firm's investments are made, the Government of Ontario's financial assistance is provided on a proportional basis. This simply means that the firm undertaking a project does not receive the entire provincial support amount in a lump-sum, one time shot; rather, it receives portions as the investments are being made. The above listed information is very general information and any specific details, such as the length and format, about a particular agreement between a firm and the Government of Ontario would be considered commercially sensitive information. However, if enough research and probing are done, specific information about particular subsidies can sometimes be uncovered.

Subsidy Recipients And Data

By compiling all publicly available information, Table 1 was constructed as a means to showcase OAIS agreements and Ontario's investments in the automotive industry. This was done in part because the Government of Ontario has no official document with a complete listing or extended details of the OAIS agreements. The information contained in Table 1 was obtained mostly through official government news releases and through press clippings. In addition, a small amount of information contained in Table 1 is not publicly available, as extra research and communications were undertaken with industry participants and the ASB directorate.

The automotive investments portrayed in Table 1 date from April 2004 to April 2008. All data in Table 1 are presented in terms of millions of dollars, except for employment data which is listed as the number of full-time jobs created or maintained. Contact was made with the ASB with the goal of receiving confirmation of all information about the investments listed in Table 1. While no immediate confirmation was received about Table 1, personal communications would later confirm information pertaining to specific investment projects.

In order to confirm the accuracy of the information, the author engaged in discussions with leading newspaper reporters, industry participants as well as personal communication with the Automotive Sector of Industry Canada. This was essential to ensure the information portrayed was as accurate as possible. The information contained in Table 1 is therefore considered to be the most accurate information available. All public knowledge of OAIS is incorporated in the Table 1, along with additional pieces of information. It is to be noted that the table does not include investments in the automotive industry that were made under the

Advanced Manufacturing Investment Strategy (AMIS), since it is not specifically geared towards the automotive industry.

The top half of Table 1 lists the automotive industry investments that have been made through the OAIS fund. The provincial funds for these investments are confirmed as being part of the OAIS. The bottom half of the table shows automotive industry investments made by the Government of Ontario, however, the source of the funding does not originate from OAIS or AMIS. It is unknown whether the funds are part of a specific provincial program, but what is known is that they are definitely not part of OAIS or AMIS.

Subsidy recipients have been listed in order of largest provincial support amounts to smallest. The first data column in Table 1 depicts the provincial support amounts for the Government of Ontario's subsidies in the automotive industry investment projects. Several of the investment projects have not only received provincial subsidies, but federal subsidies as well. The federal support amounts are listed in the second data column of Table 1. While federal policies are not the main focus of this paper, the federal subsidies will play an important role in the analysis. This cost-benefit analysis makes the assumption that the provincial subsidies leveraged the federal subsidies for the automotive projects. If the provincial subsidy would not have been made, then the federal subsidy also would not have occurred. The federal subsidies therefore complement the provincial subsidies and for that reason, will be included in the cost-benefit calculus. An important point to state is that the funding for the federal subsidies does not originate from a single federal program. As such, the origins of the federal subsidies are unknown. The third data column is for the project's total investment value. This amount is how much total money is being invested into the automotive project.

Lastly, the final data column provides an indication of the investment project's direct employment impact. It is the number of individuals that will be employed (or keep their employment) at the automotive shop according the government's press releases. Certain automotive industry projects were described as maintaining or creating "hundreds" of positions. "Hundreds" could mean 200 positions or 700 positions. The term is simply far too vague. For obvious reasons, these employment figures were not included in Table 1. Only the employment information with specific figures has been included in the table. The entry corresponding to the GM Beacon Project notes that as part of the OAIS subsidy agreement, over a nine year time span, GM was required to maintain an average of 16,000 employees in Ontario (Howlett 2008).

Three Subsidies Of Interest

Three particular automotive subsidies will be further discussed and described in detail. The first two will be the test cases used in the cost-benefit analysis of the Government of Ontario's decision to provide subsidies to the automotive industry. These are the two investment projects where precise employment information and terms of the subsidies were available. While the terms of the third automotive subsidy were available, there is an imprecise Ontario-wide commitment for jobs associated with the subsidy. For that reason, it would be incorrect to use the third subsidy in a cost-benefit analysis. However, it will still be discussed due to the size and significance of the investment project.

On October 29, 2004, the first OAIS subsidy was awarded. The $100 million OAIS subsidy was handed to Ford as part of the Centennial Project along with a $100 million federal subsidy (Item 2 in Table 1). The subsidy's objective was to provide Ford with assistance in transforming its Oakville Assembly Complex (OAC) into a flexible automotive assembly plant.

According to a news release from Ford and Industry Canada, the investments undertaken by Ford are said to help maintain 3,900 jobs at the Oakville plant. While it is nearly impossible to know the outcome at the plant had the investment not gone forward, the author is making the assumption that the entire 3,900 jobs were in jeopardy. We are taking the position that if the plant was not going to be updated, then it was going to be terminated and shutdown. In effect, this can be seen as the best case because it is unknown whether the entire plant would have been shutdown, experienced layoffs and shift closings or if the plant would have kept up operations without a hiccup. It is the best economic outcome because it is the situation where the greatest number of jobs are kept. Therefore, 3,900 jobs were "saved" as a result of the investment. Through research in the fiscal Ontario public accounts, it has been determined that the provincial subsidy was provided in the form of a grant. More specifically, in Volume 3: Detailed Schedules of Payments of the 2005-2006 and 2006-2007 Ontario public accounts, the payments listed in Ford's direction leads to the conclusion that the subsidy was issued as a grant.[2] As for the $100 million federal subsidy, federal news releases identified the subsidy as a loan. The assumption is also made that the provincial subsidy leveraged the federal subsidy.

The second subsidy being analyzed was given to Ford to provide assistance in reopening the Essex Engine Plant in Windsor (Item 6 in Table 1). The plant was closed on November 23rd, 2007, as 457 hourly and 71 salaried employees were let go (Vander Deolen 2007). As early as January, 2008, Ford was already lobbying for provincial and federal funds in order to reopen the engine plant. Ford was going to undertake a $300 million investment in the plant, but was seeking $60 million in combined provincial and federal support subsidies. According to media articles (e.g. Chase et al. 2008), it was reported that Ford would build the new engines in another

[2] All three volumes of the Ontario public accounts can be found on Ontario Ministry of Finance website, [http://www.fin.gov.on.ca/english/budget/paccts/2007/], 2005-2006 can also be found there.

jurisdiction if government funds were not supplied. Four months after the plant's closing, it was announced that the Government of Ontario would provide $17 million for Ford's $168 million investment to reopen the engine plant with 300 workers (no federal support). Through personal communication with the director of the ASB, it was revealed that the subsidy was provided as a "conditional grant" through OAIS.

