

The Economic Impact of Collective Bargaining at the State Level in Michigan: The Case of the 2006 Auto Assembly Industry Special Attrition Program

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Abstract

In response to declining demand for the vehicles produced by General Motors (GM) and Ford, the United Auto Workers (UAW) and GM and Ford, along with Delphi and Automotive Components Holdings (ACH), the parts suppliers that had been spun off from GM and Ford, agreed in 2006 via collective bargaining to “special attrition programs” (SAP) consisting of early retirement incentives or “buyouts” as well as payments to encourage voluntary separation. These incentives, which ranged from \$35,000 to \$140,000, were accepted by approximately 35,000 of 110,000 GM hourly workers, 38,000 of 80,000 Ford and ACH hourly workers, and 12,600 of 24,000 Delphi hourly workers, all terminations to be effective by the end of 2006 (Ford Motor Co. 2006, General Motors 2006). Thus, by early 2007, the hourly workforces of GM, Ford/ACH, and Delphi had been reduced by approximately 85,500 employees.^{1,2}

This paper estimates the effect of this collectively bargained attrition program on the Michigan economy. In essence, the attrition payments to hourly workers, who are disproportionately located in Michigan, created an infusion of cash into the Michigan economy. As workers spent this money, it induced economic activity in other industries. We attempt to estimate the magnitude of the inducements, or “multiplier effects,” using an input–output model.

Workforce Reductions: Law and Practice

Outside of unemployment insurance benefits, there is no law in the United States that requires any employer redundancy payments or severance pay. The Worker Adjustment Retraining and Notification (WARN) Act requires notice to affected employees if they will be involved in a large-scale layoff. The notice could be interpreted as a required severance payment if the employer fails to provide the required notice; in such a situation, the employer must provide the affected employees with back pay and benefits up to 60 days, depending on number of days between the actual notice and the 60-day requirement (U.S. Department of Labor, Employment and Training Administration; no date). In that sense, large-scale layoffs at GM would have fallen under the WARN notice requirements.

Nevertheless, some employers do provide severance pay. The U.S. Bureau of Labor Statistics found that in 1999, 22% of all private industry employers provided some severance pay to some employees. That figure had declined to 20% in 2000 (U.S. Bureau of Labor Statistics; no date). In the unionized sector, a 1996 analysis of the Bureau of Labor Statistics file of agreements signed between 1970 and 1990 covering 1,000 workers or more showed that 56% of the contracts provided for severance pay. The average severance pay provided throughout the sample was about 4 days per year of service (Pita 1996).

The master collective bargaining agreement that was applicable at General Motors and Ford in 2006 did not include a provision for severance pay. It is reasonable to believe that the absence of such a provision was due to inclusion of provisions on supplemental employment benefits, a guaranteed income stream, and employment security. As it was unlikely that there would be permanent separations, the parties likely were not concerned about severance pay.³ As would be expected based on the GM and Ford agreements, only 12.5% of the agreements in transportation equipment in 1996 included a severance pay requirement, with mean severance at approximately 2 days per year of service. On the other hand, 68% of the primary metals agreements in 1996 included severance pay, with the mean payment of approximately 3.5 days per year (Pita 1996).

Based on this review, it is reasonable to conclude that, in the absence of collective bargaining representation by the UAW, the workers at GM and Ford would have received minimal benefits associated with a large-scale reduction in force. Thus, it makes sense to examine the special attrition program as payments to hourly employees that would not have been available in the absence of collective bargaining.

The Special Attrition Program in the Automobile Assembly Industry

The basic provisions in the 2006 special attrition program are summarized in Table 1. The benefits were of two types: early retirement incentives for employees who were near retirement and buyouts for employees who were not close to retirement. Senior employees could choose an immediate retirement incentive of \$35,000, a preretirement program that would permit employees to gradually move into retirement while receiving a stream of income, and buyout options. GM/Delphi and the UAW negotiated only one buyout option, while the UAW and Ford/ACH negotiated two, one with postretirement health benefits and one without.

It appears that the Ford/ACH plan and the GM/Delphi plan were structured somewhat differently. Assuming a base wage of \$28 an hour and a 173-hour month, the GM preretirement program would provide only about 60% replacement on the gross wage, while the Ford program provided a fixed 85% replacement. Regarding the buyouts, any GM employee with greater than 10 years of service was eligible for the maximum payment, while the only 10-year Ford employees who were eligible for the maximum payout were those who were 55 years old. On the other hand, Ford offered an option of a smaller payout if the employee preferred to retain postemployment healthcare benefits.

Approximately 46% of eligible Ford/ACH employees accepted one of the offers, while only about a third of eligible GM employees did. The acceptance rate at Delphi was approximately 52%, possibly due to the fact that Delphi's bankruptcy suggested an uncertain future for the firm.

