CAR Research Memorandum: The Impact on the U.S. Economy of a Major Contraction of the Detroit Three Automakers

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Introduction

The automotive industry has long been, and continues to be, one of the most important sectors in the U.S. economy. The motor vehicle and parts industries employed 732,800 workers directly as of September, 2008, and the Detroit Three employed 239,341 hourly and salary workers in the United States at the end of 2007. The international producers employed roughly 113,000 people in the United States at that time. The auto industry has one of the largest economic multipliers of any sector of the U.S. economy, and is sufficiently large that its growth or contraction can be detected in changes in the U.S. Gross Domestic Product. In many states, employment in automotive and automotive parts manufacturing ranks among the top three manufacturing industries. The purpose of this memo is to estimate the economic impact—in terms of jobs, compensation and tax revenues—of a major contraction involving one or more of the Detroit Three automakers.

Two scenarios are presented: first, what would be the impact of the Detroit Three automakers ceasing all operations in United States, or the 100 percent contraction scenario, and second, what would result from a 50 percent reduction in overall Detroit Three employment and production in the U.S. economy, an event that probably would involve a contraction by two of the domestic automakers. The circumstances are such that either of these scenarios is possible, and indeed one or the other is probable, within the next 12 months.

The Center for Automotive Research (CAR) has carried out the majority of national level automotive economic contribution studies completed in the United States since 1992.[1] A list of these studies is footnoted below and these reports contain descriptions of the methodologies used to produce this memo.

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[1] These studies include: The Center for Automotive Research. **Contribution of the Motor Vehicle Supplier Sector to the Economies of the United States and its 50 States**. Prepared for the Motor & Equipment Manufacturers Association, Ann Arbor, January, 2007. The Center for Automotive Research. **Contribution of Toyota to the Economies of Fourteen States and the United States in 2003.** Prepared for Toyota Motor North America, Inc., Ann Arbor, June, 2005. Institute of Labor and Industrial Relations, University of Michigan and the Center for Automotive Research. **Contribution of the U.S. Motor Vehicle Industry to the Economies of the United States, California, New York, and New Jersey in 2003**. Prepared for the Alliance of Automobile Manufacturers, Inc., Ann Arbor, May, 2004. Institute of Labor and Industrial Relations and the Office for the Study of Automotive Transportation, University of Michigan and the Center for Automotive Research. **Contribution of the Automotive Industry to the U.S. Economy in 1998: The Nation and Its Fifty States.** A Study Prepared for the Alliance of Automobile Manufacturers, Inc. and the Association of International Automobile Manufacturers, Inc. Ann Arbor, Winter 2001. The Office for the Study of Automotive Transportation, Transportation Research Institute, and the Institute of Labor and Industrial Relations, University of Michigan. **The Contribution of the International Auto Sector to the U.S. Economy**. A study prepared for the Association of International Automobile Manufacturers, Inc., Ann Arbor, March, 1998. McAlinden, Sean P., et. al., **Economic Contribution of the Automotive Industry to the U.S. Economy – An Update – A Study Prepared for the Alliance of Automobile Manufacturers**, Center for Automotive Research. Ann Arbor, Fall 2003. Office for the Study of Automotive Transportation, **Competitive Survival: Private Initiatives, Public Policy and the North American Automotive Industry** – Prepared for the U.S.-Canada Automotive Select Panel. University of Michigan Transportation Research Institute, Ann Arbor, June, 1992. The research staff of the Center for Automotive Research performed a number of these studies when located at the University of Michigan's Office for the Study of Automotive Transportation.

This study was sponsored by the Center for Automotive Research and was not commissioned by any third party organization or company.

Methodology
The estimates of economic impact presented in this memo were generated through the use of an economic/demographic forecasting and policy simulation model constructed by Regional Economic Models, Inc. (REMI). The model was calibrated using public and proprietary data on automotive industry employment, wages, price and capacity. Simulations estimating economic impacts on the U.S. economy were run for three years after the assumed initial change in Detroit Three operations. The model captures three types of employment impacts:

1. DIRECT: Direct changes in employment, compensation and personal income tax revenues that are a result of the Detroit Three contraction in production and employment. In other words, a fall in the number of people employed at the Detroit Three companies reduces the earnings of those employees and the tax revenues derived directly from their income and spending.
2. INDIRECT: This is the "supplier effect". Indirect changes in employment, compensation and tax revenues that are a result of a cancellation of purchased inputs to automotive production (any employment, compensation or personal income taxes related to firms that sell commodities, products or services directly and indirectly to the Detroit Three automakers). The supplier effect includes both manufacturing and non-manufacturing suppliers to the industry as well as suppliers to suppliers.
3. SPIN-OFF: These are the expenditure-induced effects in the general economy. Spin-off effects represent the loss of economic activity due to reduced spending of employees of the Detroit Three and their suppliers in the U.S. economy.

