



WELCOME! CAR Breakfast Briefing

The Future of Automotive Human Resources in the United States

- 7:30 a.m. Breakfast and check-in/registration**
- 8:00 a.m. Sean McAlinden, Chief Economist and Vice President of Research, CAR**
Introduction and Meaning of the 2007 Automotive Labor Agreements
- 8:25 a.m. Kristin Dziczek, Senior Project Manager, Economics and Business Group, CAR**
CAR's Employment, Attrition and Hiring Forecast and Hiring and Training OEM Production and Skilled Trades Employees
- 9:00 a.m. Sean McAlinden**
Hiring and Training OEM Engineering and Technical Employees
- 9:15 a.m. Bernard Swiecki, Senior Project Manager, Economics and Business Group, CAR**
Hiring and Training Supplier Engineering Employees
- 9:30 a.m. Kristin Dziczek**
The Program for Labor and Education
- 9:40 a.m. Question & Answer**
- 10:00 a.m. Adjourn**

The presentation and full study will be available on the CAR website by COB on Tuesday, February 19.

CENTER FOR AUTOMOTIVE RESEARCH



August 11–15, 2008

Grand Traverse Resort and Spa, Traverse City, Michigan USA



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the
Date!**

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contact Deborah Schilz at the Center for Automotive Research at dschilz@cargroup.org, or phone 734.929.0463.

The Program for Automotive Labor and Education

- Funding for the “Beyond the Big Leave” study: Charles Stewart Mott Foundation



- Funding for 2008 research dissemination: Mid-Michigan Innovation Team (MMIT)/ U.S. Department of Labor’s Workforce Innovation for Regional Economic Development (WIRED) initiative

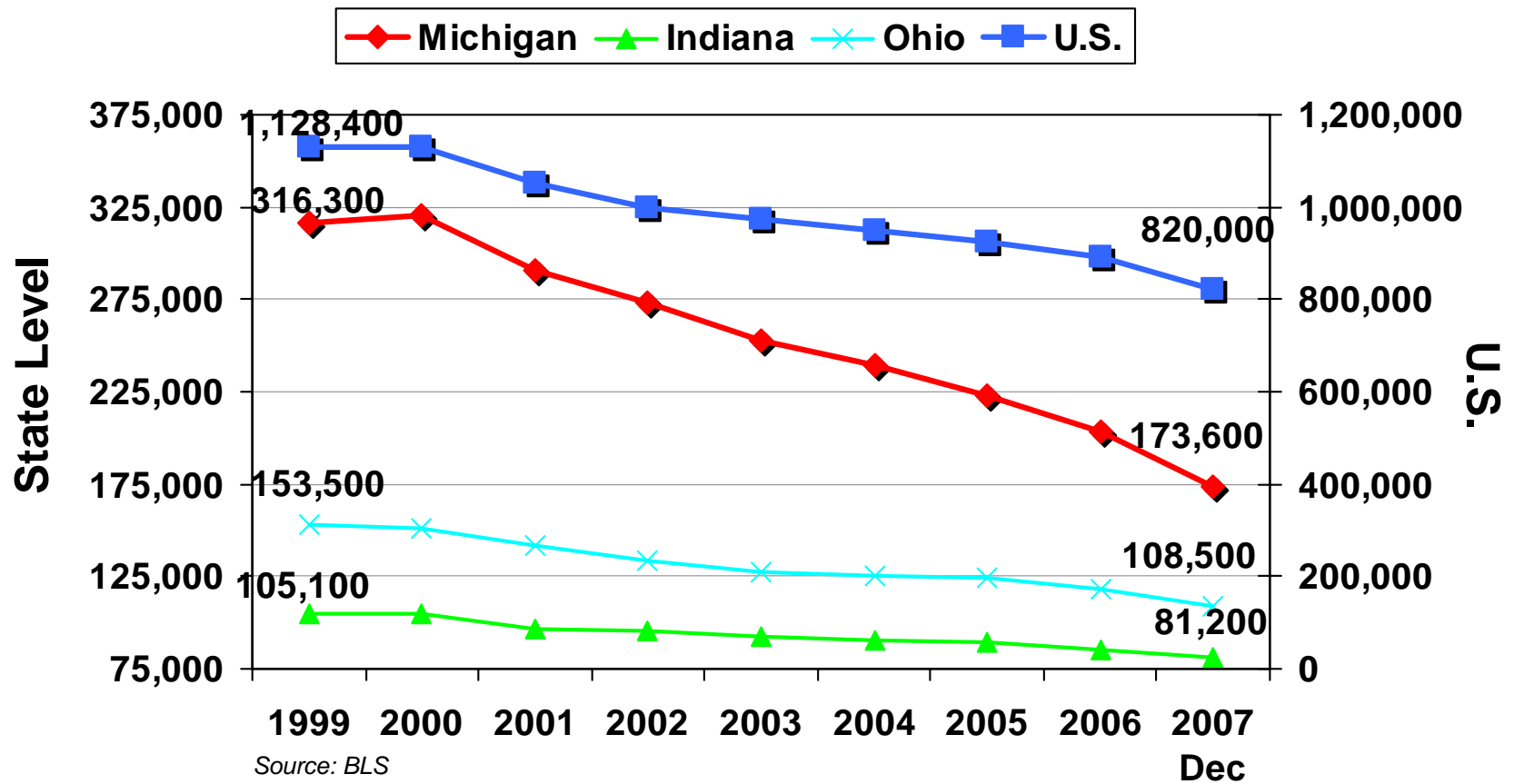


\$ The Buyout War \$

Introduction and Meaning of the 2007 Labor Agreements

The Darkest Part of the Tunnel . . .