Literature Review: Separation Pay and Consumption

Although there has been research on the economic effects of severance pay, all of it has conceptualized severance pay as a cost to employers and examined the labor market impact of policies requiring severance pay. The general finding of these studies was that legislated severance pay requirements are associated with decreases in employment and increases in unemployment, although the magnitude of such effects is unclear (Lazear 1990; Addison and Grosso 1996; Addison and Teixeira 2005).

There is, however, a small literature on the consumption effects of unemployment insurance payments, a payment associated with a workforce reduction. Gruber (1997) found that households receiving unemployment benefits that replace at least 84% of weekly earnings prior to unemployment fully smooth consumption over the unemployment spell. His estimates are based only on food consumption data, however, and it is reasonable to assume that income elasticity for food is less than for total expenditures.

In a similar study, Browning and Crossley (2001) use total expenditure data for Canadian households and estimate that a \$1 decrease in unemployment insurance benefits is associated with a 25-cent decrease in total expenditures for the mean household. The estimated effect increases to a dollar-for-dollar relationship, however, among liquidity-constrained households.

These estimates imply a reasonably high marginal propensity to consume, or MPC (between 0.75 and 1), out of transitory income streams. But only the preretirement options under the SAP pay a stream of

income; the special retirement incentive and various buyout options each pay a lump sum. Therefore, it is appropriate to assume the MPC out of the special retirement incentive and the buyout options is closer to the MPC from windfall gains than it is to transitory income stream.

TABLE 1
Basic Attrition Benefits Negotiated Between UAW and General Motors, Delphi, Ford and Automotive Components Holdings, 2006

Provision/benefit	GM/Delphi	Ford/ACH
Special retirement incentive	\$35,000 if age 50 or greater with at least 10 years of service	\$35,000 if 30 years of service; 55 years of age with age + service = 85 or more; 65 years old with 1 year seniority
Preretirement program	29 years of service = \$2,900/mo; 28 years of service = \$2,850/mo; 27 years of service = \$2,800/mo; must retire at 30 years of service	85% of hourly pay until 30 years of service
Buyout option 1	\$140,000 (10 or more years seniority) or \$70,000 (less than 10 years seniority) to sever all ties with GM and Delphi except any vested pension benefits	\$140,000 less taxes; benefits to continue for 6 months; must have 30 years of credited service or be 55 with 10 years of service; forfeit postretirement healthcare benefits
Buyout option 2	N/A	\$100,000 less taxes; benefits to continue for 6 months; retirement delayed for at least 23 months after termination date
Numbers	GM: buyouts 4,600, retirements, 30,400; Delphi total, 12,600	38,000 accepted. "Just over half of the buyouts accepted during the recent open enrollment period were by employees who accepted one of the non-traditional packages, which provided options such as lump sum payments, tuition reimbursements or scholarship funds for family members."
Conditions	May apply for one (assumed)	May apply for one
Effective dates	2006	11/1/06–9/1/07

Source: UAW, 2006, UAW-GM-Delphi: "Key Points of the GM and Delphi Special Attrition Program," http://uaw.org/delphi/2006_Attrition_Program_highlights.pdf, accessed October 27, 2008; UAW, 2006, "UAW Ford Report," September 14, <http://www.uaw1111.org/images%5C091406voluntarybuyouts.pdf>, accessed October 27, 2008. "Ford's Hourly Buyout Acceptances Reach 38,000 this Year." 2006. *PR Newswire*, November 29.

Life-cycle consumption theory predicts consumers will allocate expenditures from a windfall gain received today as though they had purchased an annuity that pays out until the end of their lives. Empirical estimates, however, suggest the true MPC out of windfall income is higher than the annuity value and perhaps as high as 1 (Bodkin 1959; Ishikawa and Ueda 1984; Rucker 1984; Hatsopoulos, Krugman, and Poterba 1989; Johnson, Parker, and Souleles 2004).

Among Israeli recipients of German restitution payments, Kreinin (1961) found an MPC of 0.167 for durables and 0.156 for nondurables. Yet, using the same data, Landsberger (1966) found MPCs of 0.23 among Israeli households receiving the largest restitution payments (around 65% of annual income) and over 2 among those receiving the smallest (around 7% of annual income). Keeler, James, and Abdel-Ghany (1985) also found heterogeneity in the MPC based on the size of the windfall. For cash gifts and insurance settlements, they found MPCs ranging from over 2 to 0.370 as the size of the windfall increased from less than 5% to over 100% of permanent income.

Finally, it could be that individuals receiving the lump sum payments, and the buyouts in particular, treated these infusions of cash as wealth rather than income; individuals who took the \$140,000 buyout may have rolled this lump sum payment into existing retirement or other savings. If this is the case, estimates of the MPC out of wealth are likely to be closer to the true MPC. Poterba (2000) concludes most estimates are between 1% and 5%.

