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The Economics of Subsidies in Ontario's Automotive Industry

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Abstract

We compare the choice between granting subsidies to the automotive industry and using the funds instead to implement a permanent reduction in the sales tax on capital goods, one of Ontario's most distortionary taxes. Our results depend critically upon how workers respond to the withdrawal of subsidies. Either workers agree to reduce their wages to offset the lost subsidies or they refuse to adjust. Our cost-benefit analysis shows the best outcome for the economy is to eliminate the subsidies, have workers adjust, and reduce the deadweight loss of taxation. The second-best outcome is to subsidize, maintain high wage levels in the industry, but forgo the benefits of tax reform. The worst outcome would be to withdraw subsidies, have workers refuse to adjust, and then experience lost employment and production. In contrast, the best outcome for the affected workers is to maintain high wages through subsidies. Therefore workers have an incentive to act strategically, by refusing to adjust their wages. For this reason, the government's openness to subsidies likely contributes to an environment in which subsidies become inevitable.

Keywords: subsidies, Ontario, automotive sector
JEL: H2

Résumé

Nous comparons le choix entre fournir des subventions à l'industrie d'automobile avec la possibilité d'utiliser les fonds afin de mettre en œuvre une réduction permanente de la taxe de vente sur les biens de capitaux, l'une des taxes de l'Ontario qui causent le plus de distortions économiques. Nos résultats dépendent fortement sur la façon dont les travailleurs répondent au retrait des subventions. Notre analyse coûts-bénéfices démontre que le meilleur résultat pour l'économie est d'éliminer les subventions, avoir des travailleurs qui s'adaptent, et de réduire la perte sèche reliée à la taxation. Le résultat de second rang est de subventionner et de maintenir des niveaux de salaires élevés dans l'industrie mais de renoncer aux avantages de la réforme fiscale. La pire situation serait de retirer les subventions, avoir des travailleurs qui refusent de s'adapter et d'éprouver une perte d'emploi et de production. Contrairement, le meilleur résultat pour les travailleurs est de maintenir des salaires élevés par le biais de subventions. Les travailleurs sont alors incités à agir de manière stratégique, en refusant d'ajuster les salaires. Pour cette raison, l'ouverture du gouvernement aux subventions semble contribuer à un environnement dans lequel les subventions deviennent inévitables.

Mots clés*:* subventions, Ontario, l'industrie de l'automobile
JEL: H2

Introduction

A variety of factors have contributed to give Ontario a competitive advantage in automotive production in recent decades. Within Canada, the province has enjoyed the advantage of a large population and a diversified manufacturing base, with capacity in steel making and other supplier industries. Within North America, Ontario has enjoyed the advantages of (i) favourable trade rules (e.g. the Auto Pact, NAFTA), (ii) publicly provided health care, (iii) a relatively well educated work force, (iv) a favourable exchange rate (until recently), and (v) geographical proximity to the original centre of the US auto industry in the upper Midwest.

Notwithstanding these advantages, since the early 1990's Ontario and other centres of the North American auto industry have struggled against a new trend, as investments by offshore nameplates have favoured the US south. Hill and Brahmst (2003) attribute this development to three main factors: (i) a shift in population (i.e. customers) in the US market away from the northeast toward the south and southwest; (ii) a shift in market share away from the original northern producers (GM, Ford and Chrysler); and (iii) the competitive attraction of lower labour costs in the southern states, most of which prohibit closed union shops under "right-to-work" legislation (e.g. Alabama, Tennessee, Texas).[1]

In contrast, Hill and Brahmst (2003) ascribe a more modest role to financial incentives or subsidies offered by state and local governments for the location of new production facilities. They argue that such incentives, including tax rebates, infrastructure spending, labour training, grants, or interest-free loans, typically only play a role at the final stage of site selection, when two or three locations are being compared, usually within the same region.

Nonetheless, the popular perception remains that financial packages offered by governments are decisive in luring automotive investments to a particular region. An early example of such incentives occurred in 1993, when Alabama offered Mercedes-Benz $253 million (US) worth of incentives to locate an assembly plant in the state (Murphy 1999). More recently, the state of Tennessee agreed to offer Volkswagen a package valued at more than $500 million (US) (Keenan 2008d). Hill and Brahmst (2003) report that, over the 10 years 1993-2003, southern localities offered an average of $143 million (US) in incentives per facility (10 new

[1] In right-to-work states, employees cannot be compelled to join a union or pay union dues as a condition of employment.

facilities, 11 expansions), while northern localities (excluding Ontario) offered an average of $84 million per facility (8 new, 26 expansions).

In Canada, concern for the competitiveness of the domestic automotive industry made it to the front pages with the announcement of closures of three assembly plants in 2002-2003, one each by Daimler Chrysler, Ford and GM (Keenan 2003b). In response, the Canadian Automotive Partnership Council (CAPC) was formed in 2002, bringing together corporate, labour and government representatives in an effort to improve the industry's prospects.

At the same time, Industry Canada commissioned a study by the consultants KPMG comparing the cost competitiveness of two Canadian locations – Montreal and Waterloo – with six American locations for the siting of a hypothetical new assembly plant (KPMG 2003). Taking labour, taxation and other costs as given, this study concluded that the Canadian locations ranked first and second respectively (out of eight) in terms of cost competitiveness in the absence of subsidies. However, once the typical package of subsidies was factored in, the Canadian locations fell to second (Montreal) and sixth place (Waterloo).

During this period, the Conservative government of Ontario maintained a policy of not giving direct subsidies to companies. In contrast, the opposition Liberals, campaigning in the 2003 election, promised to provide funding to industries for a variety of needs, including skills training, research and development, and infrastructure.

Also in 2003, Ford identified its Oakville Assembly Plant as a potential candidate for a $1 billion conversion into a flexible manufacturing facility but it insisted that subsidies would be required for the Canadian site to be chosen. An aggressive program of lobbying took place by Ford, the Canadian Auto Workers (CAW), and related suppliers during the fall and winter of 2003/2004 (Keenan 2003a,b,c, Keenan and Tuck 2004). Even the usually anti-subsidy *Globe and Mail* declared itself in favour of a government assistance package for Ford (editorial 10/14/2003).

In April of 2004, the new Liberal government announced the Ontario Automotive Investment Strategy, a $500 million fund to attract new investments to the province's automotive sector. Ford's Oakville plant was subsequently chosen, in October 2004, as the lead project for the fund. Other assistance programs for industry followed subsequently. A number of the subsidies under OAIS were matched by the federal Liberal government under Paul Martin. In contrast, Stephen Harper's Conservatives have been much less receptive to industrial subsidies, although they did agree to provide some assistance in the 2008 election.

Most economists advocate a role for subsidies in particular circumstances when free markets are believed to be structurally incapable of functioning efficiently or equitably. For example, it is generally accepted that, left to their own devices, private companies will underinvest in scientific research and development, either due to risk aversion or spill-over of benefits to other firms. Similarly, it is generally accepted that free markets will not allocate education or health care in an efficient or equitable manner.