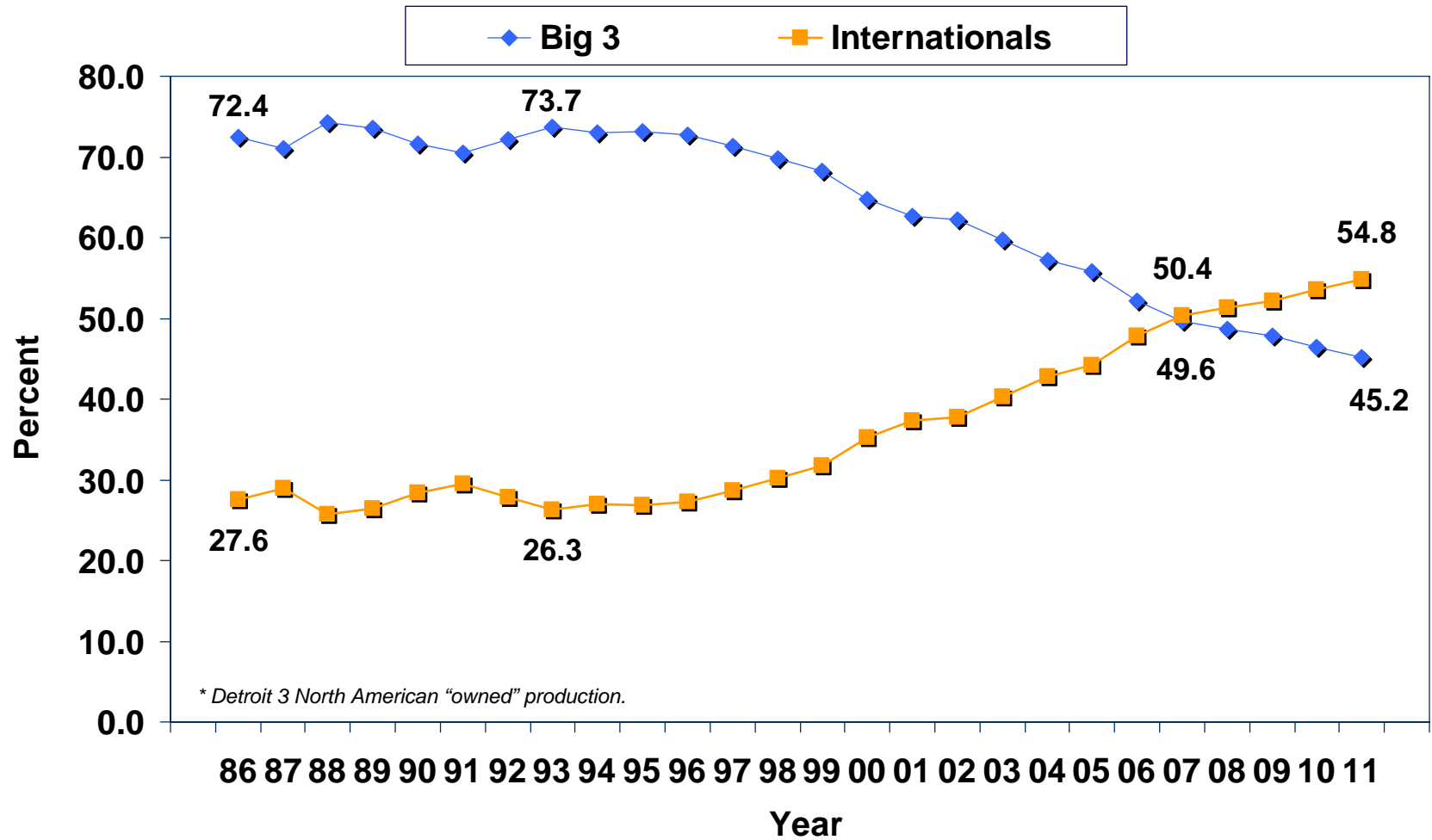
Motor Vehicle & Parts Manufacturing Employment 1999 – Dec 2007