In summary, we do not know of any prior study that has estimated consumer spending behavior associated with buyouts or other forms of severance pay. Related literature suggests the MPC out of streams of transitory income during unemployment spells ranges between 0.75 and 1, the MPC out of windfall gains could be as low as 0.15 or as high as over 1 but is decreasing in the ratio of the windfall to permanent income, and the MPC out of wealth is between 0.01 and 0.05. Of the estimates reviewed, only those for transitory income streams were based on consumption during unemployment spells. Given that consumers do smooth consumption over the life cycle, albeit imperfectly, the MPCs out of windfalls and wealth during unemployment spells should be greater than during periods of employment.

Estimation Procedure

The purpose of economic impact analysis is to trace the full impact, direct and indirect, of a spending event on jobs and incomes in a local economy. The event considered in this paper is consumer spending by UAW-represented workers in Michigan who received payments under the 2006 special attrition program. The direct effects of this spending are the impacts on Michigan businesses that provide the goods or services purchased by former auto workers. Using an input–output model, economic impact analysis also estimates the indirect, or so-called multiplier, effects that arise when businesses purchase intermediate inputs from other Michigan businesses, when upstream workers spend a portion of their incomes in the local economy, and, depending on the extent of recycled spending allowed for in the model, when governments spend new tax revenues. Spending out of the income generated during the various stages of the economic impact process continues to circulate within the economy until it is dissipated through “leakages” in the form of savings or payments for goods and services from outside the local economy.

Estimates of the economic impact of the special attrition program on Michigan were made using a 2007 Michigan-specific version of IMPLAN, an input–output model used widely by researchers throughout the United States (Minnesota IMPLAN Group 1997). Impacts are reported for three types of economic variables: value added, employee compensation (also referred to as earnings), and employment. “Value added” is a broad measure of income and is synonymous with gross state product. Employee compensation consists of wages, salaries, and benefits such as employer contributions to retirement or healthcare programs. Employment is a count of both full- and part-time jobs.

Three sets of multipliers were estimated using alternative models available within IMPLAN. Two sets of multipliers were prepared using IMPLAN’s Social Accounting Matrix (SAM). In each case, trade flows are calculated using IMPLAN’s “regional purchase coefficients,” which are econometrically derived estimates of the percentage of demand for a specific commodity that is satisfied by local producers. In the model referred to as “SAMhh,” the amount of recycled spending is limited to household spending out of labor income. In the model referred to as “fullSAM,” the model is broadened to include a recycling of spending by all levels of government out of new tax revenues generated in the economic impact process and, in addition, estimates of capital expenditures necessary to replace depreciated capital.

A third model, referred to as “Type2LQ,” was also developed within IMPLAN. This model closely resembles the RIMSII input–output model available from the U.S. Department of Commerce. Trade flows are estimated using output-based measures of location quotients, and recycled spending is limited to household spending out of labor income. Estimates of trade flows based on location quotients typically result in smaller leakages (i.e., more spent on local goods and services) than those estimated using regional purchase coefficients. Since in our model the Type2LQ multipliers end up between the SAM and SAMhh estimates, our reported impacts are based on the Type2LQ multipliers. Nevertheless, all multipliers and the data necessary to construct impacts based on SAM and SAMhh are reported.

Assumptions

The IMPLAN analysis is based on the consumption generated from the special attrition program. Based on the foregoing review of the consumption literature, it seems reasonable to assume the MPCs will differ across the options in the special attrition program. The preretirement option pays a stream of income that households are likely to treat like unemployment benefits. Therefore, we will assume the MPC out of the preretirement payments is between 0.75 and 1. The buyout options and special retirement incentive, on the other hand, pay out a lump sum amount. Life-cycle consumption theory predicts employees taking these lump sums would consume the annual annuity value over their remaining lifetime (assuming there is no bequest motive). As discussed, if these lump sums are treated as windfalls, empirical estimates of the MPC out of windfalls suggest values substantially higher than the annuity value. Nonetheless, it should be decreasing in the ratio of the windfall to income.

Using average hourly wage information, we estimate annual gross income among Ford, ACH, GM, and Delphi workers eligible for the buyouts was about \$57,600. This estimate accounts for overtime pay and premium pay. At an annual gross income of \$57,600, the special retirement incentive of \$35,000 represents about 60% of annual after-tax income, and this percentage is as high as 240% under the buyout options. Although Landsberger's (1966) estimate of 0.23 for windfalls equal to 65% of annual income and the estimate of Keeler, James, and Abdel-Ghany (1985) of 0.37 among households receiving windfalls equal to or greater than their annual income, Kreinen (1961) estimated the MPC out of windfalls was just above 0.15, which is closer to the annuity value. To encompass the wide range of estimates in the literature, we assume a range between 0.15 and 0.40 for the special retirement incentive.