The largest OAIS subsidy recipient has been General Motors of Canada for its Beacon Project, which received $235 million and $200 million from the Government of Ontario and the Government of Canada, respectively (Item 1 in Table 1). It must be noted though, that $60 million of the province's $235 million subsidy is destined for an Automotive Innovation Network among multiple universities, with the University of Ontario's Institute of Technology being the center hub. As a result, since this paper examines the government's investments in manufacturing only, we will focus on $175 million as the province's contribution. Details of GM's agreement with the province were unknown until recently. On June 4th, 2008, it was made public that the $175 million subsidy was an interest-free loan until the year 2053 (Howlett 2008). Had funds been provided as a grant, the effect would have been near identical. Using a nominal discount rate of 6.64%, the present value of $175 million in 2053 is only $8 million[3,4]. It was also revealed that the OAIS agreement required GM to maintain an average of 16,000 employees in Ontario (over a nine year span) with an unspecified number guaranteed for its truck assembly

[3] Our nominal discount rate is calculated using the average monthly yield on 10-year Government of Canada bonds for the period of January 1988 to June 2008 (CANSIM v122543). Our nominal discount rate is consistent with the method used by Boardman et al. (2006), where they use a nominal discount rate of 6.71% for U.S. data (p. 252). A nominal discount rate of 6.64% is also consistent with a real discount rate of 3.5% for Canada in Boardman et al. (2008).

[4] When future values are presented in terms of nominal dollars (where inflation has not been accounted for), calculating the present value requires the use of a nominal discount rate. In contrast, when dealing with current dollars (in this paper, depending on the case study, current dollars are either 2004 or 2005 dollars), a real discount rate must be used since the effects of inflation have already been accounted for. For example, the $175 million amount is in 2053 nominal dollars; therefore we use a nominal discount rate with a 48 year time span, from 2005 to 2053.

plant (Howlett 2008). If GM fails to meet these requirements, GM would be forced to accelerate its repayment of the subsidy. The $200 million subsidy from the Federal Government was provided as a loan, however, the terms of the contract are unknown.

When the Beacon Project was announced, the entire investment was going to create 500 new jobs in the economy. The project was also going to secure existing employment for many years to come. Much of the Beacon Project was focused on the car assembly plant in Oshawa (there is a car and truck plant in Oshawa), where $1.076 billion was committed for new vehicle mandates for the Impala and Monte Carlo models.[5] However, there is no precise employment information regarding the number of jobs at stake at the car assembly plant in Oshawa (or would have been at stake had the investments not gone through). On May 13th, 2008, GM announced that it was closing its transmission plant in Windsor, laying-off 1,400 individuals. Less than a month later, GM announced the closing of its truck assembly facility in Oshawa with 2,600 employees being affected. The recent layoffs and shift reductions at GM plants have summed to 4,000 individuals being let go. These layoffs will most likely result in GM not being able to fulfill the requirements of its OAIS subsidy and thus an acceleration of its loan repayment (Howlett 2008).

However, it would be incorrect to link the Beacon Project with these jobs losses, which were the result of a downturn in the automotive industry. Since we do not know how many jobs were at stake in the Beacon Project, it would be inappropriate to use the GM Beacon Project in the cost-benefit analysis. Even though the agreement with GM calls for an Ontario-wide

[5] According to a Government of Ontario news release, "Ontario invests in St. Catharines Prosperity", March 2, 2005. [http://www.ontariocanada.com/ontcan/page.do?page=5906&lang=en]. Also, GM ceased production of the Monte Carlo model in 2007 and the Beacon Project did not allocate any specific funds for GM's truck assembly plant in Oshawa.

commitment of 16,000 jobs, it is imprecise. An additional element is that the terms of the federal subsidies to Ford and GM are unknown. As a result, the assumption is made that the federal subsidy to Ford for the Centennial Project has the same conditions and term as the $175 million provincial loan to GM. The federal subsidy to Ford is therefore provided as an interest-free loan until 2052 (a 48 year time span since the Centennial Project was announced in 2004).

Literature Review

Before embarking on to the core of this paper, it would prove quite useful to take a quick glance at the relevant literature that has been written in recent years. This literature review will focus on the tools and concepts that are essential to the construction of this cost-benefit analysis. While this paper will by no means be the first to conduct a cost-benefit analysis of a government's policy decisions, this will be the first to provide a cost-benefit analysis of the Government of Ontario's automotive industry investments.

The economic literature focusing on publicly funded subsidies to privately owned corporations has tended to have very similar findings. They are findings that do not hold well for government bodies or for the subsidies' recipients. As pointed out by Milke (2007), the literature has shown that subsidies to targeted recipients have not resulted in widespread economic growth. He also notes that "At best, a generous interpretation of the literature suggests that subsidies *may* in very specific locations produce *some* effect on *some* economic behaviour" (Milke, 2007, p. 3).[6] Mintz and Smart (2003) propose that broad-based tax cuts would be far more beneficial to economic activity in the Atlantic Provinces than targeted subsidies. Furthermore, in order to provide subsidies, governments use the funds generated from tax

[6] Words in Italics were in the original paper by Milke (2007).

revenues. Subsidies are thus publicly funded through tax revenues. Since taxes play such a significant role in the Canadian economy, it will be useful to explore the issue of taxation.

It has been well documented that taxes, apart from lump-sum taxes, create distortions in an economy. A quick browse in any introduction to public economics textbook will reveal that distortions are created in the presence of taxes (for example, Rosen et al. 2003). These economic distortions result in deadweight losses. When taxes are applied, the deadweight loss is seen as an excess burden to society. As the government decides to collect an additional dollar of tax revenue, the supplementary deadweight loss incurred is known as the marginal excess tax burden (METB). The METB is the measure of the distortionary effects of a tax when an additional dollar of tax revenue is raised.[7]

In a cost-benefit analysis such as this one, the METB needs to be taken into account. For example, if a government wishes to finance a project with a cost of $1 by raising $1 of tax revenue, the total social cost will be:

$$Social\ Cost = 1 \times (1 + METB) \qquad (1)$$

Thus, when a project is financed through tax revenues, the cost to society is the amount raised plus the additional economic loss, which is calculated with the help of the METB. (See Boardman et al. 2006, p. 103-106 for a discussion.)

There are several pieces of economic literature that attempt to calculate the METB. For the Canadian economy, one particular research paper by Baylor and Beauséjour (2004) has calculated METBs for various Canadian taxes using a general equilibrium tax model. Their

[7] In economic literature, sometimes the term METB is not used and authors instead use the notion of Marginal Cost of Public Funds (MCPF), which is equal to 1 + METB.

study incorporates the major Canadian taxes as they examine which have the greatest impacts on investment and economic activity in Canada. Baylor and Beauséjour (2004) define the METB as the "welfare gain (in dollars) per dollar of lost present value of government revenue" (p. 16), where the welfare gain is measured as the increase in current wealth necessary to have the same effect on welfare as the tax cut.

For this cost-benefit analysis, the author has chosen to use the METB value corresponding to the sales tax on capital goods (which includes all forms of business inputs), where

> ...[T]he representative capital good is a composite of commodities from various sectors and countries. The sales tax on capital goods is modelled as an ad valorem tax on commodities purchased for the sake of investment....(Baylor and Beauséjour, 2004, p. 25-26)

The reasoning behind this choice lies with the fact that sales taxes on capital goods are considered to be one of the most distortionary taxes in the economy (Smart 2007 and Baylor and Beauséjour 2004). Baylor and Beauséjour (2004) find that the METB corresponding to a sales tax on business inputs is equal to 1.29, which means that, for every $1 of tax revenue raised, there is an additional $1.29 in economic loss. In addition, there has been increasing pressure placed upon provincial governments to undergo tax reforms in order to rid themselves of this form of sales tax. Only five provinces still impose such a tax: British Columbia, Manitoba, Ontario, Saskatchewan and Prince Edward Island (Dachis 2008).