Down Below 50%

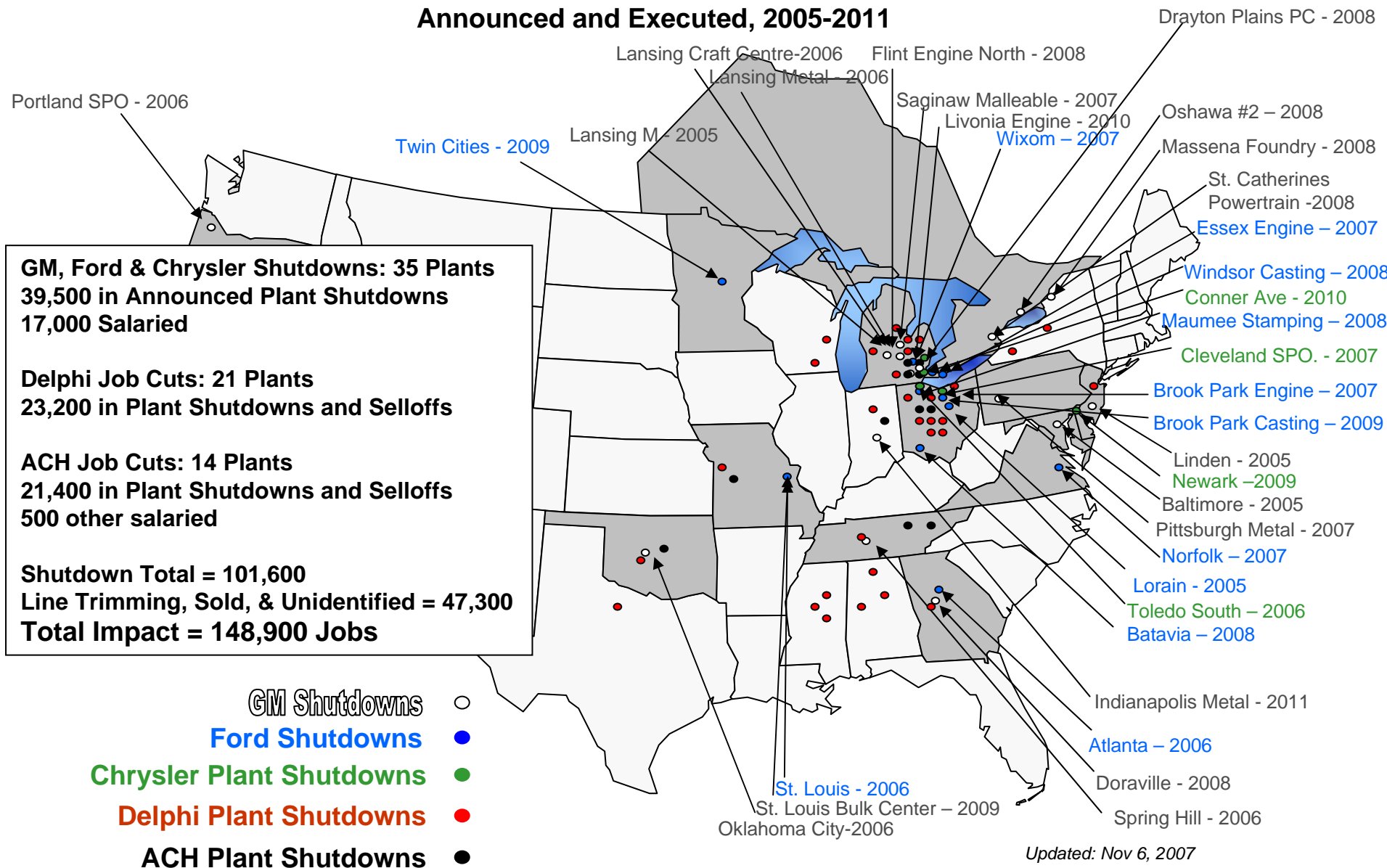
Detroit 3 U.S. Market Share*

1986 – 2011



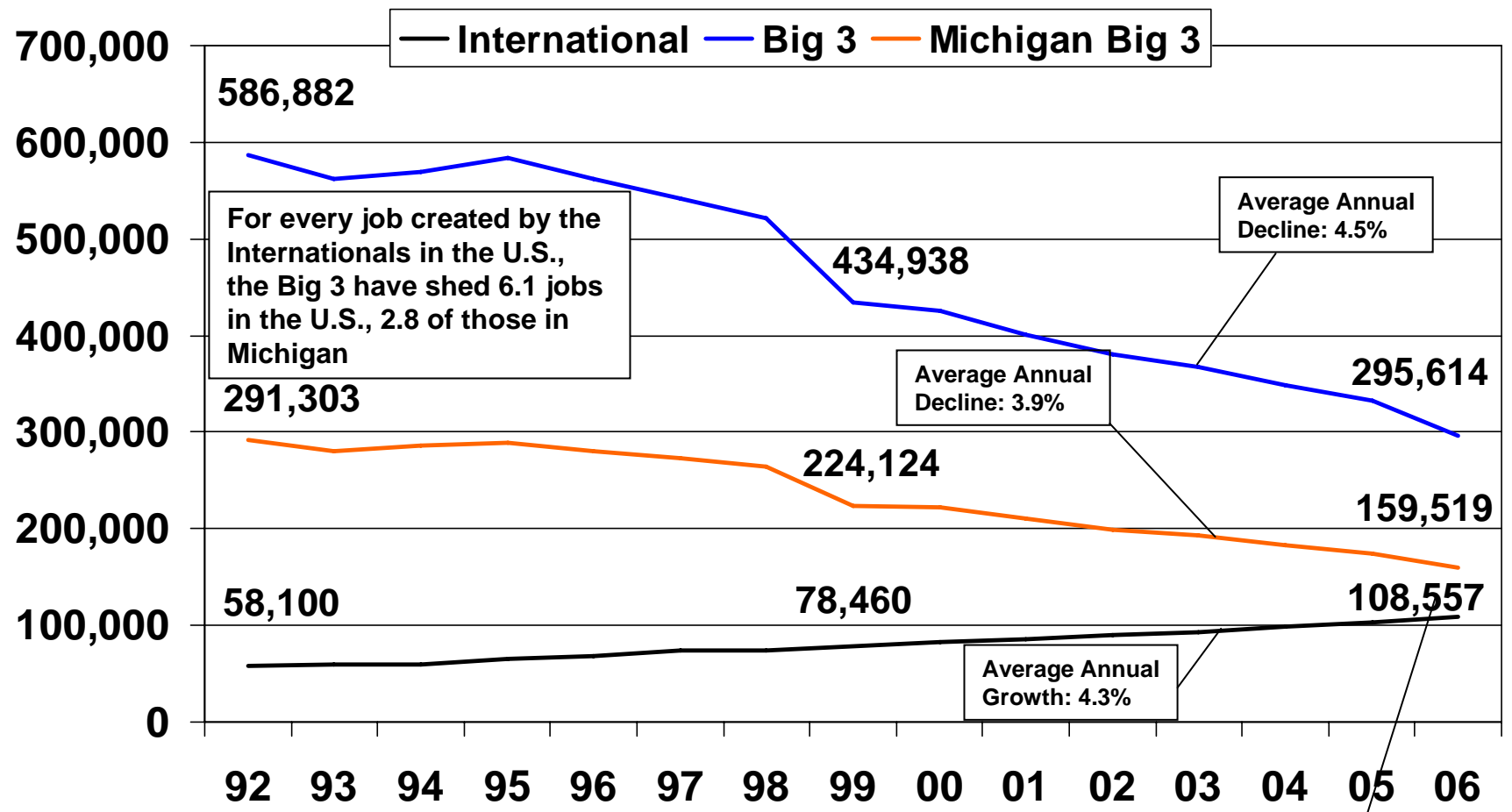
GM, Ford, Chrysler, Delphi & ACH U.S. and Canadian Plant Shutdowns