Nonetheless, in general, economists tend to be circumspect in recommending subsidies. If a subsidy is to be granted to a particular firm or sector, economists worry that the government cannot possibly know in advance which firm or sector will be able to make the best use of taxpayers' money. This argument is commonly referred to as the problem of picking winners, but it could just as well be referred to as the danger of picking losers. In effect, by granting a financial advantage to a particular firm or sector, the government is placing itself in the role of venture capitalist with taxpayers' money, with all the attendant risks of making bad bets. For this reason, economists usually argue that a broadly based subsidy, with eligibility for as many firms as possible, is preferable to a narrowly based one. In the limit, the most broadly based "subsidy" can be achieved by an across-the-board cut in the rate of business taxation.

Economists are particularly leery of subsidies in the form of direct payments, for such payments must ultimately be financed through taxation. Beyond the obvious burden to the taxpayer's pocket book, taxation also entails in most cases an additional burden in terms of foregone investment or production in the economy. This second burden – referred to as deadweight loss – results from the disincentive effect of taxation on the very things that drive the economy – personal work effort, business investment, household consumption and savings.

Baylor and Beauséjour (2004) provide estimates of the size of the deadweight loss of taxation in Canada. Their results are summarized in Table 1. For each tax, the table shows the estimated dollar value of lost economic benefits corresponding with a dollar increase in the tax, over and above the dollar which is actually transferred from taxpayers to the government. Thus, for example, the first line shows that $1.30 of benefits fail to materialize in the economy for every $1 in tax that is collected from personal investment income. As shown, the effects range from relatively small ($0.13) to very large ($1.30), depending upon the type of tax.

The comparison between the sales tax on capital goods ($1.29, second line) and consumption taxes ($0.13, last line) is particularly important in the Canadian context. Economists

distinguish between a retail sales tax (RST), which is imposed on all purchases of a good, whether by firms or consumers, and a value added tax (VAT), which is only imposed on consumers. The imposition of a tax (RST or VAT) on consumers leads to a relatively modest deadweight loss according to Baylor and Beauséjour ($0.13). In contrast, the imposition of the RST on firms for the purchase of capital goods leads to a large deadweight loss ($1.29).

This result is not particularly surprising, since the RST adds to a firm's cost of doing business. For example, an 8 % sales tax on new equipment increases the cost of investment by 8 %. In many cases, this amount is enough to make an investment unprofitable, in which case the firm does not carry through. The sum total of lost investment in the economy, as a result, feeds through to lower employment, lower production and lower incomes. In contrast, the tax on consumers does not have as large an effect, as individuals do not adjust their work effort much in response to consumption taxes.

Canadians today face a mix of retail sales taxes and value-added taxes depending upon where they live. The federal GST, the HST (Harmonized Sales Tax) in Newfoundland and Labrador, Nova Scotia and New Brunswick, and the TVA in Quebec are all value-added taxes. In contrast, the provincial sales taxes in Ontario (8 %), Manitoba (7 %), Saskatchewan (5 %), British Columbia (7 %), and Prince Edward Island (10 %) are all retail sales taxes which fall on both firms and consumers.[2] It follows that these last five provinces experience the high deadweight loss associated with RST on capital goods ($1.29) and other non-capital business inputs.[3,4]

For this reason, economists have encouraged these five provinces to switch from retail sales taxes to value-added taxes on consumption (Mintz and Smart 2003, Smart 2007, Dungan et al. 2008). But replacing the RST in Ontario with a valued-added tax – either harmonized with the

[2] Some of these RST's are not pure types. For example, Ontario offers sales tax rebates to selected sectors and certain types of purchases – e.g. production equipment and some processing materials for manufacturing (see Ontario (2001) for details). Nonetheless, Smart (2007) indicates that "more than 40 percent of RST revenues in Ontario are estimated to come from taxes on business inputs" (p.1), and in particular that the average sales tax rate on machinery and equipment in Ontario (i.e. after rebates) is 4.4 percent (p.5).

[3] Baylor and Beauséjour (2004) model sales taxes on capital goods and intermediate goods separately. However, they only report the marginal deadweight loss for the tax on capital goods. Ideally, we would like to know the values of both, since both affect the profitability of business operations and investment. Unfortunately, we are not aware of any estimates of the marginal deadweight loss on intermediate goods. Therefore, we focus on the tax on capital goods.

[4] According to Table 1, the highest deadweight loss is associated with taxation of personal investment income ($1.30). However, much investment income is sheltered from taxation in various savings programs, including

federal GST or separate – would likely amount to a large tax cut. For example, Dachis (2008) estimates that harmonizing with the GST at the existing RST rate of 8 % would result in a $249 million loss to the provincial treasury over the next three years (2009-2011).[5]

Obviously, cutting taxes would leave less revenue to spend on subsidies for industry, including the automotive sector. In Ontario, this trade-off between cutting taxes and subsidizing industry has fed into an ideological debate – perhaps it would be more accurate to call it a partisan feud – between the Liberal premier and the Conservative federal finance minister about the appropriate role for government in the economy (Howlett and Blackwell 2008). However, there has been very little in the way of serious analysis of the relative merits of these approaches in the present context. Stanford (2006) assesses auto subsidies in terms of the government's tax take; i.e. the return in increased tax revenues for each dollar of subsidy. However, he neglects the opportunity cost of the subsidies – i.e. what else could the money be used for? – and he overlooks benefits and costs other than tax revenues.

The current paper is intended to fill this gap. We conduct a cost-benefit analysis in which we compare the existing policy – i.e. Ontario and the federal government subsidize the automotive industry while maintaining the current provincial sales tax system – with hypothetical scenarios in which the industry is not subsidized. In one of these scenarios, Ontario's sales tax on capital goods is reduced by an amount equal to the withheld subsidy.

Of course, in the past several years the North American auto industry has been shaken by a trio of overlapping crises: first, soaring fuel prices; second, the collapse of the US housing market; and third, the worldwide financial crisis which has dried up consumer credit. Figure 1 shows monthly employment in the Canadian automotive sector (parts and assembly) since 2005. As shown, the sector shed roughly 29,000 jobs (19 %) between June 2005 and August 2008, and more cuts have been announced.[6]

Due to the crisis, some companies may not be able to fulfill the terms of their subsidy contracts, and thus our analysis may seem somewhat moot. Indeed, the optics have turned out rather badly, as companies which have received subsidies are now shedding thousands of jobs

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RRSP's and RESP's. In addition, the new federal Tax Free Savings Account, announced in the 2008 budget, will provide an additional shelter for investment income.

[5] Manitoba, Sasksatchewan, and PEI would also face revenues losses, according to Dachis (2008), but not British Columbia.

[6] The CAW estimates additional cuts of approximately 10,000 jobs have been announced but not yet implemented (personal communication with Jim Stanford, CAW economist, November 2, 2008).