Yet employees taking the lump sum buyouts may have regarded the payments as additions to wealth rather than windfall income. This is especially likely among younger employees who took the buyouts and were able to find alternative employment fairly quickly; they may have taken the buyout payment and rolled it into an existing 401K or other retirement account. This is less likely with the special retirement incentive because it was offered to workers near retirement, and presumably most who took the incentive chose to retire rather than seek alternative employment. If the buyouts taken by younger workers were treated as additions to wealth (specifically retirement savings) rather than as wage replacement, the MPC for the buyouts should be nearer to estimates for the MPC out of wealth, which ranges between 1% and 5%. Therefore, we will assume a separate MPC for the buyouts ranging from 0.5 to 0.40.

To isolate the marginal effect of the special attrition program on the Michigan economy, we must assume counterfactual workforce reduction scenarios in the absence of the collectively bargained payments. Given the financial state of the auto industry and the Big Three automakers in particular, we assume they would have needed to create an employment cost savings that would be at least as large as the cost savings created through the special attrition program.

The first counterfactual assumption we consider, which we will call the "layoff counterfactual," is that GM and Ford would have laid off enough Michigan workers to create the same net wage and benefit cost savings as they created through the special attrition program. The workers who are laid off would then be eligible for unemployment compensation and those who kept their jobs would continue receive their usual income. Therefore, the net effect of the special attrition program under this counterfactual assumption will be calculated using estimated consumption among employees who took any of the incentive payments net of consumption that would have occurred if some workers' jobs had been saved and the rest were laid off and receiving unemployment compensation.

Although severance pay is not required by law, it may be unreasonable to assume no severance would be paid in the absence of UAW representation. Thus, we formulate a second counterfactual scenario in which GM and Ford offer buyouts similar to those offered by nonunion Nissan to workers in Tennessee in 2007. Nissan offered hourly workers a lump sum buyout amount of \$45,000 plus an additional \$500 for each accumulated year of service (Wert 2007). They expected 5% of their hourly workers to take that offer. Given the smaller size of this incentive as compared to the GM and Ford incentives on the one hand and the relatively worse state of the auto industry in Michigan on the other, we assume 10% of Michigan GM and Ford hourly employees would have taken this offer. (The percentage who actually participated in the more generous SAP was approximately 30%.) The effect of the special attrition program under this counterfactual

assumption is based on consumption under the SAP net of estimated consumption among employees who would have taken the less generous buyout offer, those whose jobs were saved (since these buyouts cost less), and those who were laid off. We will refer to this counterfactual assumption as the “nonunion counterfactual.”

Under each of these scenarios, some proportion of the workers who take the incentive payments or are laid off will choose to relocate. Using mobility data from the March Current Populations Surveys from 2000 to 2005, we estimate an average annual outmigration rate among those who separated from employment in the automotive industry in Michigan of approximately 10%. Also, under both counterfactuals, some workers retain their jobs and receive their wages. We will assume the MPC out of this income stream is 0.9.

We restrict our analysis to the economic impact of the special attrition program in the first year. Forecasting beyond the first year would require information about workers’ ability to find new jobs, their mobility, and the ongoing health of the automakers. We lack that information, but we do provide a thought experiment and simple calculations to approximate the relative magnitudes of long-run effects under the SAP and each counterfactual. Given the short-run economic trouble the state of Michigan is in, we argue that the state’s discount rate is fairly high and thus the short-run impact of the SAP is of interest independent of any long-run effects.

Results

Table 2 summarizes the multipliers associated with \$1 million of additional Michigan consumer spending. Looking at the Type2LQ multipliers, the estimates suggest \$1 million of additional spending among Michigan consumers would generate \$791,202 in value added (which is analogous to state GDP), \$401,120 in earnings among Michigan workers, and 11.9 new Michigan jobs. As stated previously, the Type2LQ estimates are between the fullSAM and the SAMhh. The fullSAM estimates are higher because they include any government spending induced by the additional taxes collected from the \$1 million in consumption and the earnings generated. The SAMhh estimates exclude that recycling. The Type2LQ estimates also exclude induced government spending but, since they are based on location quotients, they generally assume more spending occurs within the state than either the fullSAM or the SAMhh estimates. For the rest of our analysis we used the Type2LQ estimates.

TABLE 2
Estimated Economic Impact of an Additional \$1 Million of
Consumer Spending Among Michigan Residents

	fullSAM	SAMhh	Type2LQ
Value added	\$849,797	\$607,832	\$791,202
Earnings	\$458,056	\$304,824	\$401,120
Employment	13.3	9.6	11.9

Note: fullSAM, SAMhh, and Type2LQ are three different estimation methods. Each makes different assumptions about the amount of recycling of consumer spending that occurs and the rate of leakage of that spending outside the Michigan economy. See the text for full explanations.