Announced and Executed, 2005-2011



Updated: Nov 6, 2007

U.S. Big 3 and International Automotive Employment 1992- 2006



Source: CAR studies for AIAM & AAM, AIAM Annual Reports, CAR Estimates

11/7/07

**3.1% in Michigan
(3,390 employees)**



Looks Like the Handshake Paid Off



Sean?

**Well Maybe Not . . .
Many, many restrictions
still in contract.**






Five Big Changes in the Contract and many small ones . . .

- Retiree Health Liability Will Be Retired in 2010.
- 2nd Tier Wages/Benefits Will be Paid to new workers who do work that suppliers can do . . . Or any new worker at Ford
- Retiree Health Benefits eliminated for all future hires
- Defined Pension eliminated for all future hires
- Eventually, all plants will have competitive operating agreements with union locals

GM Works a Patient Deal in '07




- GM will cut cost of active U.S. labor by almost \$2.0 billion a year in 2011 compared to 2007. VEBA will increase cash flow by another \$2.8 billion per year and more in later years.
- Much of the savings will be from the use of over 20,000 non-core, 2nd tier workers.
- Skilled trades count will fall. “True North” COAs still underway.
- Cost savings will take 2-4 years to develop.
- Labor cost gap with N.A. Toyota will transform into an advantage.
- Yet, will this improvement be too late?

UAW Contract Economics

			
New Agreement Base Wages	\$28.12	\$28.05	\$28.13
	4 zeros on the base		
2nd Tier	\$14.00-\$16.23/hour	\$14.00-\$16.23/hour	\$14.20-\$15.34/hour
	Annual raises		
	Up to 22,855 non-core (~31%)	Up to 13,405 non-core (~27.4%)	20% of workforce
	Current workers are "red circled"		
COLA	\$0.05 Beginning Float	\$1.06 Beginning Float	\$0.10 Beginning Float
	\$0.68	\$0.00	\$0.66
Lump Sums	\$3K 2007, 3%-4%-3%		
	\$10,059	\$10,235	\$10,067
Total Economic Gains	\$13,056	\$10,235	\$12,904




Source: UAW Contract Summaries, CAR Research

UAW Contract Benefits

			
Traditional Active Health	Choice of plans, higher co-pays & deductibles		
2nd Tier Active Health	\$300/\$600 deductibles covered by a \$300/\$600 HSA		
	\$1,000/\$2,000 out-of-pocket cap		
Traditional Retiree Health	\$31.8B VEBA PLUS Pension Pass Through	\$8.8B VEBA PLUS Pension Pass Through	\$13.2B VEBA (5% inflation)
	VEBA operational in 2010		
2nd Tier Retiree Health	\$1/hour for every hour worked into 401(k)		
Traditional Pension	Basic pension rate increased		
	\$700/year lump sums		
2nd Tier Pension	6.4% wages in cash balance defined benefit retirement plan – 3 year vesting		

Source: UAW Contract Summaries, CAR Research

UAW Contract Job Security

			
Jobs Bank	2-year limit, 1 refusal within area hire, 4 in extended area (exception: only 2 at Linden, OK City & Rancho Cucamonga)	2-year limit, 4 refusals	2-year limit, 2 refusals
Temporary Workers	Made permanent	Not made permanent	Not made permanent
Product Guarantees	Extensive specific product commitments	Continue and/or expand production at 6 assembly, 4 stamping and 8 powertrain plants, reversed 4 closures	5 flexible body shops, general product commitments
Insourcing	3,000 jobs insourced	1,025 jobs insourced	1,500 jobs insourced
	3,100 jobs evaluated	1,100 jobs evaluated	1,700 jobs evaluated
Outsourcing	Moratorium on core and non-core jobs		Moratorium – except for outsourcing previously agreed to in COAs
	Exit All Housekeeping and Groundskeeping		
Employment Levels	1-for-1 attrition replacement covers 100% of membership except for market-related layoff and where plant has workers on protected status		
Plant Closing Exemptions	St. Louis SPO, Livonia Powertrain and Massena Powertrain	Newark Assy, Detroit Axle, Fontana PDC, Conner Ave Assy & Sterling Emissions	Twin Cities Assy, Cleveland Casting & Batavia Transmission

Source: UAW Contract Summaries, CAR Research

UAW-GM Product Matrices

- Contract language, as always, is subject to interpretation
- Product plans in this agreement are stronger than any third-party forecast
- UAW will hold the company's feet to the fire if they "bounce the check" on these product commitments

LEGEND

Current
Will Be Allocated
Demand & Business Case Dependent
In Danger of Closing
Closed