There exists a number of studies in economic literature that examine the distortionary effects of sales taxes on capital goods. More specifically, these studies provide an in-depth look at the benefits of shifting towards a harmonized sales tax with the Goods and Services Tax (GST) serving as the basis. Notable Canadian economic literature on this subject includes recent

publications by Dachis (2008) and Smart (2007). Dachis (2008) examines how the Federal Government can provide assistance to the provinces to encourage them to harmonize their sales taxes with the GST. Harmonizing with the GST is generally seen as beneficial since

> The federal GST is a value-added tax that allows businesses to claim a tax credit against the GST they pay on purchases. In contrast, a provincial RST (Retail Sales Tax) does not allow businesses to claim these input tax credits, increases their costs as a result and, therefore, the final price to consumers. (Dachis, 2008, p.1)

Smart (2007) provides a critical examination of the impacts of the Harmonized Sales Tax in the Atlantic Provinces (Newfoundland, Nova Scotia and New Brunswick) following the 1997 tax reform. The literature on sales taxes tend to find that the main problem with provincial sales taxes is that business inputs are taxed compared to the GST which is a value-added tax. The retail sales tax increases the costs which therefore reduces the incentive to invest as

> ...[P]rovincial RSTs tax most capital goods bought by business. Taxes on capital are deemed to be especially undesirable because they have long-lasting effects on the economy by limiting the growth of the capital stock and reducing the long-run growth of productivity and employment. (Smart, 2007, p. 4)

If all provinces were to move from a sales tax to a harmonized tax, with the GST as base, it would prove to be economically beneficial for Canada as it would provide greater investment incentives. Such business incentives can be translated into increased investments and long term economic gains. For example, Smart (2007) found that the harmonizing provinces' annual investments in machinery and equipment rose by 12.2% above the trend levels in the years following the 1997 tax reforms.

Using Baylor and Beauséjour's (2004) findings, the economic cost of raising $1 in tax revenue through the sales tax on capital goods is $2.29 (METB = 1.29), while in comparison, it is a mere $1.13 (METB = 0.13) if that $1 is raised through the GST or a harmonized sales tax.

Clearly, from an economic perspective, it would be much more efficient to raise government tax revenue through the GST or a harmonized sales tax since less economic activity would be destroyed. According to Smart (2007), there is a consensus in economic circles,

> Conventional wisdom among public-finance economists has it that retail taxes are inferior to value-added taxes that raise the same revenue – for a variety of reasons, including the narrowness of their base (which distorts relative prices of marketed goods), their susceptibility to tax evasion, and their tendency to cascade through the value-added chain, thus distorting the relative prices of business inputs, particularly capital goods. (Smart, 2007, p. 14)

A move towards less distortionary taxes, such as a harmonized sales tax, would thus bring significant benefits to the economy.

Setting Up The Cost-Benefit Analysis

The North American automotive industry, especially GM, Ford and Chrysler, has faced significant challenges since 2007 and onwards. In the summer-fall of 2007, the entire U.S. economy was marked by the credit crunch and an economic downturn, resulting in an overall decrease in demand and sales. In addition, for many individuals, their attitude towards the environment has changed drastically over the past few years. There has been a shift in consumer demand as consumers are now making the environment a priority in many aspects of their lives, including the vehicles they drive. With the added factor of rising commodity prices, smaller and more efficient vehicles are in, while the bulkier, inefficient and bigger gas guzzlers are out. The automotive companies have had to re-structure their business procedures and product lines, resulting in trying times for the industry.

Various media have questioned why the governments are providing money to automotive corporations only to see them lay off hundreds and thousands of individuals (e.g. DeCloet 2008).

While numerous plant closings have recently been announced, mostly by CAW operated shops, this cost-benefit analysis focuses on the investments made by the Government of Ontario and the Federal Government in the automotive industry prior to the recent struggles. To look at it in a different perspective, even if the automotive industry was not in a downturn, this cost-benefit analysis evaluates the benefits of the Government's policy and attempts to answer the questions of whether or not it is a "good" policy.

In order to properly conduct this cost-benefit analysis, there will be three different scenarios: the status quo scenario, Scenario #2 where there are no subsidies and the workers adjust to competitive pressures and Scenario #3 where once again there are no subsidies, but workers do not adjust to the competitive pressures of the economy. In the final two scenarios, instead of providing subsidies, the Government of Ontario will use the funds towards debt repayment, meaning it will no longer have to pay the flow of interest that would have accrued. The government is then able to implement a policy of permanent tax cuts.

As for the federal subsidies, the Federal Government will instead give the funds to the Government of Ontario in order to finance a permanent tax cut (in the same manner that Ontario uses its own funds). According the Dachis (2008), the Federal Government should provide funds to Ontario to convince the Government to improve its tax competitiveness. The study reveals that if Ontario were to adopt a harmonized sales tax (HST) system, not only would it be placing a more visible tax on consumers, but it would also experience "...a shortfall in revenues if (its) HST rates were to equal (its) current RST rates" (Dachis, 2008, p.4). For those reasons, the Federal Government can provide compensation as an incentive for Ontario to adopt a harmonized sales tax. When the Atlantic Provinces underwent the tax reform in 1997, the

Federal Government offered compensation to the provinces for the difference in revenues they would have earned, compared to the actual earned revenues (Dachis 2008).

The final two scenarios will be compared to the status quo scenario in order to obtain the net benefit of moving away from the status quo to the alternative. In each scenario, the two automotive subsidies previously discussed in detail (the Ford Centennial Project and the Ford Essex Engine Plant) will be analyzed. This is done since the investment projects have varying impacts on employment and will therefore have different consequences on the economy. In addition, the first investment project consists of a provincial grant and a federal loan, while the second investment project is a provincial grant. Grants and loans are treated in a similar fashion, with the exception that there will be an additional benefit element for repayment in the case of a loan. This distinction will have an effect, albeit not an overly significant one, on the final net benefits.

The Status Quo - Scenario #1

The status quo is the scenario in which the Ontario economy has functioned since the implementation of OAIS in 2004. In the status quo, the Government of Ontario and Federal Government provide financial support in the form of subsidies to the automotive industry. Simply stated, the subsidies go ahead. In this scenario, the $100 million provincial subsidy and $100 million federal subsidy for the Ford Centennial Project as well as the $17 million provincial subsidy to help reopen the closed Ford Essex Engine Plant go ahead as planned.

In this situation, the government's subsidies play a major role in determining the labour market conditions. It is assumed that the companies require a minimum threshold of assistance

to make the investments profitable but that they are indifferent to whether that assistance comes from governments, in the form of subsidies, or from workers, in the form of reduced wages and benefits. Thus, subsidies relieve pressure on workers to make concessions. In the status quo scenario, automotive workers do not adjust their wages and benefits in accordance with market pressures, since the subsidies relieve them of that necessity.