The sum of the direct, indirect and expenditure-induced or spin-off impacts represents the reduction in the total contribution of the automotive industry to the national economy as a result of a contraction in Detroit Three production and employment.

Two Scenarios and Their Assumptions
The contraction scenarios explored in this memo should not be interpreted as representing the economic activity that would be lost if the automotive industry never existed in the United States. The two scenarios represent short-term shocks that would affect all auto producers in the United States and that would be mitigated over time by gradual increases in domestic production by international automakers and surviving Detroit Three capacity (in Scenario 2).

We assume that domestic production by international automakers in the United States would be seriously affected by a major contraction of the Detroit Three automakers for at least a period of one year due to the high likelihood of many U.S. supplier company insolvencies. In fact, we assume in our 100 percent contraction scenario that not only does domestic production by the Detroit companies fall to zero in the first year, but that domestic production (in the U.S.) by the international producers also falls to zero. That is because we expect a major wave in supplier bankruptcies or a "supplier shock." The collapse of a domestic market for suppliers coupled with the reality that few auto suppliers serve export markets would result in manufacturing utilization rates below 50 percent, forcing suppliers to restructure or liquidate. The scale of the contraction of the Detroit Three would overwhelm any attempt by the international producers to keep their existing suppliers in business or to find alternative suppliers, here or elsewhere. U.S. consumers would be forced to rely on only imported vehicles as a source of new vehicle purchases in the first year. However, we do not assume that the international automakers in the U.S. lay off their employees at any time. We also assume that by the third year, the international producers are back at full operational capacity and have expanded to at least take up some of the lost Detroit Three production (20 percent of former Detroit output).

Our second scenario also assumes that Detroit Three production and employment falls by 100 percent in the first year but recovers to 50 percent in the second and third years. We assume essentially the same first year supplier crisis for all automakers in the United States. Production would fall about 50 percent in the first and second years for the international producers. However, it is assumed that the international producers would recover fully by the third year and that the surviving Detroit companies would restore production to 50 percent of the former combined level by the second year and maintain this level in the third year.

We assume that government spending will decline by the amount of state and local taxes paid by the Detroit Three companies at each of their operating locations. The information on taxes paid to state and local governments by two of the Detroit Three was determined from each company's 10-K filing with the SEC. For the other Detroit Three company, state and local taxes paid were estimated.

In all contraction scenarios, imported automotive supplies and parts prices are increased by 15 percent because of the probable disruption in the domestic supplier sector.

Results

<u>Scenario 1: 100 Percent Reduction in Detroit Three U.S. Operations</u>

Should all of the Detroit Three's U.S. operations cease in 2009, the first year total employment impact would be a loss of nearly 3.0 million jobs in the U.S. economy—comprised of 239,341 jobs at the Detroit Three, 973,969 indirect/supplier jobs and over 1.7 million spin-off (expenditure-induced) jobs. The employment picture recovers somewhat in 2010 (2.5 million jobs lost) and 2011 (1.8 million jobs lost), due to increased U.S. production by the international automakers, and the process of dislocated workers finding new employment.

Scenario 1: Employment Impact

YEAR	**2009**	**2010**	**2011**
DETROIT 3 REDUCTION	**100%**	**100%**	**100%**
Direct Employment	-239,341	-239,341	-205,611
Indirect Employment	-973,969	-795,223	-544,598
Spinoff Employment	-1,738,034	-1,427,452	-1,021,354
Total Employment	-2,951,344	-2,462,016	-1,771,563

In economic terms, the rapid termination of Detroit Three U.S. operations in 2009 would reduce U.S. personal income by over $150.7 billion in the first year, and generate a total loss of $398.2 billion over the course of three years. The impact of this personal income loss on fiscal government operations at the local, state and federal levels include an increase in transfer payments, a reduction in social security receipts and personal income taxes paid. The net impact of all three of these categories is negative on the government balance sheet, resulting in a loss to the government of $60.1 billion in 2009, $54.3 billion in 2010, and $42.0 billion in 2011—a total government tax loss of over $156.4 billion over three years.