GM Assembly

Category	Plant	City	State	Product 2007	Product 2008	Product 2009	Product 2010	Product 2011	Product 2012	Product 2013 -->	
Assembly	Wilmington	Wilmington	DE	KAPPA-based Pontiac Solstice, Saturn Sky, and Opel GT					Products consolidated to Bowling Green		
Assembly	Doraville	Doraville	GA	Chevy & Pontiac Minivans	CLOSED						
Assembly	Fort Wayne	Fort Wayne	IN	GMT900 Full Size Truck & LD Pick-up (Silverado and Sierra)					C3XX Full Size Truck & LD Pick-up (Redesigned Silverado and Sierra)		
Assembly	Fairfax	Fairfax	KS	Chevy Malibu & Saturn Aura			Epsilon Chevy Malibu				
						Global Epsilon Buick LaCrosse					
							Saturn Aura				
Assembly	Bowling Green	Bowling Green	KY	Chevy Corvette & Cadillac XLR					Corvette & Cadillac XLR Replacement		
									Next generation Kappa (Solstice & Sky)		
Assembly	Shreveport	Shreveport	LA	H3, H3T, Chevy Colorado & GMC Canyon					New H3, H3T		
									Chevrolet Colorado, GMC Canyon		
							H4				
Assembly	Detroit-Hamtramck	Detroit	MI	Buick Lucerne & Cadillac DTS							
						Global Delta MPV7					
							Global Delta Volt				
									Global Epsilon Chevy Malibu		



Tier II / New Hire Wage & Benefit Plan

	<u>New Non-Core Rate</u>	<u>Existing GM Employees</u>
Base Wage	\$15.30 Base* (\$14.00 Start)	\$28.12 Base
Active Health Care	15% employee cost share + \$600 Flex Spending Account	5% employee cost share
Retiree Health Care	In lieu of, \$1.00/hr 401k contribution**	Future VEBA Trust
Pension	Cash Balance Plan @ 6.4%**	Traditional Pension
2008 All-in Cost/Hr	\$25.65	\$78.21 (incl. OPEB) Memo: \$60 excl. OPEB

* Base wage before inflation adjustment after full grow-in over 2 years

** Will continue in plans even if later transitioned to core position

16,766 (23,000) Non-Core to Start . . . at GM 15,000 at Chrysler, 20% at Ford

A	B	C
\$16.23	\$15.30	\$14.50
Machining	Sub Assembly	Truck Driver
-Camshafts -Connecting Rods	Inspection	Material Handling
Others	Non Core Stampings	Unitizing
	Non Core Blanks	Warehousing
		Kitting
		Sequencing
		Repacking
		Others

Source: UAW Contract Summaries

The Tiers

	All-In Cost/Hour	Active Health	Post-Employment Benefits
1st Tier	<p>\$78.21 (including OPEB)</p> <p>\$60.00 (excluding OPEB)</p>	Choice of Standard Health Insurance Plans	<p>Traditional Pension</p> <p>VEBA for Retiree Health</p>
Tier 1.5 or “New Traditionals”	\$47.00	Plan with \$300/600 Deductibles	Cash Balance Defined Benefit
2nd Tier	\$25.65	Equivalent Flex Spending Account	401(k) for Retiree Health Care

Big 3 U.S. Hourly Employment: 2007-2011

Employment Declines by 21,410 But 38,480 New Hires (59,890 will leave . . .)

	2007 Employment	2011 Employment	Hourly New Hires
Chrysler	41,770	33,420	3,450
Ford	50,300	43,540	5,150
GM	74,500	68,200	29,880

Source: Center for Automotive Research Estimates, 12-07

Big 3 U.S. Hourly Employment: 2007-2011

	1st Tier \$62/Hour	1.5 Tier \$47/Hour	Non- Core/2nd Tier \$26/Hour
Chrysler	29,970	0	3,450
Ford	38,390	0	5,150
GM	38,320	6,880	23,000

Source: Center for Automotive Research Estimates, 1-08

The Current Scenario

The Final Calculations: Money, '07- '11

	Starting Compensation (billions)	End Cost (billions)	Change in Labor Cost (billions)	Change in Vehicle Cost (N. American basis)
GM	\$10.3	\$ 7.6	(\$2.7)	(\$841)
Ford	6.9	5.8	(1.1)	(80)
Chrysler	5.8	4.5	(1.3)	(330)
Retiree Health				
-GM	\$3.1	\$.3	(\$2.8)	(\$699)
-Ford	1.1	.1	(1.0)	(366)
-Chrysler	.8	.1	(.7)	(278)

(N.A. Production: CSM, 12-2-07)