Since public funds are provided to the automotive industry, subsidies can therefore be viewed as a transfer from taxpayers to automotive workers. It must be noted, shareholders are not impacted by the provision of subsidies. This analysis makes the assumption that if the subsidies (or financial incentives) are not provided, the automotive companies will make their investments in other jurisdictions. The shareholder's position does not change whether the investments are made in one jurisdiction over another. Shareholders are thus indifferent in all scenarios. There are specific individuals who will gain (the automotive workers) and others who will lose out (taxpayers). This also raises the issue of vertical equity. According to Rosen et al. (2003), vertical equity is an economic notion whereby individuals who earn more and thus have a higher ability-to-pay, should carry more of the tax burden.

Table 2 provides an overview of the compensation received by automotive workers and manufacturing workers in Canada. Not only are there large discrepancies between automotive workers and others industrial workers, there also exists significant wage and benefit differences amongst automotive workers. More specifically, there is a significant difference in the remuneration by unionized workers compared to non-unionized workers. In the Canadian automotive industry, the unionized employees are represented by the Canadian Auto Workers (CAW) union. The "all-in costs" from Table 2 can help in translating the scope of the

differences. These all-in costs represent the total cost for one hour of labour: wages, benefits, pensions and other costs. GM, Ford and Chrysler face all-in costs of approximately $30 more per hour compared to the non-union Japanese based operations of Toyota and Honda in Canada ($77.75 compared to less than $50).

Based on the collective bargaining agreements from GM, Ford and Chrysler, the base wage for a CAW automotive assembler is $32.55 per hour (Human Resources and Social Development Canada 2008). This number does not include seniority, which significantly increases the average CAW automotive assembly wage. Compared to the non-union Japanese based operations in Canada, such as Toyota and Honda, CAW workers can expect to earn a significantly larger wage. It is to be noted that non-CAW auto assemblers earn less than the $30.77/hour Canadian average from Table 2, since that number includes the CAW wages, which account for the large majority of wages in this sector. We can take the ratio of the all-in costs ($50 and $77.75) to arrive at an approximation for the non-unionized wage of an automotive assembler in Canada. Using this method, we yield an hourly wage for automotive assemblers of approximately $21 per hour.

The CAW is Canada's largest private sector union, representing approximately 265,000 workers across various industries in Canada (Gray 2008). From Table 1, it is also apparent that CAW shops have received significantly more provincial subsidy money than other shops. For example, a simple calculation yields that the average provincial subsidy towards a CAW operated shop provided 9.58% of the total investment amount, while non-CAW shops received only 6.71% of the total investment. We can see that in this situation, the lower paid industrial workers, as taxpayers, are subsidizing higher paid automotive workers. Thus, it is not vertically

equitable to have an economy where the higher paid automotive workers are being subsidized by lower paid industrial workers (seen as taxpayers).

While both CAW shops and non-CAW shops have been recipients of government subsidies, CAW shops receive a disproportionately greater ratio of provincial subsidy money-to-investment. The automotive industry subsidies towards CAW shops therefore play a greater role of relieving the automotive workers of the necessity of downward adjustments in wages and benefits, compared to non-CAW shops. In Table 2, comparisons are made to the national data, as Ontario motor vehicle manufacturing data is not available so as to comply with the Statistics Act. Nonetheless, 84.32% of national automotive production (including the parts sector) in 2004 took place in Ontario (Statistics Canada, 2004 Input-Output tables). Thus, the national data are indicative of conditions in Ontario.

As the data in Table 2 indicates, employees at CAW shops are compensated significantly better than other automotive workers and manufacturing workers. Because CAW shops receive a greater percentage of subsidies as well as having a higher subsidy money-to-investment ratio, it follows that the lower paid industrial workers, as taxpayers, are subsidizing higher paid autoworkers. Automotive workers, especially CAW automotive workers, are relieved of the necessity of downward adjustments in wages and benefits due to the government's subsidies.

Scenario #2

The scenario that will now be analyzed in this cost-benefit analysis is a hypothetical situation whereby neither the Government of Ontario nor the Federal Government provide subsidies to the automotive industry. However, the automotive industry investments still go

ahead as workers adjust their wages to provide the required assistance. Note that this scenario mirrors the recent experience in the U.S., where in their 2007 contract negotiations, the United Auto Workers (UAW) agreed to a variety of concessions, including a two-tiered wage and benefit system for new employees and the restructuring of the health care system. It has been reported that these concessions trimmed the hourly all-in costs by $20 to $25, netting new hourly all-in costs of approximately $50 to $55 (Keenan 2008b and DesRosiers 2008). The automotive workers thus operate in a more competitive labour environment, as wages and benefits will adjust to maintain employment at the same level.

In this scenario, instead of providing subsidies, the Government of Ontario uses the funds for the purpose of debt repayment. By doing so, the government saves on the associated interest payments. By no longer having to pay the flow of interest, the government can then implement a permanent tax cut equal to the saved interest payments.[8] As for the federal funds, the Federal Government gives the funds to the Government of Ontario and just as above, implements a permanent cut in the sales tax on business inputs. From Dachis (2008), this follows a similar logic, as the ultimate goal is to eliminate the extremely distortionary taxes. This can be seen as federal assistance to Ontario to encourage the government to move towards a system of harmonizing their sales taxes with the GST. This is a better use of the federal funds than cutting the corporate income tax since from Baylor and Beauséjour (2004), the METB is 1.29 for the sales tax on business inputs while it is only 0.37 for the corporate income tax.

The first automotive investment that will be analyzed is the $200 million subsidy that was provided to Ford for its Centennial Project. The subsidy, $100 million as a grant (provincial) and

[8] If the government did not have any outstanding debt, it could buy a bond with the funds that it has from no longer providing the subsidy. The annual flow of interest from the bond could then be used to finance a permanent tax cut.

$100 million as a loan (federal), was issued as part of the investment project to maintain 3,900 full-time jobs. Since there are no subsidies in this scenario, the automotive workers are the ones who provide the investment incentive. The 3,900 Ford employees must adjust their wages (or some combination of wages and benefits) to the level where they are providing the $200 million in lump-sum support. Dividing $200 million by 3,900 employees, we obtain a value of $51,282 per employee. Translating this present value into an annual basis can be easily done using the following equation:

$$Present\ Value = \frac{\Delta w}{r} \qquad (2)$$

where Δw represents the required change in annual income and r is the real social discount rate. The real social discount rate used in this analysis is 3.5%, a rate in line with Boardman et al. (2008). Substituting into (2) yields a value for Δw of $1,795 per year (2004 dollars), or approximately 86 cents per hour (2004 dollars).[9] If each Ford employee gave up $0.86 per hour, Ford would have received the support it needed to undertake the investment project. This concession represents a 2.6% reduction in the base wage for CAW assemblers. While not insignificant, it would still leave these employees well above the wage level earned by workers at Japanese-based assembly plants and far above the wages earned by the Canadian manufacturing average (see Table 2).

With the $200 million that is not being provided in a subsidy to Ford, the Government of Ontario is able to pay down an equal amount of debt.[10] Doing so saves the government from paying the flow of interest that would have accrued. The government can then implement a

[9] Calculated using 40 hours per week, for 52 weeks a year.