(DeCloet 2008). A skeptic would argue that Ontario is experiencing yet another failed exercise in picking winners. On the other hand, the government could argue that the losses would have been even worse without the subsidies. In any case, we have chosen to assess the subsidy policy in the environment prior to the recent struggles. We seek to determine whether subsidizing the automotive industry represented good policy at the time the decisions were made.

Our best-case hypothetical scenario involves the federal government transferring its subsidy funds to the Ontario government to help finance the tax reform. Such transfers have a clear precedent. In 1997, New Brunswick, Nova Scotia, and Newfoundland and Labrador faced significant losses of revenue when they harmonized their sales taxes with the GST. At that time, the federal government offered partial compensation for losses over four years, as an inducement to the provinces to harmonize. Applying the same formula today, Dachis (2008) estimates that Ontario would receive $248 million in compensation from the federal government if it were to replace its RST with the HST. Thus, we argue it is reasonable to compare scenarios in which the federal government transfers funds to Ontario to help finance tax reform rather than subsidize specific industries in the province.

The results of our cost-benefit analysis will depend critically upon how automotive workers respond to the loss of subsidies. We consider two possibilities: workers either agree to adjust their wages downward to offset the lost subsidies or they refuse to adjust. We find that, if workers are willing to adjust, then tax reform leads to a better social outcome than subsidizing the automotive industry. The key to this outcome is the insight that in Ontario the subsidies are used primarily to maintain a high level of wages and benefits for workers. If workers adjust when subsidies are withdrawn, they lose income, but this loss is less than the gain of eliminating the deadweight loss associated with the sales tax on capital goods. Moreover, the loss of income is consistent with the principle of vertical equity, as the affected workers are among the highest-paid industrial workers in Canada.

In contrast, if workers are not willing to adjust, then investments are relocated to another jurisdiction, with consequent loss of employment and production. These losses stimulate multiplier effects in the economy, with the result that the government's budget balance deteriorates and it can no longer afford the tax cut. In this case, it is better to subsidize the auto sector.

Overall, the best outcome for the economy is to eliminate the subsidies, have workers adjust, and reduce the deadweight loss of taxation. The second-best outcome is to subsidize, maintain high wage levels in the industry, but forgo the benefits of tax reform. The worst outcome would be to withdraw subsidies, have workers refuse to adjust, and then experience lost employment and production.

For the workers, the ranking of scenarios is different. For them, the best outcome is to maintain high wages through subsidies. Their second-best outcome is to have subsidies withdrawn and agree to adjust their wages downward. Finally, their worst outcome would be to have subsidies withdrawn, refuse to reduce wages, and then experience unemployment.

The different ranking for workers and government creates an incentive for workers to act strategically, resisting demands for concessions in wages and benefits in order to pressure the government into granting subsidies. Similarly, firms have an incentive to threaten layoffs in order to obtain subsidies. Thus, the government's openness to subsidies likely contributes to an environment in which subsidies become inevitable. We argue, therefore, that the best strategy for governments would be to take a strong stand against preferential industrial subsidies (as opposed to subsidies for market failure) and stick to it.

The next section provides an overview of the subsidies granted by the Ontario and federal governments to the automotive industry since 2004. The following three sections present our cost-benefit analysis. The last two sections provide a sensitivity analysis of our results and an assessment of our scenarios in terms of equity and efficiency.

Subsidies to the Canadian Automotive Industry

In April 2004, the provincial government announced the Ontario Automotive Investment Strategy (OAIS), a $500 million fund to attract new investments in the province's automotive sector. Table 2 provides details of the 10 agreements which were eventually reached under the aegis of this fund. In December 2005, the Ontario government announced a second $500 million fund, dubbed the Advanced Manufacturing Investment Strategy (AMIS), focusing on technological innovation in the manufacturing sector, including the automotive sector. The Ontario government has also provided a limited number of subsidies on an ad hoc basis, including one each with Toyota and Honda (items 13 and 14 in Table 2). The federal government has also provided a number of subsidies to the auto sector, which are also listed in Table 2.

Public information on the terms of the subsidies is extremely limited, which the Ontario government claims is due to the commercially sensitive nature of the arrangements.[7] Under OAIS, the agreements can take the form of either a grant or a loan, with duration varying from one agreement to the next. In contrast, assistance under AMIS takes the form of interest-free loans for up to five years. Where the terms of the agreement have not been fulfilled, a grant is to be paid back, or the repayment accelerated in the case of a loan.[8]

Table 2 compiles all of the information we have found concerning individual subsidy agreements in the automotive sector since 2004. The information was obtained from press releases, newspaper articles, media contacts, the Ontario Automotive Strategy Branch, and the federal Department of Industry. In addition to the subsidies, the table also includes the total value of each investment, and the number of jobs involved. Agreements are listed in descending order of the size of the provincial subsidy.

The level of detail regarding employment varies. Certain projects were described in the press releases as maintaining or creating "hundreds" of positions. Obviously, these sorts of claims are too imprecise for meaningful analysis, and therefore they have been excluded from Table 2.

The largest subsidy recipient has been General Motors of Canada, for its Beacon Project, which received $235 million from the Ontario government and $200 million from the federal government (item 1 in Table 2). Originally, both components took the form of loans (Howlett 2008). Ontario's loan was interest-free and was to be re-paid in 2053. The terms of the federal loan were not made public at the time of the initial announcement.

Most of the employment impact of this agreement takes the form of a commitment to maintain 16,000 jobs province-wide over a nine-year timeframe. Unfortunately, this information is too vague for the purpose of cost-benefit analysis. Many media commentators (e.g. DeCloet 2008) have criticized the lack of public information about this agreement, given the size of the subsidies. Major layoffs by GM in June 2008 threatened to take the company's total employment below this level, which led some observers to speculate that the company would be required to repay the loans on an accelerated schedule (Howlett 2008). However, the federal government

[7] Personal communication with the director of Ontario's Automotive Strategy Branch.
[8] Personal communication, Automotive Strategy Branch.

responded in September 2008 by converting the loan into a grant, in return for additional commitments totalling $290 million from the company (Chase and Keenan 2008).

The second largest agreement involved $200 million to Ford for its "Centennial Project", which involves the transformation of its Oakville Assembly Complex into a flexible assembly plant (item 2 in Table 2). Half of this assistance was provided by Ontario, the other half by the federal government. While the press releases were not entirely clear, we have determined that Ontario's assistance takes the form of a grant, as indicated in the Public Accounts.[9] The federal assistance takes the form of a loan, although the terms of the loan have not been made public. For the purpose of our analysis, we assume that the terms of the federal loan are the same as the provincial loan to GM for the Beacon Project: namely a zero-interest loan with repayment in 48 years. According to the federal press release (Industry Canada 2004), this initiative "will maintain some 3900 direct jobs as well as thousands of other jobs in the area that depend on the Ford assembly plant." Thus, for the purpose of the cost-benefit analysis we assume that 3,900 direct jobs are at stake, with the attendant multiplier effects on related firms.