Table 3 summarizes the total payments received by Michigan workers under the SAP. In the first column of data, we summarize the payments received by individual workers. The second data column reports the estimated number of Michigan workers who accepted each offer. These estimates are based on reports of national acceptance rates published in press releases and articles in 2006. To arrive at the estimates for Michigan, we assume the estimated number of workers from Michigan who accepted is equal to the percentage of GM and Ford UAW-represented employment in Michigan, which we estimate to be 41%.⁴ Disaggregated information on acceptance rates for each offer type was not always available. To estimate the number of workers accepting a given offer, we make the following assumption:

$$\frac{\text{Workers Taking Offer X}}{\text{Workers Taking any SAP Offer}} = \frac{\text{Workers Eligible for Offer X}}{\text{Workers Eligible for any SAP Offer}}$$

Based on the foregoing assumptions, we generate the estimates of total payments received by Michigan workers under each offer that are reported in the third data column. Applying our mobility assumption of 10%, we calculate the number of workers who took an offer under the SAP and stayed in Michigan. These figures are reported in the fourth data column. The fifth data column then reports the payments to Michigan workers who stayed in Michigan. These figures will form the basis for our estimated consumption generated by the SAP.

TABLE 3
Estimated Total Payments to Michigan Workers Through the Special Attrition Program in 2006

Offer	Individual payout in 2006	Estimated MI workers accepting	Estimated payment to MI workers in 2006	Estimated accepting workers who stayed in MI ¹	Estimated payment to MI workers who stayed in MI in 2006
GM/Delphi special retirement incentive	\$35,000	12,262	\$429 million	11,036	\$386 million
Ford/ACH special retirement incentive	\$35,000	5,237	\$183 million	4,713	\$165 million
GM/Delphi preretirement incentive	\$2,800 - \$2,900	4,689	\$160 million	4,220	\$144 million ²
Ford/ACH preretirement incentive	85% of hourly pay about \$48,960 a year ³	2,143	\$105 million	1,929	\$94 million
GM/Delphi buyout option 1 (>10 yrs service)	\$140,000	1,898	\$266 million	1,708	\$239 million
GM/Delphi buyout option 1 GM (<10 yrs service)	\$70,000	667	\$47 million	600	\$42 million
Ford/ACH buyout option 1	\$140,000	3,034	\$425 million	2,731	\$382 million
Ford/ACH buyout option 2	\$100,000	5,166	\$465 million	4,649	\$465 million
Total		35,096	\$2,131 million	31,586	\$1,918 million

¹We assume 10% of workers left Michigan after accepting an offer. See text for discussion.

²The amount paid under the preretirement incentive depended on years of seniority (see Table 1). We assume an even distribution of workers with 27, 28, and 29 years of service took this offer, and so the average payment in 2006 was \$2,850.

³Our annual hourly pay estimate assumes \$30/hour wage, a 48-week year, and 40-hour weeks.

Table 4 presents a breakdown of all payments and income streams to Michigan workers under the SAP, the layoff counterfactual, and the nonunion counterfactual. To determine how many layoffs and buyouts are needed under each counterfactual assumption, we first estimated the savings generated by the SAP. We estimate annual compensation savings (assuming benefits costs amount to 40% of total compensation) per job eliminated would be \$80,640.⁵ Given that the average Michigan Ford/ACH and GM/Delphi hourly employee has 18 years of service, and normal retirement occurs at 30 years of service, the total compensation savings per worker over the remainder of the mean employee's working life is approximately \$787,084 per worker in present value terms (assuming a 4% interest rate). So, through the

SAP, Ford/ACH and GM/Delphi generated about \$27.6 billion dollars worth of gross wage and benefits savings. We estimate they paid about \$2.132 billion dollars to Michigan workers in 2006 and committed to pay an additional \$181 million (in present value terms) over 2007 and 2008 in preretirement payments. Thus, the present value of their net wage and benefit savings under the SAP in 2006 was approximately \$25.3 billion.

TABLE 4
Estimated Net Wage and Benefit Savings and Payments to Workers in 2006 Under Special Attrition Program vs. Counterfactuals (All Dollar Amounts In Millions)

	Special attrition program	Layoff counterfactual	Nonunion counterfactual ¹
Number of MI workers accepting attrition offer	35,096	0	11,700
Number of MI workers laid off	0	32,133	21,359
Present value of gross wage and benefit cost savings to GM/Ford ²	\$27,624	\$25,291	\$26,020
Payments to MI workers through attrition programs	\$2,332 ³	\$0	\$729
Net wage and benefit savings to GM and Ford	\$25,291	\$25,291	\$25,291
Total jobs saved relative to special attrition program	N/A	2,963	2,037
Unemployment compensation received by MI workers	\$0	\$220	\$146
Total annual after tax wages in 2006 from jobs saved	N/A	\$148	\$102
Total income received by MI workers in 2006	\$2,132	\$368	\$977
Total income received by MI workers in 2006 who stayed in Michigan ⁴	\$1,918	\$346	\$890

¹Figures are based on the buyouts offered to Nissan workers in Tennessee plants during 2007 and assume 10% of MI workers would have taken these buyouts (see text for discussion).

²Figures assume average annual wage and benefit costs of \$96,000 per worker over 12 years of work (since the average employee has 18 years of service and normal retirement is at 30 years) at a 4% interest rate.