[10] As was mentioned earlier, the Federal Government gives the $100 million to the Government of Ontario to finance a permanent cut in the sales tax on business inputs.

permanent tax cut equal to the saved interest payments. The present value of the tax cut is just equal to the lump-sum $200 million, using the government's borrowing rate as the discount rate.[11]

Next, when a government raises funds through taxes, distortionary effects are created. The reverse is also true. When a government adopts a tax cut policy, the economic distortions existing in the economy are reduced. Thus, when taxes are lowered, we must multiply the tax revenues that are inserted back into the economy by the METB to obtain a benefit of reduced economic distortions (in present value). As discussed earlier in this paper, this cost-benefit analysis uses an METB of 1.29, which is the METB associated with sales taxes on business inputs from Baylor and Beauséjour (2004). Multiplying the present value of the tax cuts by the METB yields $258 million ($200 million × 1.29).

Thus the total benefit of the policy consists of three components: (i) $200 million received by bondholders, (ii) $200 million (present value) in reduced taxes, and (iii) $258 million (present value) of reduced economic distortion. The total cost of the policy includes the following three components: (iv) $200 million (present value) in reduced gross wages for auto workers[12], (v) $200 million in current taxes to pay down debt, and (vi) $200 million (present value) in reductions for interest recipients (bondholders).

In this case, the total cost also includes a fourth component, which reflects the fact that the Federal Government does not receive a $100 million payment from Ford in 2052, which it

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[11] Boardman et al. (2008) indicate an average government borrowing rate of 3.5% (real), which is consistent with our evaluation of Δw above. The nominal discount rate of 6.64% used in this analysis is consistent with Boardman et al. (2006). See footnote 3 for a discussion on the nominal discount rate of 6.64%.

[12] $168.52 million in reduced net wages (disposable income) for workers, plus $31.48 million in reduced direct tax receipts for government. Based on the 2004 Ontario direct tax payments as a proportion of personal income (15.74%), obtained from Statistics Canada, CANSIM table 384-0012.

would have received in the status quo as repayment of the interest-free loan. In the status quo, this payment could have been used to pay down debt and finance a permanent tax cut (again giving the funds to Ontario to reduce the sales tax on business inputs). As before, the net effect of such a tax cut would be given by the principal multiplied by the METB, or $129 million. Since this value would accrue in 2052, it would need to be discounted to yield the present value. Using a nominal discount rate of 6.64% (see footnote 3) results in a present value of $5.89 million in 2004, when the Ford Centennial Project was announced. By refusing to grant a loan in the present scenario, the government forgoes this benefit.

The net benefit of not providing the subsidy to Ford is thus

Net Benefit = $200 million + $200 million + $258 million - $200 million - $200 million - $200 million - $5.89 million

Net Benefit = $52.11 million

Note that items (i) and (v), and items (ii) and (vi) are just transfers which cancel out in the cost-benefit calculus. Item (v) also generates distortion; however, since this element of distortion is common to all of our scenarios, including the status quo, we omit it. The demand effects of lower wages for automotive workers have not been included in the calculations for this scenario since these are offset by the demand effects from bondholders, who receive the same sum that workers forego in wages. Comparing this result with the status quo indicates that society as a whole would be $52.11 million better off by not providing the subsidy and instead using the funds for the purpose of debt repayment and adopting a permanent tax cut with the saved interest payments, provided that workers adjust their wages in the manner described.

Analyzing the second subsidy to Ford follows the same logic as above, with the exception that there is only a provincial subsidy and there is no repayment. The $17 million subsidy was provided as a grant to Ford to help with a $168 million investment to reopen the Essex Engine Plant, which was closed for a period of a few months. With the new investment, 300 employees are returning to work in the plant. These 300 employees could have avoided being unemployed by adjusting their wages (although not the original number of employees, which was higher), as Ford would have received the assistance needed to make the investment profitable. In order to provide $17 million in assistance, the 300 Ford employees would each need to give up $56,667 in present value earnings. Using a discount rate of 3.5% (real), this equals an annual wage reduction of $1,983. In terms of an hourly wage rate, their new wage would fall by $0.95, still maintaining significantly higher wages than their counterparts (see Table 2).

The Government of Ontario once again uses the funds for the purposes of debt repayment, which finances a permanent tax cut. The resulting reduction in economic distortion is $21.93 million (17 million × 1.29). Following the same approach as above, we list the components of total benefit as follows: (i) $17 million received by bondholders, (ii) $17 million (present value) in reduced taxes, and (iii) $21.93 million (present value) of reduced economic distortion. The total cost of the policy consists of the following components: (iv) $17 million (present value) in reduced gross wages for auto workers[13], (v) $17 million in current taxes to pay down debt, and (vi) $17 million (present value) in reductions for interest recipients

[13] $14.324 million in reduced net wages (disposable income) for workers, plus $2.676 million in reduced direct tax receipts for government. Based on the 2004 Ontario direct tax payments as a proportion of personal income (15.74%), obtained from Statistics Canada, CANSIM table 384-0012.

(bondholders). The net benefit of not providing the subsidy to Ford is therefore $4.93 million; i.e.

Net Benefit = $17 million + $17 million + $21.93 million - $17 million - $17 million - $17 million

Net Benefit = $4.93 million

The two investment projects analyzed under the assumptions of this scenario are presented in Table 3. The total net benefit to society would be $57.04 million if the automotive subsidies had not been issued, auto workers had reduced wages to provide the necessary incentives, and the government had used the funds for debt repayment and implemented a permanent cut of sales taxes on business inputs. Stated in another way, society as a whole is $57.04 million worse off due to the subsidies that were given to Ford, compared with the alternative of debt repayment.

Scenario #3

The final scenario in this cost-benefit analysis involves a situation where the Government of Ontario and Federal Government once again do not provide subsidies to the automotive industry. The Government will instead use the funds for the purposes of debt repayment, save public funds on the interest payments and implement a permanent tax cut. The difference between this scenario and the previous one is that automotive workers do not adjust their wages to provide the financial inventive required by the companies. The result is that the investment and associated jobs are relocated to another jurisdiction in either the U.S. or Mexico. Automotive workers in Ontario will thus be affected by a transitional period of unemployment and lost wages. In addition, the loss of wages and employment for the automotive workers will

also have indirect consequences and multiplier effects on the entire Canadian economy. The refusal of the automotive workers to make concessions in this scenario is consistent with the CAW's position in recent years. See Gray (2008) for a discussion. In contrast, in the United States, the UAW agreed in 2007 to reduce hourly labour costs (all-in costs) by $20 to $25 (Keenan 2008b).

For this scenario, the benefits of the government's policy of debt repayment and tax cuts have already been calculated in Scenario #2 (see Table 3). The cost calculations are significantly different from Scenario #2 due to the transitional period of unemployment. In order to evaluate these costs, the paper makes use of Statistics Canada's Input-Output Model, which disaggregates the Canadian economy into 303 industries and 727 commodities for a given year. For our purpose, we focus on 2004, the year in which the OAIS was established (and the most recent year for which the model is available).