The other agreement which we will subject to cost-benefit analysis involves a $17 million grant to Ford, to partially re-open its Essex Engine Plant in Windsor (item 6 in Table 2). The plant was closed on November 23rd, 2007, resulting in the layoff of 457 hourly and 71 salaried employees (Vander Deolen 2007). By the following January, Ford was lobbying the Ontario and federal governments for assistance in reopening the plant. At that time, Ford proposed a $300 million investment, with $60 million in combined provincial and federal subsidies. According to media reports (e.g. Chase et al. 2008), Ford threatened to build the new engines in another jurisdiction if government subsidies were not provided. Four months after the plant's closing, Ontario agreed to provide $17 million in return for a $168 million investment to reopen the plant with 300 workers. Personal communication with the director of the ASB has confirmed that the subsidy was provided as a "conditional grant" through OAIS.

The federal government did not participate in this agreement for the Essex Engine Plant. However, in September 2008, the federal government announced a separate agreement, involving a $65.5 million zero-interest loan for the purpose of converting the plant into a flexible assembly facility and opening an R&D centre (item 15, Table 2). For the purpose of our cost-

[9] See Ontario Public Accounts, Volume 3, Detailed Schedules of Payments, 2005-2006 and 2006-2007. Available on-line at <http://www.fin.gov.on.ca/english/budget/paccts/2007/>.

benefit analysis, we focus on the provincial agreement only, as the economic case for it was made independent of the federal funding, which came later.

Two Projects and Two Scenarios

We undertake cost-benefit analyses of two subsidy agreements: Ford's Centennial Project (item 2 in Table 2) and Ford's Essex Engine Plant (item 6 in Table 2). These projects differ in terms of scale and therefore in terms of their economic impact. In addition, Centennial involves a grant and a zero-interest loan, while Essex involves only a grant. Grants and zero-interest loans are treated in a similar fashion, with the exception that there will be an additional benefit element for repayment in the case of the loan.

In the status quo, Ontario and the federal government subsidize investments by automotive companies. We compare this status quo with two hypothetical scenarios in which neither government provides subsidies. In the first scenario, Ottawa transfers an equal amount of money directly to the Ontario government, which then uses the combined funds to pay down provincial debt. This reduction in debt results in reduced interest payments, which are then used to finance permanent cuts to Ontario's sales tax on capital goods. As argued in the introduction, the transfer of funds from Ottawa to Queens Park follows the precedent of compensation paid to the Atlantic provinces when they adopted the HST in 1997. Transferring money to Ontario to reduce the RST on capital goods also represents a better use of funds than reducing federal income taxes, since, as shown in Table 1, the marginal deadweight loss is significantly less for personal and corporate income taxes than for the tax on capital goods.

The hypothetical scenarios differ in terms of the response of auto workers to the withdrawal of subsidies. We assume 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, with subsidies withdrawn, workers come under increased pressure to make concessions in wages and benefits. In scenario #1, we assume workers agree to wage reductions equivalent to the withdrawn subsidies. As a result, the investments go ahead. In contrast, in scenario #2, we assume that workers refuse to make concessions. As a result, the investments are made elsewhere (outside Canada), and the workers experience a transitional period of unemployment.

Scenario #1: Workers Adjust

The possibility that workers would reduce their wages in response to competitive pressure has its precedent in the recent experience of the United Auto Workers (UAW) in the U.S. In their 2007 contract negotiations, the 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 for the companies (i.e. wages + benefits + payroll taxes) by $20 to $25, netting new hourly all-in costs of approximately $50 to $55 (Keenan 2008b and DesRosiers 2008).

Since there are no subsidies in this scenario, the workers must provide the investment incentive to the companies in the form of reduced wages (or some combination of wages and benefits). In the case of the Centennial Project (Table 2, line 2), the 3,900 affected employees must reduce their wages to yield the equivalent, in present value terms, of a $200 million lump-sum payment by the government. Dividing $200 million by 3,900 employees, we obtain a value of $51,282 per employee. Translating this present value into an annual basis is done using the relation

$$present\ value = \frac{\Delta w}{r} \qquad (1)$$

where Δw represents the required change in annual income (wages) and r is the real social discount rate. Following Boardman et al. (2008), we use a value for r of 3.5%. Substituting into (1) yields a value for Δw of $1,795 per year (2004 dollars), or approximately 86 cents per hour (assuming 40 hours per week, 52 weeks per year).

In other words, if each affected worker had given up 86 cents per hour, Ford would have received the support it needed to convert its Oakville Assembly Plant into a flexible manufacturing facility without government assistance. This concession represents a 2.6 % reduction in the base wage for the unionized (CAW) workers at Ford. While not insignificant, it would still leave these employees well above the wage level earned by non-unionized assembly workers in Ontario (i.e. Toyota, Honda) and far above the wages earned by the Canadian manufacturing average (see Table 3 and below for more discussion).

In fact, the $200 million (present value) concession by workers can be broken down into $168.5 million in reduced net wages (disposable income), plus $31.5 million in reduced direct tax receipts for government. This breakdown is based on the 2004 Ontario direct tax payments

as a proportion of personal income (15.74%), obtained from Statistics Canada (CANSIM table 384-0012.) Thus, in net value terms, workers contribute $168.5 million to the firm, while government contributes $31.5 million in the form of reduced tax receipts.

In this scenario, the Government of Ontario uses the net value of $168.5 million (provincial plus federal funds) to pay down debt and then finance permanent cuts to the sales tax on capital goods out of the interest savings. The present value of the tax cut is just equal to the lump-sum $168.5 million, assuming the government's borrowing rate is the same as the social discount rate, *r*. Using Baylor and Beaséjour's (2004) estimate of the marginal deadweight loss of 1.29 (Table 1, line 2), we calculate a total reduction in deadweight loss of $217.4 million ($168.5 million × 1.29). In gross, we can summarize the benefits of the policy as follows: (i) $168.5 million received by bondholders, (ii) $168.5 million (present value) in reduced taxes, and (iii) $217.4 million (present value) of reduced economic distortion.

The total cost of the policy consists of three components. Two of these components have already been covered: (iv) $168.5 million (present value) in reduced net wages for auto workers, and (v) $168.5 million (present value) in reductions for interest recipients (bondholders).

The third cost component reflects the fact that the federal government does not receive a $100 million payment from Ford in 2052, which it 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 capital goods). As before, the net effect of such a tax cut would be given by the principal multiplied by the marginal deadweight loss, or $129 million. Since this value would accrue in 2052, it would need to be discounted to yield the present value. Such a calculation would require a nominal discount rate, rather than the real value of 3.5 % which we used earlier, since the $100 million repayment would not be adjusted for inflation. We use a nominal discount rate of 6.64 %, which results in a present value of $5.9 million in 2004, when the Ford Centennial Project was announced.[10] By refusing to grant a loan in the present scenario, the government forgoes this benefit.