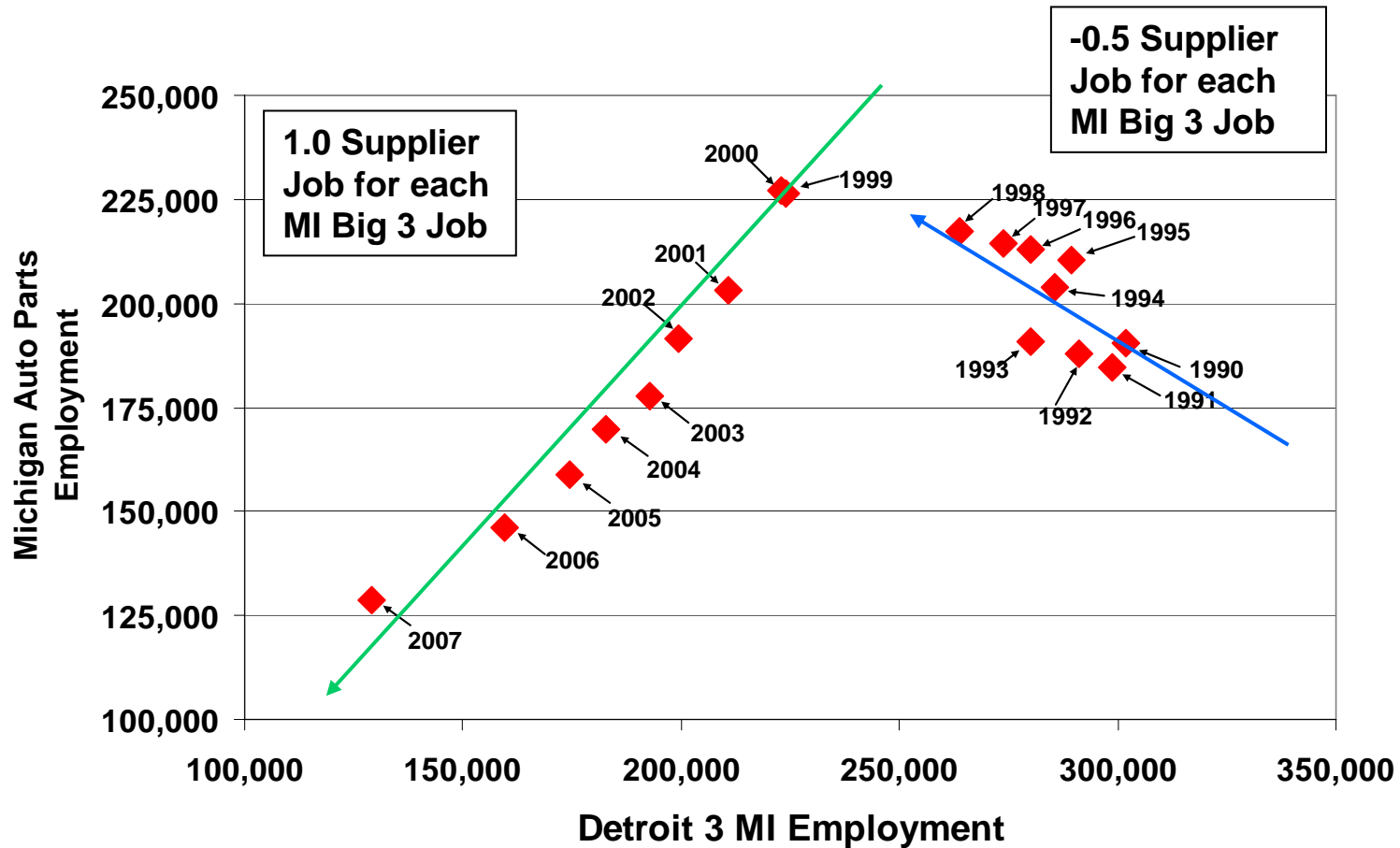
GM “Won” this Negotiation

- **GM had the:**
 - **Long-term VEBA cash**
 - **Excess Pension Funding**
 - **The Demographics! And they still do . . .**
 - **The Product Plan – so they were picked to go first.**
- **Yet, Ford has an entire plant system operating on COAs. And it has the best relationship with the union going forward – “just in case.” Will ask UAW to hold GM back if their advantage grows . . . ?**
- **Chrysler caught up with it’s two rivals, but may not have demographics (like Ford) to make as much money from this deal. So they will ignore the deal . . .**

Effect on Suppliers

- **Detroit 3 will not “get into” the component business again – but sequencing/material handling will be in-sourced.**
- **Non-manufacturing will be contracted out.**
- **Last stage supply in U.S. better be from union supplier facilities.**
- **Detroit 3 will be more competitive – should reduce pressure somewhat on suppliers for “price-downs.”**
- **Now we know exactly what UAW will ask for from suppliers. The Delphi/ACH/New Entrant Detroit Three (Metaldyne) Deal.**

Detroit 3 MI Employment vs. MI Automotive Parts Manufacturing Employment 1990 - 2007



Conclusions

- Labor contract will work to reduce or eliminate labor cost gap with Toyota N.A.
- Yet, Toyota will respond and Ford/Chrysler are heavily constrained by “demographics” to make full use of agreement. Buy-out costs will continue to rise.
- Big 3 have strong incentives to hire and retire heavily in next two years.
- Hiring may happen too quickly for training and education response.
- Yet GM “won,” and the UAW will be larger in 2011 than otherwise (38,000+ jobs) – but wages will fall everywhere in the U.S. auto industry.
- GM and Ford now offering buyouts to entire UAW Labor Force. Chrysler should move soon – CAW will have a rough ride this summer.

CAR's Employment, Attrition and Hiring Forecast

$$\begin{aligned} & \text{Forecast Employment Level} \\ & \quad - \text{Projected Attrition} \\ \hline & = \text{Potential Hiring} \end{aligned}$$

CAR's Forecast Includes:

- Detroit Three and International Automaker Employment Levels 2008-2016
- Detroit Three Projected Attrition
- Detroit Three Hiring