The Input-Output Model provides results in terms of employment, wages and salaries, and GDP by province, for a given shock to either gross output or final demand. In contrast, since we do not know the dollar value of gross output associated with each automotive investment, we must structure the simulation as a shock to employment. Fortunately, the linearity of the model makes it easy to convert from output to employment shocks. In particular, we first simulate an arbitrary shock of $100 million to gross output in the "Automobile and Light-Duty Motor Vehicle Manufacturing" industry. The model then returns data on the direct and upstream employment effects (full-time equivalent jobs) of the shock. Since we know the total number of direct jobs at stake – e.g. 3,900 in the Ford Centennial Project – we can scale the output of the model to reflect this number of jobs.

This first simulation provides information on the direct and upstream impacts of the lost automotive production.[14] It is then necessary to account for the multiplier effects of lost wages and salaries. In fact, other components of national income have also been reduced – i.e. government tax revenues, company profits, and non-wage benefits. However, in the short-run, it seems reasonable to focus on lost wages and salaries as the main source of multiplier effects. Changes in taxes collected are most likely to affect governments' surpluses or deficits in the short run, without affecting spending and GDP[15]. A large proportion of company profits accrue to non-Ontario owners, with a correspondingly low multiplier effect on Ontario GDP.[16] Furthermore, the lost automotive investment in fact represents a relocation from Ontario to some other jurisdiction. Thus, the profits will still flow to shareholders – only the source location has changed. Finally, changes in benefits paid affect mostly investment funds (pension funds, workers compensation and unemployment insurance premiums), which would not have much of an impact on GDP in the short-run.

To simulate the multiplier effect of lost wages and salaries, we subtract direct tax payments and savings, to arrive at estimates of the reduction in consumer expenditure by province.[17] The allocation of consumer expenditure among commodities is provided by the 2004 Final Demand Table in the system of input-output tables produced by Statistics Canada. Using this information, we broke down the reductions in consumer expenditure by province into corresponding reductions in demand for individual commodities.

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[14] Upstream impacts refers to the lost production, employment and incomes of supplier industries.

[15] A referee noted that government surpluses would lead to increased saving, leading to more investments which would then increase GDP. However, this would be significant in a closed economy but much less significant in a small, open economy such as Canada, which has access to global financial markets.

[16] The effect of retained earnings on business investment has already been accounted for as an upstream impact in the first simulation.

[17] Direct tax payments as a proportion of personal income were obtained from Statistics Canada, CANSIM table 384-0012. The savings rates were obtained from CANSIM table 384-0013.

This information was then fed into the model as a demand-side shock, which yielded further reductions in gross output, employment, incomes and GDP, by province. In principle, this procedure should be repeated until the multiplier effects have been reduced to zero. In practice, we approximated this outcome by calculating an Ontario scaling factor, which we then applied iteratively to the second-round simulation to arrive at a final estimate.[18] Tables 4 and 5 contain the results of our simulations for the Ford Centennial Project and Essex Engine Plant.

After accounting for multiplier effects, not providing the Ford Centennial Project subsidy would have a total negative impact on national GDP of approximately $2.578 billion per annum with $2.284 billion accounted for by Ontario, according to the model (see Table 4). For the most part, the negative economic impacts from the project not going forward were mostly felt by Ontario, followed by Québec and Alberta. A total of 25,696 jobs were lost nationally with 21,952 of those being in Ontario. These job losses resulted in $1.141 billion in lost wages per annum for all of Canada and $1.011 billion in lost wages in Ontario (Table 4). Since the cost-benefit analysis deals with the Government of Ontario's investment policies, the present value of lost GDP (or economic activity) in Ontario will be taken as the measure of the cost of the transitional period of unemployment.[19]

However, it is important to recognize that the numbers listed above are not permanent lost wages and permanent losses in GDP. It would be erroneous to assume that all individuals

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[18] The scaling factor is equal to the ratio of the second-round effect on consumer expenditure to the first-round effect. Each province exhibits a different value for this ratio. Nonetheless, as Ontario accounts for 90% of all impacts in the second round, the use of the Ontario ratio for all provinces does not seem unreasonable. In subsequent research, we plan to construct a computable general equilibrium model to account for these effects automatically.

[19] In fact, this measure will be an overstatement of the true cost of the transitional period, as it includes a reduction in distributed profits which in fact will still flow to shareholders. As mentioned earlier, the automotive investments are not cancelled; they just go ahead in a different jurisdiction.

who lost employment will remain forever unemployed and never contribute to society. As such, this analysis uses the re-employment data for Canada from Abe et al. (2002). These authors provide a cumulative distribution of the re-employment of laid-off workers at monthly intervals up to one year. At one year, 74.8% of men and 64% of women have been re-employed, according to their data (a 69.74% average, using the national sex ratio of employed individuals for 2004 – CANSIM v2461329 and v2461539). Beyond this point, we assume a simple linear trend, such that all workers have been re-employed after two years. Figure 1 illustrates the re-employment distribution used in this analysis.

We use the re-employment distribution in Figure 1 as the distribution of the restoration of economic activity over time. Thus, at the end of two years, we assume that all lost GDP has been regained. While we expect it highly likely that the laid-off workers would be rehired at lower wages (e.g. the Canadian manufacturing average rather than the CAW rates shown in Table 2), we do not see any reason to assume that the total value of production would be lower after the transition. Rather, we expect that company profits would gain at the expense of labour income, restoring a more normal ratio between the two, compared with the unionized automotive sector.

Dividing our estimate of Ontario's annual GDP loss from the Input-Output model ($2.284 billion) into a monthly value and applying the re-employment distribution of Figure 1 allows us to calculate the adjusted GDP impact at monthly intervals over the two-year transition. Discounting these values to the initial period (2004) at an annual real discount rate of 3.5% yields a present value of lost economic activity associated with the loss of the Ford Centennial Project of $1.65 billion.

Because the federal subsidy to Ford was issued as an interest-free loan until 2052, the repayment of the loan that will no longer happen in 2052 and the associated tax cut must be counted as a cost (since the federal funds would have been given to the province). This cost was calculated to be $5.89 million in Scenario #2.

From Scenario #2, we know that the total benefit of the debt repayment and subsequent tax cut policy is $658 million for the Ford Centennial Project (Table 3). We can now itemize the components of total cost as follows: $1.65 billion (present value) of lost GDP due to the period of transitional unemployment, $200 million in current taxes to pay down debt, $200 million (present value) in reductions for interest recipients (bondholders), and $5.89 million associated with the foregone loan repayment (and subsequent permanent tax cut). Therefore the net benefit of not providing the subsidy to the Ford Centennial Project is - $1.398 billion (net cost of $1.398 billion); i.e.

Net Benefit = $658 million - $1,650 million - $200 million - $200 million - $5.89 million

Net Benefit = - $1,398 million

If the Government of Ontario and Federal Government had not provided the $200 million subsidy to Ford and instead used the funds for the purposes of debt repayment and a permanent tax cut, society as a whole would be $1.398 billion worse off, assuming workers did not adjust their wages and were therefore laid off.

The same analysis follows for the second Ford project. As reported in Table 5, Ontario's GDP falls by $175.72 million, with 1,689 jobs lost in the province as a result of the engine plant not being re-opened and its indirect effect. However, as above, these losses would not be

permanent. Using the re-employment rates from Abe et al. (2002) and following the same approach as above, the total present value of lost GDP is calculated to be $126.91 million.