[10] 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). This method is consistent with the one used by Boardman et al. (2006, p. 252) for U.S. data. It is also consistent with the real estimate of 3.5 % reported for Canada in Boardman et al. (2008).

The net benefit of not providing the subsidy to Ford for the Centennial Project is thus $211.5 million ($168.5 million + $168.5 million + $217.4 million - $168.5 million - $168.5 million - $5.9 million). This result is summarized in Table 4. Note that items (i) and (iv), and items (ii) and (v) are just transfers which cancel out in the cost-benefit calculus. We omit the demand (multiplier) effects of lower wages for automotive workers since these are offset by the demand effects from bondholders, who receive the same sum that workers forego in net wages. Comparing this result with the status quo indicates that society as a whole would be $211.5 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.

The analysis of the Essex Engine Plant proceeds in the same manner, except that there is only a provincial subsidy and no repayment. The 300 affected workers must reduce their wages to yield the equivalent, in present value terms, of a $17 million subsidy; in other words $56,667 per worker. Converting this sum using equation (1), we obtain an annual wage reduction of $1,983 per worker, equivalent to 95 cents per hour. This amount ($17 million) can be broken down into $14.3 million in reduced net wages (disposable income) for workers, plus $2.7 million in reduced direct tax receipts for government. Once again, the government uses its net savings (federal + provincial) for the purposes of debt repayment, which finances a permanent tax cut. The resulting reduction in economic distortion is $18.4 million (14.3 million $\times$ 1.29).

The components of total benefit in this case are: (i) $14.3 million received by bondholders, (ii) $14.3 million (present value) in reduced taxes, and (iii) $18.4 million (present value) of reduced economic distortion. The components of total cost are: (iv) $14.3 million (present value) in reduced net wages for auto workers, and (v) $14.3 million (present value) in reductions for interest recipients (bondholders). The net benefit of not providing the subsidy to Ford is therefore $18.4 million ($14.3 million + $14.3 million + $18.4 million - $14.3 million - $14.3 million). This result is summarized in Table 4.

Scenario #2: Workers Do Not Adjust

In this scenario, governments do not subsidize firms, and workers refuse to adjust their wages and benefits downward to compensate. As a result, (i) the investment and associated jobs are relocated from Ontario to another jurisdiction in either the U.S. or elsewhere, (ii) the affected

workers experience a transitional period of unemployment and lost income, and (iii) the loss of income and production have multiplier effects on the entire Canadian economy. The refusal of the automotive workers to make wage concessions in this scenario is consistent with the CAW's position in recent years (Gray 2008).

In order to evaluate the multiplier effects of this scenario, 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.[11] 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[12]. A large proportion of company profits accrue to non-Ontario owners, with a correspondingly low multiplier effect on Ontario GDP.[13] Furthermore, the lost automotive investment in fact represents a relocation from Ontario to some

[11] Upstream impacts refers to the lost production, employment and incomes of supplier industries.
[12] In a closed-economy model, a change in the government's surplus leads to a change in saving and investment and therefore a change in GDP. However, this effect is less significant in a small, open economy such as Canada, which has access to global financial markets.
[13] The effect of retained earnings on business investment has already been accounted for as an upstream impact in the simulation.

other jurisdiction. Thus, the profits will still flow to shareholders – only the source location has changed. Finally, changes in non-wage benefits 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.[14] 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. 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.[15] Table 5 contains 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 5(a)). For the most part, the negative economic impacts from the project not going forward were mostly felt by Ontario, followed by Quebec 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 5(a)). Since the cost-benefit analysis deals with the Government of Ontario's investment policies, the present value of

[14] 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.

[15] The scaling factor is equal to the ratio of the second-round change in consumer expenditure to the first-round change in consumer expenditure. 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.

lost GDP (or economic activity) in Ontario will be taken as the measure of the cost of the transitional period of unemployment.[16]

However, it is important to recognize that the losses listed above are not permanent, since it would be erroneous to assume that all individuals who lost employment would remain forever unemployed and never contribute to society. To address this issue, we use 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, based on data covering the period 1993-95. At one year, 74.8 % of men and 64.0 % of women have been re-employed, according to their data. We combine these two values into an average of 69.7 %, based on 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 2 presents the re-employment distribution.

We use the re-employment distribution in Figure 2 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 3), 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 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 $5.9 million in Scenario #1.

[16] 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.

In Scenario #1, we calculated that the two levels of government lost $31.5 million in direct tax receipts when workers reduced their wages by $200 million, leaving a net savings of $168.5 million to devote to the tax reform. In the present scenario, lost wages and salaries are much higher, due to the transitional period of unemployment. In the case of the Centennial Project, Table 5 indicates that total lost wages and salaries amount to $1.14 billion per annum for Canada as a whole.[17] Applying the re-employment distribution to this figure in the same manner as above and discounting yields a present value of lost wages and salaries of $824.3 million over the two-year transition period. This figure generates an expected reduction in direct taxes (present value) of $129.7 million based on the 2004 average tax rate for Ontario (15.74 %) (CANSIM table 384-0012). In addition, the loss of GDP corresponds with reductions in indirect taxes (e.g. sales taxes). Based on the share of indirect taxes in 2004 GDP (6.7 %, Statistics Canada input-output tables), we estimate a loss of indirect tax receipts of approximately $110.6 million ($0.067 \times \$1.65$ billion).[18] The total loss of tax revenue, therefore, is $240.3 million (present value), which exceeds the $200 million saving from withdrawing the subsidy. It follows that the Ontario government would not be able to implement a tax cut without worsening the budget balance. Therefore, our estimate of the impact consists only of the cost elements associated with the loss of employment and production; i.e. a net loss of $1,655.9 million ($1,650.0 million + $5.9 million). This value is recorded in Table 6.

The analysis of the Essex Engine Plant proceeds in the same fashion. Applying the input-output model, we estimate that Ontario's GDP would fall by $175.7 million per annum, with 1,689 jobs lost in the province as a result of the closure of the plant (Table 5(b)). Using the re-employment distribution (Figure 2), we arrive at a present value of lost GDP of $126.9 million. Table 5 indicates that total lost wages and salaries amount to $87.8 million per annum for Canada. Applying the re-employment distribution yields a present value of lost wages and salaries of $63.4 million over the transition period. The corresponding reduction in direct taxes is $10.0 million (15.74 %), and the reduction in indirect taxes is $8.5 million (6.7 % of lost GDP), for a total reduction in taxes of $18.5 million. Again, this value exceeds the saving from

[17] For lost wages and salaries, we focus on Canada as a whole, rather than Ontario, since we wish to estimate the loss in combined federal and provincial tax receipts.