Trends Impacting the Forecast

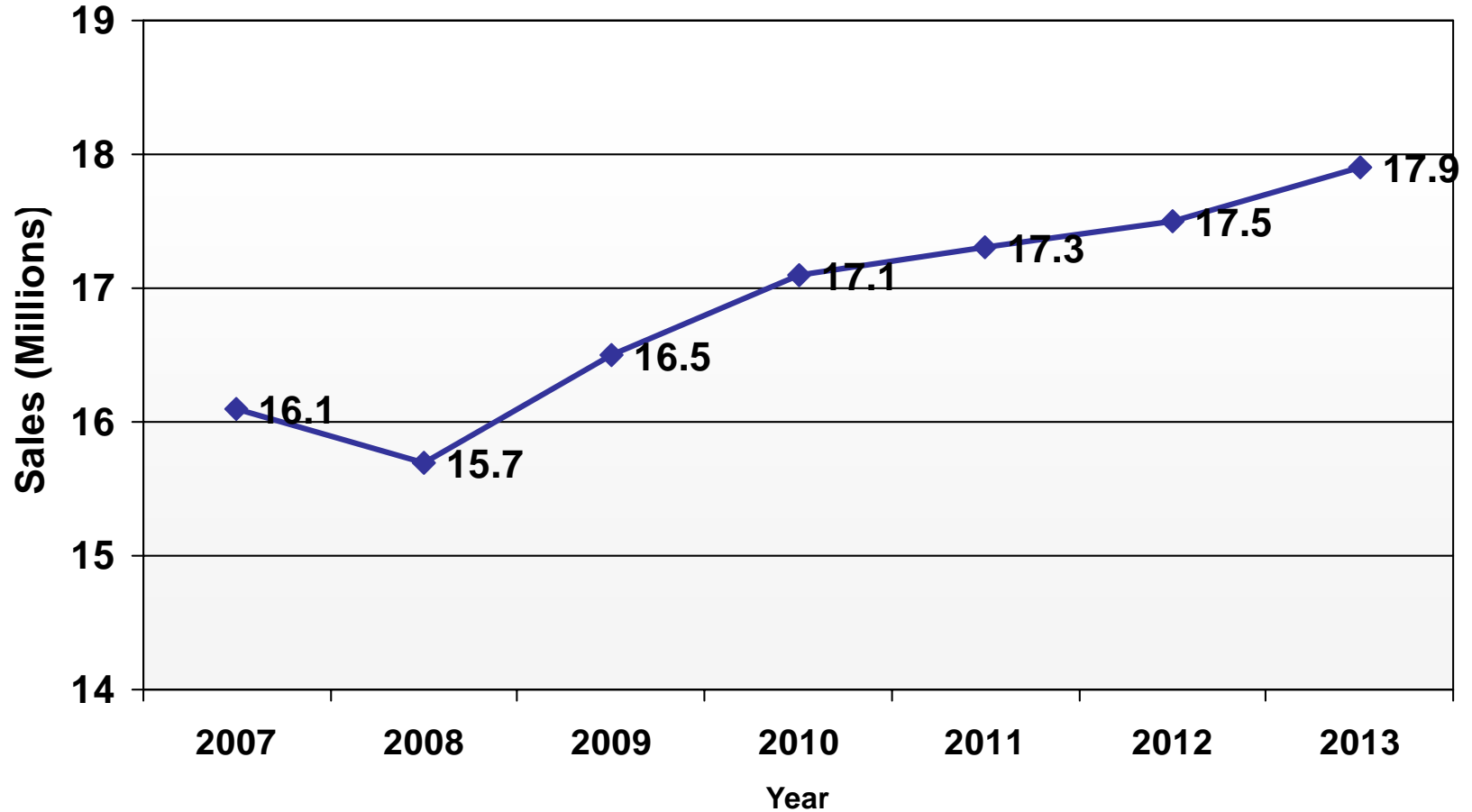
- High productivity growth in U.S. auto manufacturing and engineering
- Rapid retirement of the “baby boomer” automotive employees and their replacement by younger workers
- Replacement of traditional domestic automotive employment by international automotive employment



CAR's Forecast Model

- CAR examined:
 - Recent automotive employment trends in the United States and Michigan
 - U.S. sales, production and market share history
 - Productivity performance and trends
 - Detailed employment data, workforce demographics and projected attrition provided by the Detroit Three
 - Impact of the Detroit Three-UAW labor agreements
- CAR's model:
 - Constrains Detroit Three to match Toyota unit labor cost in N.A by 2016
 - Assumes large special attrition programs in 2008