³This figure includes payments to the 10% of workers who left Michigan and includes the present value of payments made in 2007 and 2008 to those who took the preretirement offer. Thus it is larger than the \$1.918 billion paid in 2006 to Michigan workers who stayed in Michigan.

⁴We assume 10% of workers leave Michigan after accepting a buyout or other attrition offer. 100% of those whose jobs were saved are assumed to stay in Michigan in 2006. See text for discussion of this assumption.

To estimate the number of layoffs needed to generate \$25.3 billion dollars in savings under the layoff counterfactual, we divided \$25.3 billion by the present value of the wage and benefit savings per worker (\$787,084). As shown in the second data column of Table 4, this implies that 32,133 layoffs are needed to generate \$25.3 billion in savings. In 2006, the workers who were laid off were eligible for up to 18 weeks of unemployment compensation at \$362 per week if they do not have dependents and \$380 per week if they do (State of Michigan Department of Labor and Economic Growth 2008). Assuming the higher benefit amount and a full 18 weeks of benefits, the total amount of unemployment compensation received by workers who were laid off would be \$220 million (or \$6,840 per worker).

Relative to the SAP scenario, 2,963 jobs are “saved” under the layoff counterfactual. These workers receive their usual incomes, which after taxes should be approximately \$50,000 per worker in 2006, or \$148 million in total. Thus, under the layoff counterfactual, Michigan workers would have received \$368 million in 2006 in unemployment compensation and wages. Assuming 10% of those who are laid off decide to leave Michigan, the layoff counterfactual generates a total of \$346 million in income among Michigan workers who stay in Michigan.

The third data column of Table 4 summarizes the payments to workers that would have occurred under the nonunion counterfactual. Again, we determine the number of layoffs needed by setting the net savings under the SAP equal to the net savings under the counterfactual. As explained previously, under the nonunion counterfactual, we assume about 10% of Ford/ACH and GM/Delphi workers (or 11,700 workers) would have accepted the buyout offer.

Since the nonunion buyout offer pays \$500 per year of service in addition to the \$45,000 lump sum, those accepting the offer are likely to be from the top end of the tenure distribution. Using the years of service distribution published in a 2008 Center for Automotive Research Report, we assume 55% of the

11,700 workers taking the buyout had 36 years of service and 45% had 33. These assumptions imply a total of \$729 million in buyout payments to Michigan workers in 2006. Thus, to reach \$25.3 billion, a total of 21,359 layoffs are needed (20,433 layoffs would create a gross wage and benefit savings of \$25.3 billion but an additional 926 are needed to recover the cost of the buyout program). Relative to the SAP scenario, 2,037 jobs are “saved” under the nonunion counterfactual. Again, these 2,037 workers receive their usual compensation during 2006, which totals \$102 million after taxes or \$50,000 per worker. The 21,359 workers who are laid off each receive a maximum of \$6,840 in unemployment compensation for a total of \$146 million across all laidoff workers. Thus, under the nonunion counterfactual, Michigan workers would have received a total of \$977 million in buyouts, unemployment compensation, and wages in 2006. Assuming 10% of the workers who took the buyouts or were laid off left Michigan, the nonunion counterfactual generates a total of \$890 million in income among Michigan workers who stay in Michigan.

Table 5 presents the results of our economic impact analysis under each counterfactual and a range of possible MPCs. The table notes indicate the exact MPCs assumed for each type of income. The first two rows of data contain the estimated amount of consumption that was generated by the SAP and each counterfactual. For example, in the upper left corner, under the assumption of low MPCs, the \$1,918 million in SAP payments to Michigan workers who stayed in Michigan generated a total of \$318 million of consumer spending; the remaining \$1,600 was saved. Under the same low MPC assumption, the layoff counterfactual scenario would have generated a total of \$281 million of consumer spending. Thus, the estimated net consumption created by the SAP under the low MPC assumption and layoff counterfactual is \$36 million. Applying the multipliers reported in Table 2, this \$36 million of consumer spending induced a \$29 million increase in value added, a \$15 million increase in earnings among all Michigan workers, and 434 new Michigan jobs.

Looking across the value added, earnings, and employment rows, it is clear that the assumed MPCs and the counterfactual assumed make a big difference. The estimated increase in value added, for example, ranges from a low of \$29 million under the low MPC assumption and layoff counterfactual to a high of \$458 million under the high MPC assumption and layoff counterfactual. The low MPC assumption is most appropriate if we believe that most workers took the buyouts and rolled them into a 401K and thus spent very little of the buyout monies in 2006. The high MPC assumption is most appropriate if we believe workers used a substantial portion of the buyout money (40%) to smooth consumption during the unemployment spell.