[18] The share of indirect taxes in Ontario's GDP would be higher than the national average, since the latter includes Alberta, which does not have a provincial sales tax. Thus our estimate is likely too low.

withdrawing the subsidy; therefore the government cannot afford to implement the tax reform. The net loss is therefore $126.9 million, which is recorded in Table 6.

Sensitivity Analysis

We have undertaken a sensitivity analysis of our results for scenario #1 by considering alternate values of the marginal deadweight loss of the sales tax on capital goods. Baylor and Beauséjour (2004) present a range of plausible values for this parameter between 1.70 and 1.03.[19] We use these end-points as high and low cases for our sensitivity analysis, while the earlier result (deadweight loss of 1.29) is referred to as the central case.

Table 7 shows that changing the value of the marginal deadweight loss has the expected effect on the magnitude of net benefit: in particular, higher deadweight loss results in higher net benefit of the tax cut and vice versa. However, the qualitative results do not change, as the sign of net benefit remains positive in all cases.

The robustness of the qualitative result is not surprising, since the main component of net benefit is the reduction in deadweight loss. Most of the other components of cost and benefit are simply transfers which cancel out. In particular, as noted above, the wage reduction for the workers cancels out with the payment to bond holders, while the present value of the tax reduction cancels out with reduced interest receipts for bond holders. Therefore, as long as the deadweight loss of the tax is greater than any remaining costs (e.g. present value of the repayable loan for the Centennial Project), the net benefit of the scenario will be positive.

Equity and efficiency of automotive subsidies

Our previous analysis indicates that, for relatively modest reductions in hourly wages, the affected auto workers could have provided the necessary investment incentives for the two Ford projects under study. In particular, in scenario 1, we calculated a reduction of 86 cents per hour for the Centennial Project and 95 cents per hour for the Essex Engine Plant, which represent reductions of 2.6 % and 2.9 % respectively on the base wage of a CAW assembler ($32.55, Table 3) under the previous collective agreement (expired Sept. 2008). In this light, we view the governments' automotive subsidies as transfers in support of workers' incomes rather than

[19] Baylor and Beauséjour also consider a lower value for the parameter, 0.89. However, as they explain, this value is not consistent with general equilibrium for a small, open economy such as Canada. Therefore, we ignore it.

contributions to building new facilities. Moreover, while some of the subsidies listed in Table 2 have gone to non-union shops, most – 80.5 % of the total value – have gone to CAW shops.[20] We conclude therefore that the subsidy policy has amounted mainly to a transfer to CAW workers.

Economic analysis of tax and transfer policy focuses on equity and efficiency. The principle of vertical equity – i.e. the higher an individual's income, the more he should contribute – is relevant here. According to the data in Table 3, the base wage for a CAW assembler ($32.55) is approximately 56 % above the average manufacturing wage in Canada ($20.83).[21] Therefore, the wage reductions contemplated in scenario 1 are consistent with the principle of vertical equity, as they still leave the affected workers well above the average manufacturing wage level. We are tempted to make the stronger claim that providing subsidies in the status quo also violates the principle of vertical equity. The argument here is that, if we consider an individual earning the average manufacturing wage to be representative of the average taxpayer, then the subsidies represent transfers from lower paid taxpayers, on average, to higher paid auto workers. This would be true if the auto workers were otherwise willing to reduce their wages. In that case, the subsidy policy would be regressive, as it would increase the burden on lower-income individuals for the benefit of higher-income individuals. However, if the auto workers were not willing to reduce their wages, then withdrawing subsidies would stimulate multiplier effects in the broader economy, as discussed, which would also harm lower paid workers. In that case, the argument against the subsidies would not be as clear-cut.

The principle of efficiency requires that workers be paid at least as much as they could earn in their best alternative employment – "opportunity cost" in economist's jargon. We argue that CAW workers earn significantly more than their opportunity cost. The relevant comparison is between CAW shops and non-union shops (i.e. Toyota and Honda) in Canada. We do not have data on non-union base wages. However, media reports and communications with industry participants have enabled us to piece together a rough picture of the "all-in" labour costs, i.e. the total cost for firms including wages, benefits, and payroll taxes. Table 3 indicates that the all-in cost for CAW shops is roughly $67 per hour versus less than $50 for the non-union Canadian

[20] Items 1, 2, 3, 5, 6, 8, 9, and 15 in Table 2 represent CAW shops. The remainder are non-union.
[21] Moreover, the average CAW wage is higher than the base wage, due to premiums for shift work, overtime and seniority.

shops – a difference of roughly 35 %.[22] One could argue that the CAW shops are more productive and therefore the workers earn their extra pay, but we do not find such claims to be credible, especially given the large difference in costs.

In the same vein, we observe a 36 % difference between the hourly base wage of CAW assemblers and the average wage in the Canadian parts sector ($32.55 vs. $23.95, Table 3). Again, we do not find the productivity argument persuasive in explaining this gap. Indeed, in comparing the superior productivity and quality of Canadian assembly plants over American, KPMG (2003) indicate that companies view workers within a broad class as being more or less interchangeable, while the productivity they actually achieve depends more upon the plant and the product than the workers' inherent characteristics. This view supports the interpretation that the auto parts sector may also provide a credible measure of the opportunity cost of auto assembly workers. (Our data on the parts sector pertains to the average wage only, while our data on non-unionized assembly pertains to all-in costs.)

Thus, rather than an inherent productivity advantage, it would appear that CAW workers enjoy a premium which they have accrued to themselves over the years through the enhanced bargaining power of the union. If true, then the modest wage reductions entailed in scenario 1 (less than 3 percent) would still leave the CAW pay scale well above the opportunity cost established by either the non-union assembly shops or the parts sector. It follows that these reductions would not impede economic efficiency. Moreover, even if reducing their wages did take the workers below their opportunity cost, this would still not provide an argument for subsidies, since the total value of economic activity could be increased in that case by moving the workers to the alternative employment.

Conclusion

Our cost-benefit analysis has compared the Ontario and federal governments' existing subsidies for the automotive sector with two alternative scenarios in which the governments do not provide subsidies. In the first alternative, workers reduce their wages to provide an

[22] GM estimates the all-in cost for CAW shops at $78 per hour, and this figure is accepted by the independent analysts as well (e.g. DesRosiers and McAlinden). However, Stanford (2008) argues that this figure includes approximately $10 of "legacy" costs, mostly retiree health benefits, that the companies will have to pay whether they hire new workers are not. Economists refer to such values as "sunk costs." Since they are not related to the hiring of new workers, they should not be considered part of the cost of new workers. Therefore we use Stanford's estimate of $67 for the all-in cost of CAW shops.

equivalent benefit to their companies, and, as a result, the companies go ahead with the proposed investments. For the two projects examined (Centennial and Essex Engine), the wage reductions amounted to less than $1 per hour (86 and 95 cents respectively) on a base wage of $32.55. The Ontario government then uses the net value of the withheld subsidies to pay down debt and finance a permanent cut to its sales tax on capital goods.