From Scenario #2, we know that the total benefit of the debt repayment and tax cut policy is $55.93 million for the Ford Essex Engine Plant (Table 3). We can now itemize the components of total cost as follows: $126.91 million (present value) of lost economic activity for Ontario due to transitional unemployment, $17 million in current taxes to pay down debt, and $17 million (present value) in reductions for interest recipients (bondholders). Therefore the net benefit of not providing the subsidy to the Ford Essex Engine Plant is - $104.98 million (net cost of $104.98 million); i.e.

Net Benefit = $55.93 million - $126.91 million - $17 million - $17 million

Net Benefit = - $104.98 million

The results from Scenario #3 are summarized in Table 6. As shown, under the given assumptions, paying down the debt and implementing a permanent tax cut would not yield higher net benefits to society, as the lost economic activity would far outweigh the reduced economic distortion. Ultimately, this scenario creates a similar downward adjustment of wages for automotive workers as in Scenario #2, with the exception that workers must transition through a period of unemployment. It was stated earlier that the firms required a minimum threshold of assistance to make the investments profitable, whether the assistance came from publicly funded subsidies or from the workers. Given the assumptions, ceteris paribus, one of the main benefits of the automotive subsidies is the avoidance of lost economic activity arising from the transitional period of unemployment.

Sensitivity Analysis

In this section of the paper, we will carry out a sensitivity analysis to test our results by varying the values of the METB for sales taxes on business inputs for Scenario #2 and Scenario #3. Our sensitivity analysis will use alternative values of the METB since this will be the most efficient way to determine the reliability of our original cost-benefit analysis results. More specifically, we will use the highest and lowest values for the METB of sales taxes on business inputs from Baylor and Beauséjour (2004). In their own sensitivity analysis, they find values corresponding to 1.70 and 1.03 for the METB of sales taxes on business inputs.

Only the METB values are subject to changes in our analysis; the assumptions and processes will remain the same. In Scenario #2, the wages that workers must forego remain unchanged, though the total costs and benefits will vary. The results from the sensitivity analysis for Scenario #2 are shown in Table 7. With the new METB values, qualitatively, our results remain unchanged; the signs of the net benefits do not change. Only the magnitude of the net benefits is affected. Using a higher value of METB yields higher values for the net benefits, whereas a lower METB value reduces the net benefits.

For Scenario #3, our sensitivity analysis yields similar results to those for Scenario #2 (See Table 8). The sign of the net benefit remains the same, yet the scale of the net benefits fluctuates. Since we are dealing with negative net benefits for Scenario #3, the sensitivity analysis demonstrates that using a higher METB value reduces the net cost, while the lower METB value increases the net cost.

Conclusion

This paper has provided a look into the world of targeted government subsidies by introducing the reader to the hotly debated Ontario Automotive Investment Strategy. The literature review provided a clear understanding of the issues involved when cost-benefit analyses are to be undertaken on governmental policy decisions. This paper established two hypothetical scenarios which were used to measure the benefits of shifting governmental policy away from the status quo. These scenarios were designed to resolve the issue of whether or not targeted subsidies to the automotive industry were "good" policies. This cost-benefit analysis has demonstrated that the issue of whether or not subsidies are good policies is highly dependent upon the workers' decisions in the labour market.

As Scenario #2 established, there is no need for the governments to provide funds to specific targets as automotive workers are fully capable of providing the investment incentives the companies need in order to ensure the projects take place. In this scenario, the reduced economic distortions arising from a cut in the sales taxes on business inputs provided a larger benefit to society than the cost of foregone wages by automotive workers.

Scenario #3 demonstrated that paying down the debt and implementing a permanent tax cut, instead of providing subsidies to the automotive industry, does not yield the greatest net benefits to society as the costs associated with unemployment outweigh the benefits of reduced economic distortions. In a situation where workers do not adjust to competitive pressures, a policy focused on the avoidance of lost economic activity would yield significant benefits to society.

While no one is going to deny that unemployment has negative impacts on the economy, providing publicly funded subsidies to the automotive industry has the potential to encourage layoffs. For example, it was discussed earlier that within two months of closing the plant, Ford was asking for assistance in re-opening the Essex Engine Plant. Clearly, the companies have the incentive to either close or threaten to close operations in order to receive subsidies. Combined with the fact that subsidies relieve workers of the necessity to adjust, subsidies could potentially encourage layoffs in the automotive industry. In addition, the policies have created an environment of dependency as automotive companies are only willing to undertake new investment projects on the condition that public funds be provided to support the projects (for example, see Keenan 2008c).

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Table 1: OAIS Subsidies, April 2004 – April 2008

	Recipient's name	Provincial Support, $Cdn (in millions)	Federal Support, $Cdn (in millions)	Total Investment, $Cdn (in millions)	Employment Information at Announcement
Investments through OAIS					
1.	General Motors (Beacon Project)	235	200	2,500	500 new jobs, with Ontario-wide commitment of 16,000 jobs
2.	Ford (Centennial Project)	100	100	1,000	Maintain 3,900 jobs
3.	DaimlerChrysler	76.8	46	768	-
4.	Linamar	44.5	8.97	1,100	3,000 new jobs
5.	Int'l Truck and Engine Corporation	32	30	270	-
6.	Ford (Essex Engine Plant)	17	0	168	300 new jobs
7.	Valiant	7.125	0	93	-
8.	Nemak	6	0	100	-
9.	AGS Automotive/Tiercon	6	0	62	344 new jobs
10.	Denso Manufacturing	4.5	0	78.2	322 new jobs
Total for Investments through OAIS		**528.925**	**346**	**6,139**	
Investments Of Unknown Sources					
11.	Toyota	70	55	1,100	2,000 new jobs
12.	Honda	15	0	154	340 new jobs
Total for unknown sources		**85**	**55**	**1,254**	

"-" indicates that no specific employment information is available.
Underlined subsidies were provided as grants. Subsidies with a darker background were provided as loans.
The format of the other subsidies is unknown.

CAW : GM, Ford, Chrysler, International Truck and Engine Corporation, Nemak and AGS Automotive/Tiercon
Non-Union : Toyota, Linamar, Honda, Valiant, Denso Manufacturing

Table 2: Comparison of CAW Wages and Costs

Hourly Wages

	Wages per hour
Base wage for CAW Assemblers	$32.55
Base wage for CAW Production Technicians	$32.84
2007 Canadian Motor Vehicle Manufacturing average	$30.77
2007 Canadian Motor Vehicle Parts Manufacturing average	$23.95
2007 Canadian Manufacturing average	$20.83

CAW figures come directly from the GM, Ford and Chrysler Collective Bargaining Agreements (CBA) with the CAW, for the final contract year from September 17, 2007, until September 2008. These are the base wages. CBAs can be obtained through Human Resources and Social Development Canada's website. The Canadian wage data was obtained from Statistics Canada's CANSIM table 281-0030, series V1809131, V1809789, V1809189.

All-in Costs : total cost for one hour of labour, which includes wages, benefits, pensions and other costs.

	All-in cost ($Can)/hour
CAW operated shops (prior to 2008 CBA)*	$77.75
Canadian non-CAW shops (Toyota and Honda)	Below $50
UAW operated shops	$50 to $55
U.S. non-UAW shops (e.g., Toyota, Honda and Nissan plants)	$47.50

*Following the 2008 CBA, all industry experts believe the all-in cost has remained relatively level with no significant reduction to the all-in cost. Buzz Hargrove has acknowledged that the 2008 agreements will keep the costs level (Keenan 2008b).