Although the lower bound estimates are small, they are still nonnegligible. Under the low MPC assumption and layoff counterfactual, the SAP-induced consumption accounted for 0.8% of the total increase in state GDP from 2005 to 2006 and 0.9% of the increase in earnings. Also, it led to job creation that reduced the number of unemployed persons by 0.125%, which translates to a 0.01 percentage point reduction in the unemployment rate. If we believe more of the buyout monies were spent in 2006, the induced increase in value added, earnings, and employment could have accounted for as much as 12.8% of state GDP growth, 13.9% of the increase in state earnings, and over one-tenth of a percentage point reduction in the statewide unemployment rate.

Notably, the nonunion counterfactual leads to higher consumption levels than the layoff counterfactual (and thus leads to smaller estimates of the effect of the SAP) when we assume middle or high MPCs but not when we assume low MPCs. This is because of the difference in assumptions about spending out of buyouts. If workers do in fact save nearly all of the money they receive through buyouts, then a pure layoff strategy will create more short-term consumer spending and thus larger impacts on the local economy than offering moderate or small buyouts. The SAP still has a net positive effect on the Michigan economy relative to the layoff counterfactual when low MPCs are assumed because the buyouts are much larger than under the nonunion counterfactual and because it included payments of income streams through the preretirement offers. The MPCs out of those streams are likely to be higher than out of buyouts.

All of the foregoing analyses focus on the short run impact of the SAP, which begs the question, what about the long-run effects? And more specifically, don't the layoff and nonunion counterfactual scenarios generate higher long-run benefits because more workers retain their jobs? Although a detailed long-run analysis would be beyond the scope of this paper (and would arguably require more longitudinal information about reemployment patterns after SAP attrition than we have available), we can address this argument by looking at current employment reduction forecasts for Michigan autoworkers.

TABLE 5
 Estimated Impact of the Special Attrition Program on the Michigan Economy in 2006
 (All Dollar Figures In Millions; Employment in Implan Type2lq Estimates Used)

	Layoff counterfactual			Nonunion counterfactual		
	Low MPCs	Middle MPCs	High MPCs	Low MPCs ¹	Middle MPCs ²	High MPCs ³
Total 2006 consumption under special attrition program	\$318	\$431	\$910	\$318	\$431	\$910
Total 2006 consumption under counterfactual	\$281	\$281	\$331	\$224	\$289	\$486
Net 2006 consumption under special attrition program	\$36	\$149	\$579	\$95	\$142	\$425
Increase in value added	\$29	\$118	\$458	\$75	\$113	\$336
Increase in earnings	\$15	\$60	\$232	\$38	\$57	\$170
Increase in employment	434	1,777	6,895	1,131	1,693	5,056
Increase in value added as % of state GDP	0.008%	0.031%	0.122%	0.020%	0.030%	0.089%
Increase in value added as % of state GDP growth (2005-2006)	0.805%	3.295%	12.788%	2.098%	3.140%	9.377%
Earnings as % of total state earnings	0.006%	0.026%	0.100%	0.016%	0.025%	0.074%
Earnings as % of annual state earnings growth (2005-06)	0.875%	3.584%	13.909%	2.282%	3.415%	10.200%
Percent reduction in unemployment	0.125%	0.511%	1.983%	0.325%	0.487%	1.454%

¹0.75 for preretirement and unemployment compensation, 0.05 for buyouts, 0.15 for special retirement, 0.90 for income.

²0.75 for preretirement and unemployment compensation, 0.15 for buyouts, 0.15 for special retirement, 0.90 for income.

³1 for preretirement and unemployment compensation, 0.40 for buyouts, 0.40 for special retirement, 0.90 for income

Between 2007 and 2016, the forecasted reduction in GM, Ford, and Chrysler hourly employment in Michigan is 8,230 (Center for Automotive Research 2008). That figure excludes reductions at Delphi and ACH. Assuming that Chrysler will account for 15% of these reductions (its share of total employment), Ford and GM reductions should total 6,996. Since 1999, when the Big Three have reduced Michigan employment, their suppliers have also reduced employment in nearly a 1:1 ratio (Center for Automotive Research 2008). Therefore, the reduction in Michigan hourly employment across GM, Delphi, Ford and ACH between 2007 and 2016 may be as high as 13,992. Under the layoff counterfactual, 2,963 jobs were “saved” by the special attrition program, and under the nonunion counterfactual 2,037 jobs were saved. Assuming the employment reduction is occurring at a constant rate, the number of jobs eliminated in 2007 alone is equal to between 50% and 75% of those “saved” under either counterfactual. In essence, each counterfactual may have saved jobs in the short run, but the long run for those jobs is not very long, and thus it is likely that the SAP will have a larger positive effect on the Michigan economy in the long run as well as in the short run.

Discussion and Conclusion

This paper aimed to estimate the effect of the 2006 special attrition program (SAP), and more generally the effect of auto assembly industry collective bargaining, on the Michigan economy. The SAP essentially generated a one-time infusion of cash into the state economy as GM/Delphi and Ford/ACH attempted to incent voluntary attrition. The offers extended under the SAP included buyouts ranging from \$70,000 to \$140,000 for which all employees were eligible, preretirement income replacement at 85% of wages for individuals within three years of 30 years of service, and lump sum payments of \$35,000 (with continuation of any other benefits promised during retirement) to incent early retirement among workers who were close to retirement.