In the second alternative, workers refuse to reduce their wages, the investments do not go ahead, and the workers experience a transitional period of unemployment which generates multiplier effects. As a result, the economy sustains significant losses of income and employment, and the governments' budget balance (federal and provincial) deteriorates to the extent that they cannot afford the tax cut.

Our analysis indicates that the highest net benefit is obtained under scenario 1, followed by the status quo (subsidies), followed by scenario 2. Thus, if the scenario could be freely chosen, it would be best for society if workers provided the investment incentive to the companies, through lower wages, and the government cut taxes. This outcome is also consistent with vertical equity, as the affected workers are among the highest paid industrial workers in Canada. In contrast, if it were known that workers would refuse to adjust wages, then it would be better to provide subsidies than to lose the investment and employment.

In effect, what we have here is just another manifestation of what economists call the theory of the second best. In particular, if the labour market is competitive, workers respond to shocks in an equilibrating manner, and it is better if the government does not intervene (first best). On the other hand, if the labour market is not competitive, as in the case of rigid wages, then there is an argument for the government to intervene (second best).

However, this analysis is overly simplistic, as it assumes that the behaviour of workers and firms is externally given, or "exogenous" in economist's jargon. Both theory and experience suggest otherwise. In particular, it is almost certain that workers' and firms' behaviour is influenced by the government's stance regarding subsidies.

To see this, we note that the best outcome for the workers is to receive subsidies and maintain their wages. Therefore, the mere possibility of subsidies creates an incentive for workers to adopt a stance against reducing wages, notwithstanding the danger that this approach could backfire, as in scenario 2. In other words, the workers have an incentive to play chicken with the government: the more amenable the government appears to be toward subsidies, the

stronger the incentive for workers to resist wage concessions in the hope of pushing the government into giving subsidies.

Similarly, if companies know that the government will offer subsidies, they have an incentive to threaten to shut down facilities, or even shut them down, in order to re-open them again with subsidies. This pattern corresponds remarkably well with the Essex Engine Plant. Shut down in November 2007, the lobbying effort began in January 2008, and by March the government had agreed to provide subsidies to re-open the plant.[23] Thus, combined with the incentive they provide for workers to resist concessions, it is possible that subsidies could have the perverse effect of encouraging layoffs rather than preventing them.

This discussion suggests a circular relationship in which a government that shows a willingness to subsidize creates an environment where subsidies become necessary. We conclude that the best course of action for a government would be to take a strong stand against subsidies (other than corrective subsidies for market failure) and stick to it.

Finally, the recent crisis in the auto sector suggests that, whatever the initial merits of subsidies, we may now be witnessing another in a long list of failed attempts by governments to pick industrial winners. Of course hindsight is 20/20. But even before the crisis, there were abundant signs that the Detroit-based auto makers (Ford, GM and Chrysler) were facing much weaker prospects than the "new domestics" (Toyota and Honda) and companies in other sectors of the economy. This observation reinforces the view that, rather than smart investment, subsidy programs are often little more than rescue packages for declining companies.

[23] In a truly bizarre case outside of the automotive sector, in April 2008 the Ontario government announced a $13.9 million subsidy to the pharmaceutical firm Sanofi Pasteur to build a research facility even though the CEO stated the facility would have been built regardless (Blackwell 2008).

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Table 1
Deadweight Loss of Taxation

tax type	marginal deadweight loss ($)
investment income tax	1.30
sales tax on capital goods	1.29
corporate income tax	0.37
personal income tax	0.32
payroll tax	0.15
consumption tax	0.13

Source: Baylor and Beauséjour (2004)

Table 2
Auto Industry Subsidies, April 2004 – September 2008

	Recipient's name	Ontario Support, $ millions	Federal Support, $ millions	Total Project Investment, $ millions	Employment Information
Ontario's support through OAIS					
1.	General Motors (Beacon Project)	235	200	2,790	500 new jobs + commitment to maintain 16,000 province-wide + revision (300+)
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		**528.925**	**384.97**	**6,429.2**	
Ontario's support through AMIS					
11.	Toyota Boshoku Canada	8.7	0	87.3	365 new jobs
12.	Toyotetsu Canada	7.15	0	71.5	250 new jobs
Total		**15.85**	**0**	**158.8**	
Other investments					
13.	Toyota	70	55	1,100	2,000 new jobs

14.	Honda	15	0	154	340 new jobs
15.	Ford (Renaissance Project)	0	65.5	590	548 new jobs
Total other		**85**	**120.5**	**1,844**	
Grand Total		**629.775**	**505.47**	**8,432**	

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

Table 3
Wages and All-in Costs

Hourly Wages	
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 from the GM, Ford and Chrysler Collective Bargaining Agreements, for the contract year September 2007 – September 2008. Available from Human Resources and Social Development Canada, Negotech website. Other data CANSIM series V1809131, V1809789, V1809189.

All-in Costs : total cost for one hour of labour, including wages, benefits, and payroll taxes.	
CAW operated shops	$67
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)	$48

Sources: Keenan (2008a, 2008b), DesRosiers (2008) , Gray (2008), Stanford (2008).
All figures $C.

Table 4
Scenario #1 Results

project	wage reduction $/hr	total benefit $ million	total cost $ million	net benefit $ million
Ford Centennial	0.86	554.4	342.9	211.5
Ford Essex Engine	0.95	47.0	28.6	18.4

Present values based on real discount rate of 3.5 %.

Table 5
Economic Impact of Lost Production (Input-Output Model)

a.) Ford Centennial Project

	wages &salaries $ million / yr	**GDP** $ million / yr	**employment** full-time positions / yr
Ontario	1,011.0	2,284.0	21,952
Canada	1,141.0	2,578.0	25,696

b.) Ford Essex Engine Plant

	wages &salaries $ million / yr	**GDP** $ million / yr	**employment** full-time positions / yr
Ontario	77.8	175.7	1,689
Canada	87.8	198.3	1,977

Table 6
Scenario #2 Results

project	transitional GDP loss $ million	total benefit $ million	total cost $ million	net benefit $ million
Ford Centennial	1,650.0	0	1,655.9	-1,655.9
Ford Essex Engine	126.9	0	126.9	-126.9

Present values based on real discount rate of 3.5 %.