Scenario 1: Economic Impact, Billions of Dollars (Nominal)

YEAR	2009	2010	2011
DETROIT 3 REDUCTION	**100%**	**100%**	**100%**
Personal Income	-150.7	-138.2	-109.3
Increase in Transfer Payment	+14.3	+12.4	+9.2
Decline in Social Security Receipts	-21.1	-19.3	-15.0
Personal Income Taxes	-24.7	-22.6	-17.8

Scenario 2: 50 Percent Reduction in Detroit Three U.S. Operations

Should one or more of the Detroit Three fail in 2009, initially all U.S. automotive operations would be affected, including international producers and suppliers. In this scenario, the remaining Detroit Three and international producers recover in 2010. The first year total employment impact would be a loss of nearly 2.5 million jobs in the U.S. economy—comprised of 239,341 jobs at the Detroit Three, 795,371 indirect/supplier jobs and over 1.4 million spin-off (expenditure-induced) jobs. The employment picture recovers in 2010 (1.5 million lost) and 2011 (1.0 million jobs lost), due to the resumption of U.S. production by the surviving Detroit Three producer and international automakers, and the process of dislocated workers finding new employment.

Scenario 2: Employment Impact

YEAR	2009	2010	2011
DETROIT 3 REDUCTION	**100%**	**50%**	**50%**
Direct Employment	-239,341	-119,671	-119,671
Indirect Employment	-795,371	-491,719	-311,488
Spinoff Employment	-1,427,663	-886,345	-574,434
Total Employment	-2,462,375	-1,497,734	-1,005,594

In economic terms, a 50 percent cut in Detroit Three U.S. operations would reduce personal income by over $125.1 billion in the first year, and a total loss of $275.7 billion over the course of three years. The impact of this personal income loss on fiscal government operations at the local, state and federal levels include an increase in transfer payments, a reduction in social security receipts and personal income taxes paid. The net impact of all three of these categories results in a loss to state and federal government of $49.9 billion in 2009, $33.7 billion in 2010, and $24.5 billion in 2011—a total government tax loss of over $108.1 billion over three years.

Scenario 2: Economic Impact, Billions of Dollars (Nominal)

YEAR	**2009**	**2010**	**2011**
DETROIT 3 REDUCTION	**100%**	**50%**	**50%**
Personal Income	-125.1	-86.4	-64.2
Increase in Transfer Payment	+11.9	+7.5	+5.2
Decline in Social Security Receipts	-17.5	-12.1	-8.9
Personal Income Taxes	-20.5	-14.1	-10.4

Summary

A full or partial contraction of the Detroit Three would have the following impacts on the U.S. economy:

Total Impacts After 3 Years		
	Scenario 1	Scenario 2
Personal Income ($ billions)	-398.2	-275.7
Combined loss of tax receipts and increase in transfer payments ($ billions)	-156.4	-108.1

The model represents only the impacts resulting from the initial contraction of the Detroit Three within the U.S. economy. It is reasonable to expect that a permanent contraction in the U.S. auto industry would negatively impact the auto industries of Canada and Mexico, since producers in these regions rely heavily upon U.S.-produced parts and components. This interdependency of the NAFTA automotive producers means that the total economic impacts presented here underestimate the full impact of the scenarios. The decline of Detroit Three production in Canada and Mexico would result in further U.S. losses in employment, income, and government revenues. Finally, the bankruptcy of any of the Detroit automakers may have serious implications for their pension funds and the level of obligations of the Pension Benefit Guarantee Corporation, as well as funding of the nation’s health care system. The Detroit Three are directly and indirectly responsible for funding the health care of 2 million employees, retirees, and dependents of their own companies and their suppliers.

Appendix

Below are assumptions used to develop the impact statement for the Detroit Three contraction scenarios presented in this paper:

1) U.S. employment for Detroit Three, 2007
    a. 167,319 Motor vehicle manufacturing
    b. 6,920 Warehouse
    c. 24,008 Engineer
    d. 41,094 Administrative and management
2) U.S. wages for Detroit Three, 2007
    a. Production: $67,480
    b. Skilled: $81,940
    c. U.S. Department of Labor, Bureau of Labor Statistics, Occupational Employment Survey data were used for engineers, business operations, finance and administrative employees
3) Tax impacts
    a. State and local tax impacts are modeled as a reduction to state and local government spending. Data was collected from the 2007 10-K SEC filings or was estimated.
    b. Federal tax collections are not directly modeled, and assume deficit spending.
4) Prices
    a. The prices of imported parts and supplies that substitute for loss of domestically sourced production inputs are assumed to be 15 percent higher
    b. The prices of imported vehicles are assumed to be 15 percent higher.
5) Absorption: In scenario 1, international producers are assumed to absorb 20 percent of the Detroit Three contraction through U.S.-based production. An adjustment was made to account for productivity differences.[2]

[2] "Beyond the Big Leave: The Future of U.S. Automotive Human Resources," Center for Automotive Research, 2008, page 23.