As individuals who received payments under the SAP spend that money, economic activity in the state as a whole is stimulated, resulting in multiplier effects. We find that the collectively bargained SAP did have a positive, short-run effect on the Michigan economy larger than what we might expect in the absence of collective bargaining. Our midrange estimates suggest the SAP generated consumption of \$142 million more than if the necessary cost savings had been accomplished with a much less generous buyout plan like

the one offered at nonunion competitor Nissan. This \$142 million induced a \$113 million increase in state GDP, a \$57 million increase in gross state earnings, and a 1,693 increase in Michigan jobs. The estimated impacts are economically important. The gain in value added amounts to 3% of the total growth in state GDP between 2005 and 2006, the gain in earnings amounts to 3.4% of the total growth in gross state earnings between 2005 and 2006, and the job gain is equivalent to a 0.03 percentage point reduction in the state unemployment rate. Furthermore, we provide suggestive evidence that the long-run impact of the SAP is likely to be larger than that of either counterfactual scenario considered.

Certainly the fact that the special attrition plan was the product of collective bargaining was only one of many factors that led to the differences in the attrition offer extended by the U.S. automakers and that extended by Nissan, which is the basis of our nonunion counterfactual. Notably, GM/Delphi and Ford/ACH are in considerably more dire financial situations than Nissan. Thus, more generous buyouts were more likely to be justifiable for GM/Delphi and Ford/ACH than for Nissan, and any buyout at GM/Delphi and Ford/ACH is more likely to be accepted than a similar buyout at Nissan. But buyouts for hourly workers are extremely rare in the nonunion sector. Arguably part of Nissan's motivation for offering buyouts at all is to ward off unionization. Nonetheless, it would be incorrect to attribute the entire net economic impact of the SAP on the Michigan economy to collective bargaining. Rather, we present this situation as an example of a way in which collective bargaining can lead to better social outcomes and contrast it with the view that unions and collective bargaining generate social costs through rent-seeking behavior and market distortions.

Admittedly, our estimates hinge critically on the assumptions we make about consumer spending behavior as well as the imputations we perform to arrive at estimates of cost savings under the SAP and each counterfactual scenario. To address this issue we have not only presented a wide range of plausible assumptions but we have also attempted to provide all information necessary for the reader to explore alternative sets of assumptions. Still, the entire framework we present assumes that the primary effect of the SAP is short-run induced consumption; we do not consider labor market effects. We do attempt to infer the magnitude of long-run effects based on current employment reductions in the industry. A more sophisticated analysis, however, would be required to quantify the long-run effects.

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Endnotes

1. GM, Ford, and DaimlerChrysler also had raised concerns about retiree healthcare costs. The companies claimed that these costs, often called "legacy costs," placed them at a cost disadvantage of approximately \$7,000 per vehicle vis-à-vis the nonunion transplants who had not yet been producing in the United States for a sufficiently long period to have a large number of retirees. With respect to healthcare, the parties agreed that active employees at GM and Ford would forego part of their negotiated wage increases, with the monies allocated to retiree healthcare. In addition, the parties agreed to increased healthcare cost sharing for retirees with relatively high pensions.

2. Per an agreement with UAW, additional buyouts were offered to hourly employees in 2008 after the 2007 negotiations. These provided for payments of \$70,000 or \$140,000 for employees with less than 10 years of service and more than 10 years of service, respectively, and payments to permit employees with 26 to 29 years of service to grow into retirement until they reach 30 years. An additional 19,000 hourly employees took those buyouts (General Motors 2008).

3. *Agreement Between UAW and General Motors Corporation*, September 18, 2003, and *Agreements Between UAW and Ford Motor Company*, Vols. I-IV, September 15, 2003.

4. The Center for Automotive Research (2008) estimates that 44.6% of Detroit 3 hourly (union-represented) employment is in Michigan. This percentage includes Chrysler, which did not participate in the 2006 special attrition program. Based on UAW reports, the percentage of Chrysler facilities in Michigan is 47.1%, while the comparable percentages for GM and Ford are 37.5% and 44.4%, respectively, suggesting that Chrysler has a higher percentage of hourly employment in Michigan than GM or Ford. The GM–Ford mean is 40.9%, which we round to 41%. While one could estimate higher than 41%, because GM has more hourly UAW-represented employees than Ford we would prefer a conservative estimate.

5. Notably, this calculation excludes savings on benefits during retirement. Any workers who took buyout option 1 or 2 forfeited all future benefits save their vested pension benefits. Thus, there should have been additional cost savings among these workers. We do not include that cost savings because the financial health of the U.S. automakers is uncertain and if they do go through bankruptcy, these liabilities may be shed. Thus the most conservative estimate of the cost savings generated would exclude these cost savings.

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