Table 7
Sensitivity Analysis for Scenario #1

a.) marginal deadweight loss: 1.70

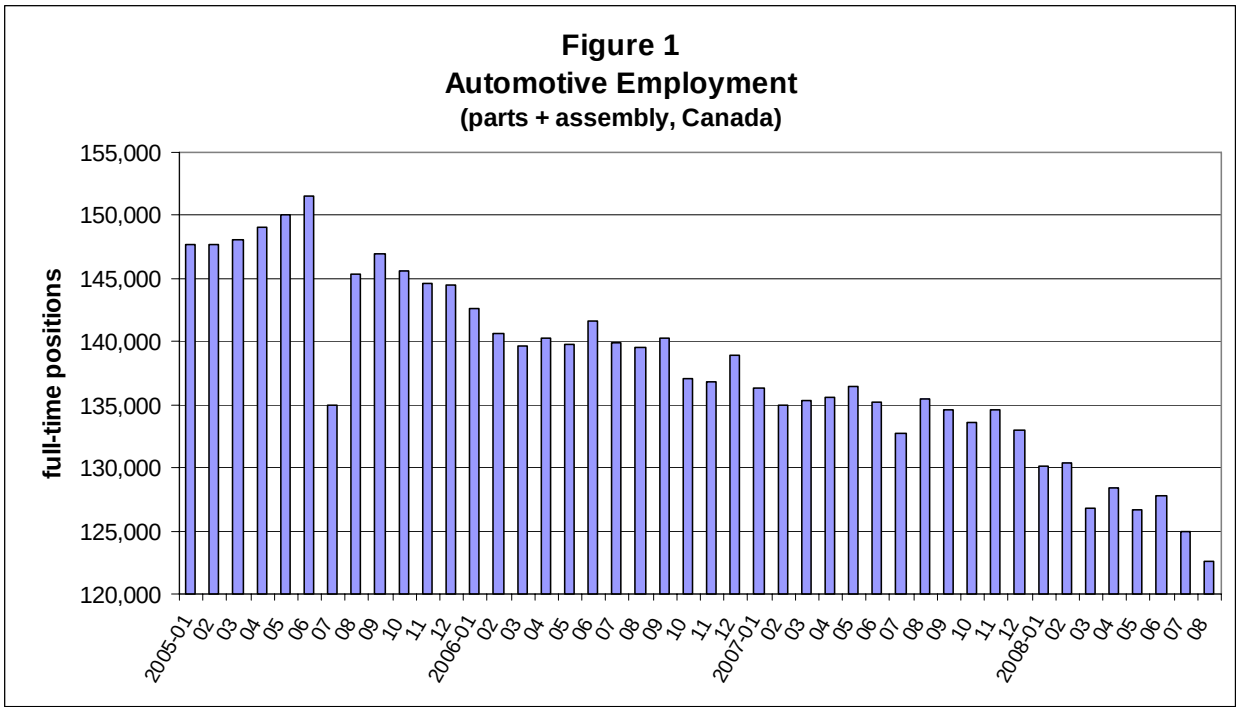
project	total benefit $ million	total cost $ million	net benefit $ million
Ford Centennial	623.5	344.8	278.7
Ford Essex Engine	52.9	28.6	24.3

b.) marginal deadweight loss: 1.29

project	total benefit $ million	total cost $ million	net benefit $ million
Ford Centennial	554.4	342.9	211.5
Ford Essex Engine	47.0	28.6	18.4

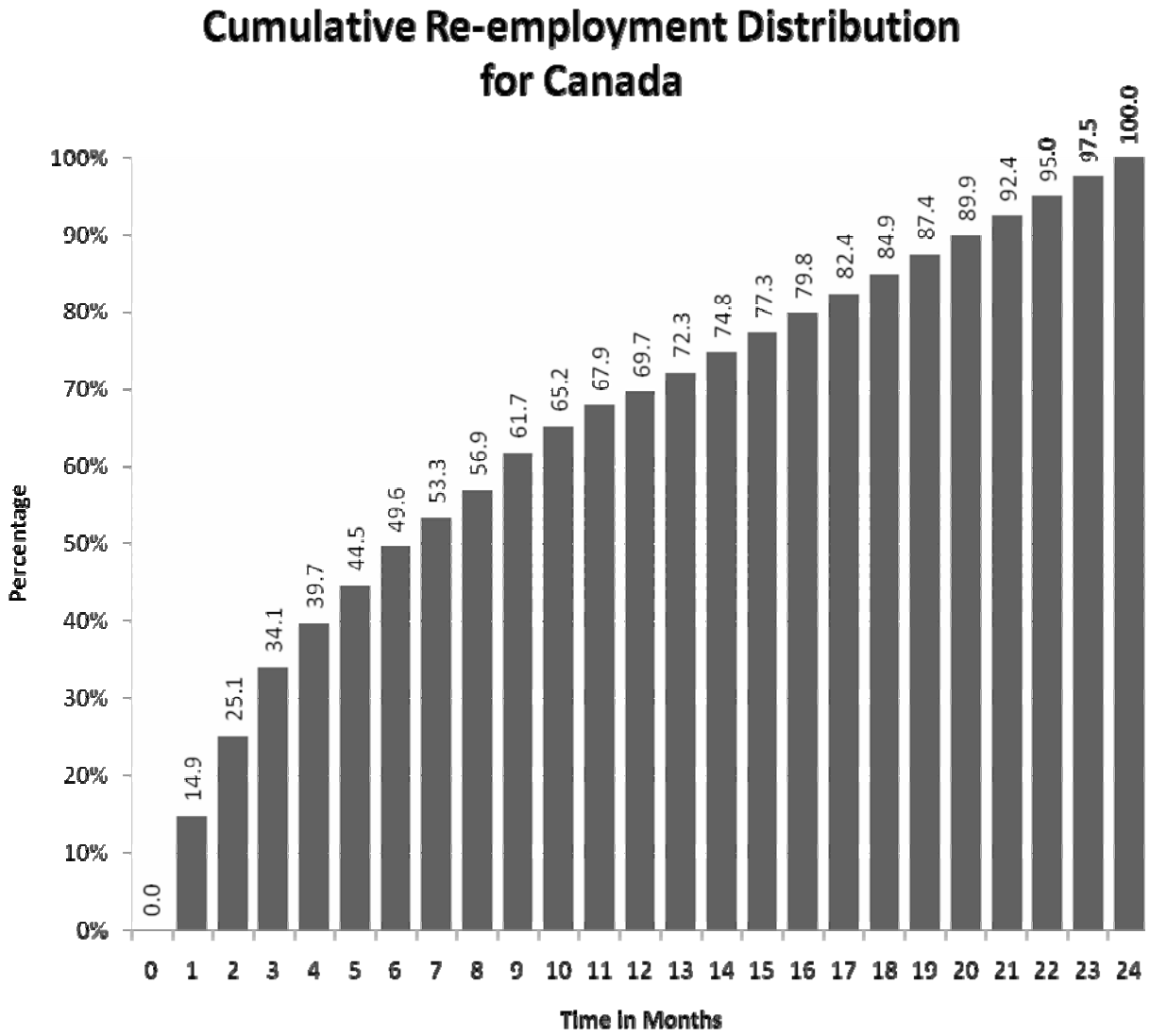
c.) marginal deadweight loss: 1.03

project	total benefit $ million	total cost $ million	net benefit $ million
Ford Centennial	510.6	341.7	168.9
Ford Essex Engine	43.3	28.6	14.7



Source: CANSIM series v1556628, v1556629

Figure 2



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).