The all-in costs above have been reported by various sources, such as Keenan (2008a and 2008b), DesRosiers (2008) and Gray (2008).

Table 3: Scenario #2 Results

(Present Values using a real discount rate of 3.5%)

	Total Benefit	Total Cost	Net Benefit
Ford Centennial Project	$658 million	$605.89 million	$52.11 million
Ford Essex Engine Plant	$55.93 million	$51 million	$4.93 million

Employee Hourly Wage Reductions

	Required reduction in hourly wage
Ford Centennial Project	$0.86
Ford Essex Engine Plant	$0.95

Table 4: Ford Centennial Project

Economic Impact of Lost Production

	W&S	GDP	Employment
Ontario	1.011	2.284	21,952
Canada	1.141	2.578	25,696

W&S: wages and salaries

W&S and GDP figures are measured in billion $C (2004).

Employment is measured as full-time equivalent jobs.

Table 5: Ford Essex Engine Plant

Economic Impact of Lost Production

	W&S	GDP	Employment
Ontario	77.77	175.72	1,689
Canada	87.78	198.34	1,977

W&S: wages and salaries

W&S and GDP figures are measured in million $C (2004).

Employment is measured as full-time equivalent jobs.

Table 6: Scenario #3 Results

(Present Values using a real discount rate of 3.5%)

	Total Benefit	Total Cost	Net Benefit
Ford Centennial Project	$658 million	$2,056 million	- $1,398 million
Ford Essex Engine Plant	$55.93 million	$160.91 million	- $104.98 million

Present value losses in Economic Activity (GDP)

	Net present value in lost GDP
Ford Centennial Project	$1.65 billion
Ford Essex Engine Plant	$126.91 million

Table 7: Sensitivity Analysis for Scenario #2

METB of sales taxes on business inputs = 1.70

	Total Benefit	Total Cost	Net Benefit
Ford Centennial Project	$740 million	$607.77 million	$132.23 million
Ford Essex Engine Plant	$62.9 million	$51 million	$11.9 million

METB of sales taxes on business inputs = 1.03

	Total Benefit	Total Cost	Net Benefit
Ford Centennial Project	$606 million	$604.71 million	$1.29 million
Ford Essex Engine Plant	$51.51 million	$51 million	$0.51 million

Table 8: Sensitivity Analysis for Scenario #3

METB of sales taxes on business inputs = 1.70

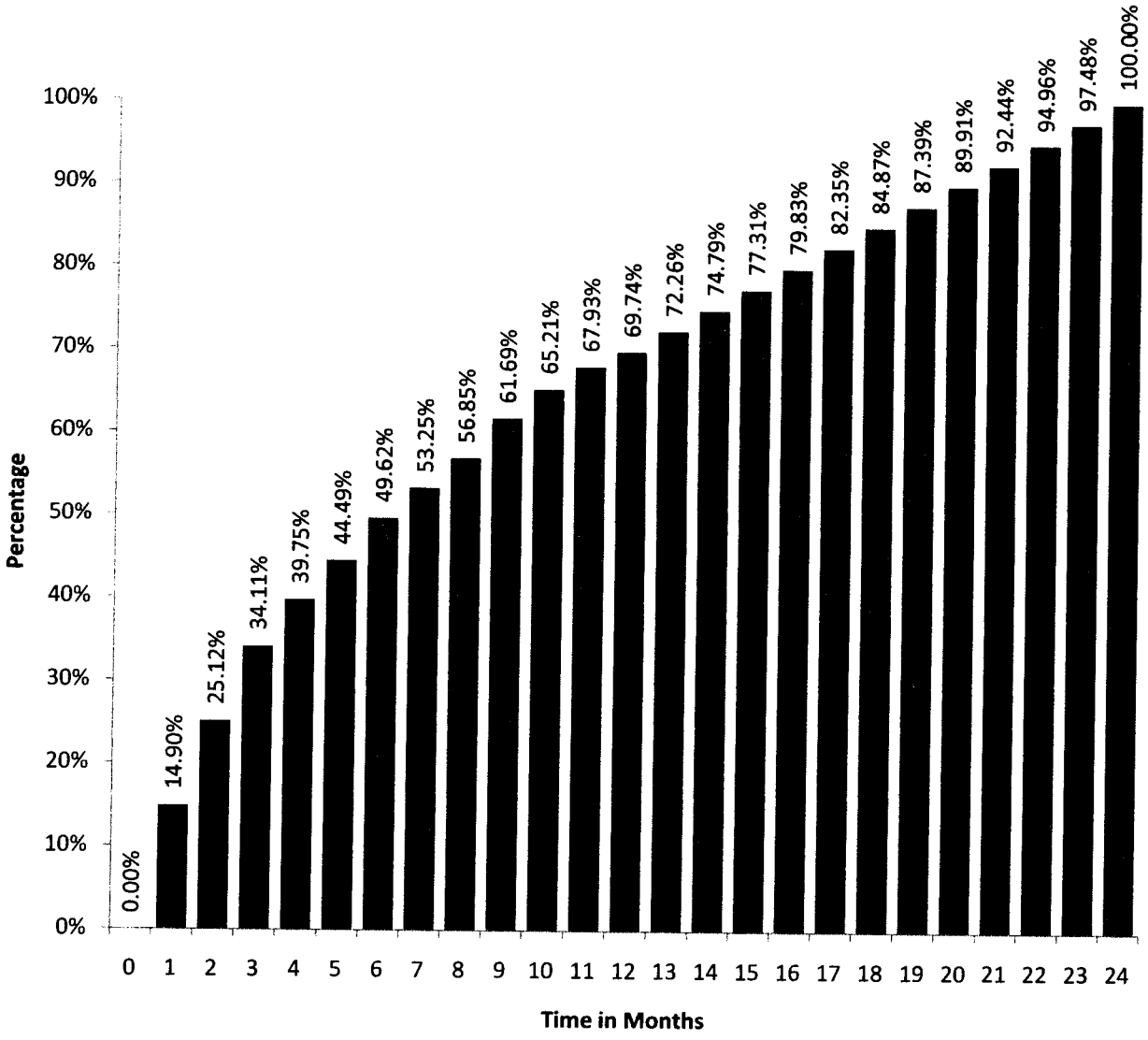
	Total Benefit	Total Cost	Net Benefit
Ford Centennial Project	$740 million	$2,058 million	- $1,318 million
Ford Essex Engine Plant	$62.9 million	$160.91 million	- $98.01 million

METB of sales taxes on business inputs = 1.03

	Total Benefit	Total Cost	Net Benefit
Ford Centennial Project	$606 million	$2,055 million	- $1,449 million
Ford Essex Engine Plant	$51.51 million	$160.91 million	- $109.4 million

Figure 1

Cumulative Re-employment Distribution for Canada



Source: Abe et al. (2002) for 0-12 months; author's calculations for 12-24 months. Values are presented as a weighted average of male and female values, using the national sex ratio for 2004 (CANSIM V2461329 and V2461539).