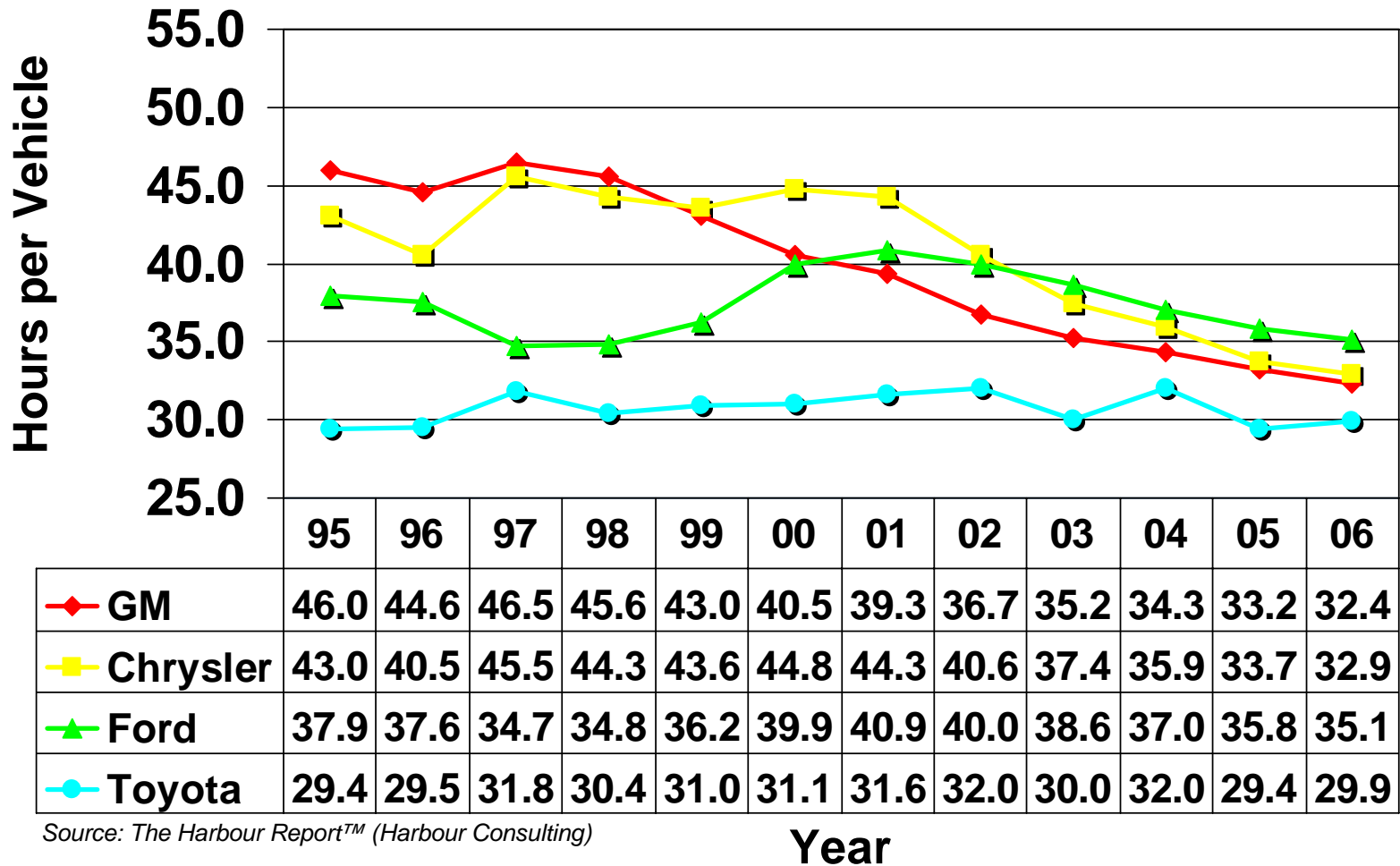
The U.S. Market: Mature but Will Grow



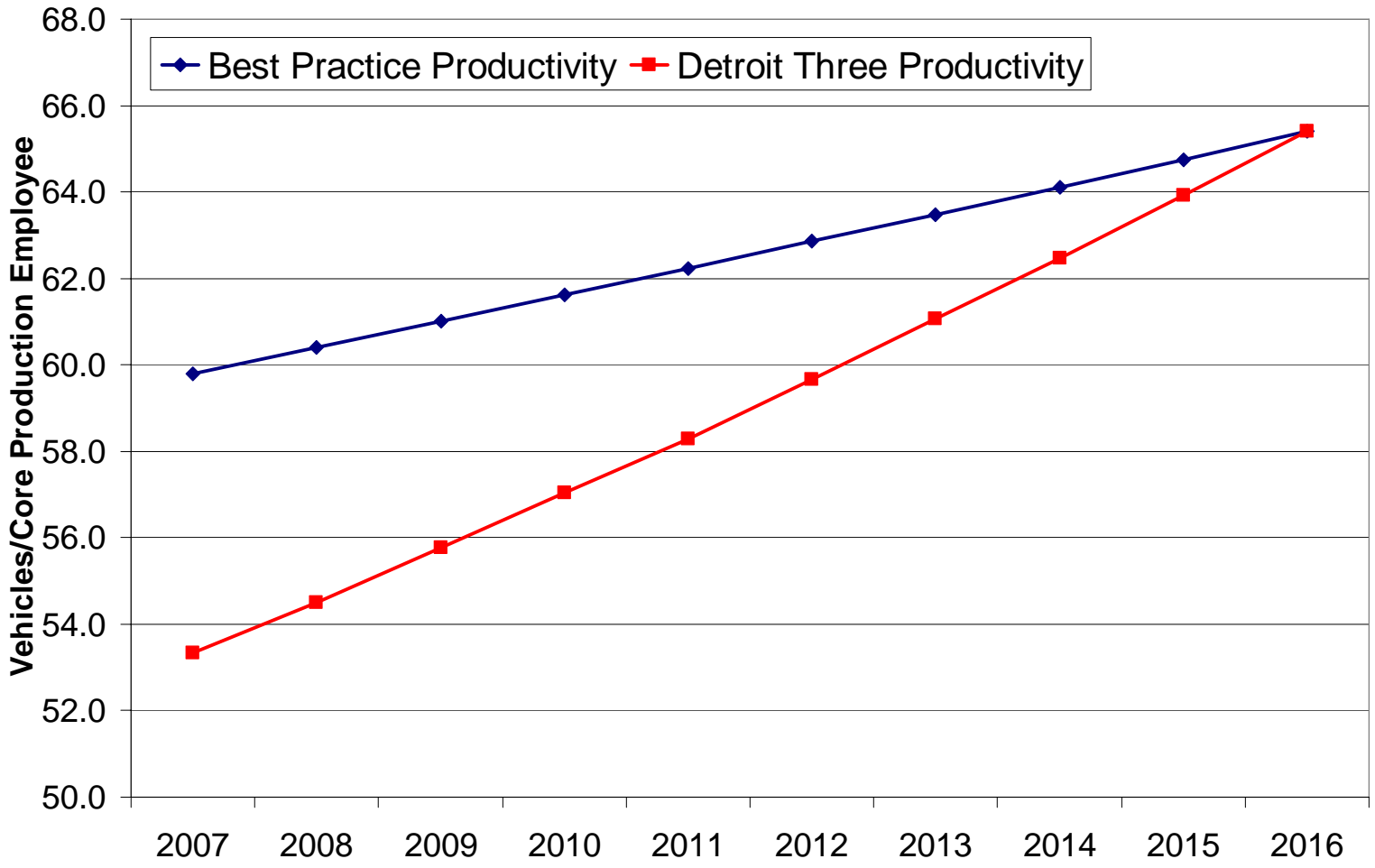
Source: CSM Worldwide and Center for Automotive Research

Harbour Productivity Estimates

It's Not about Productivity, It's About Price



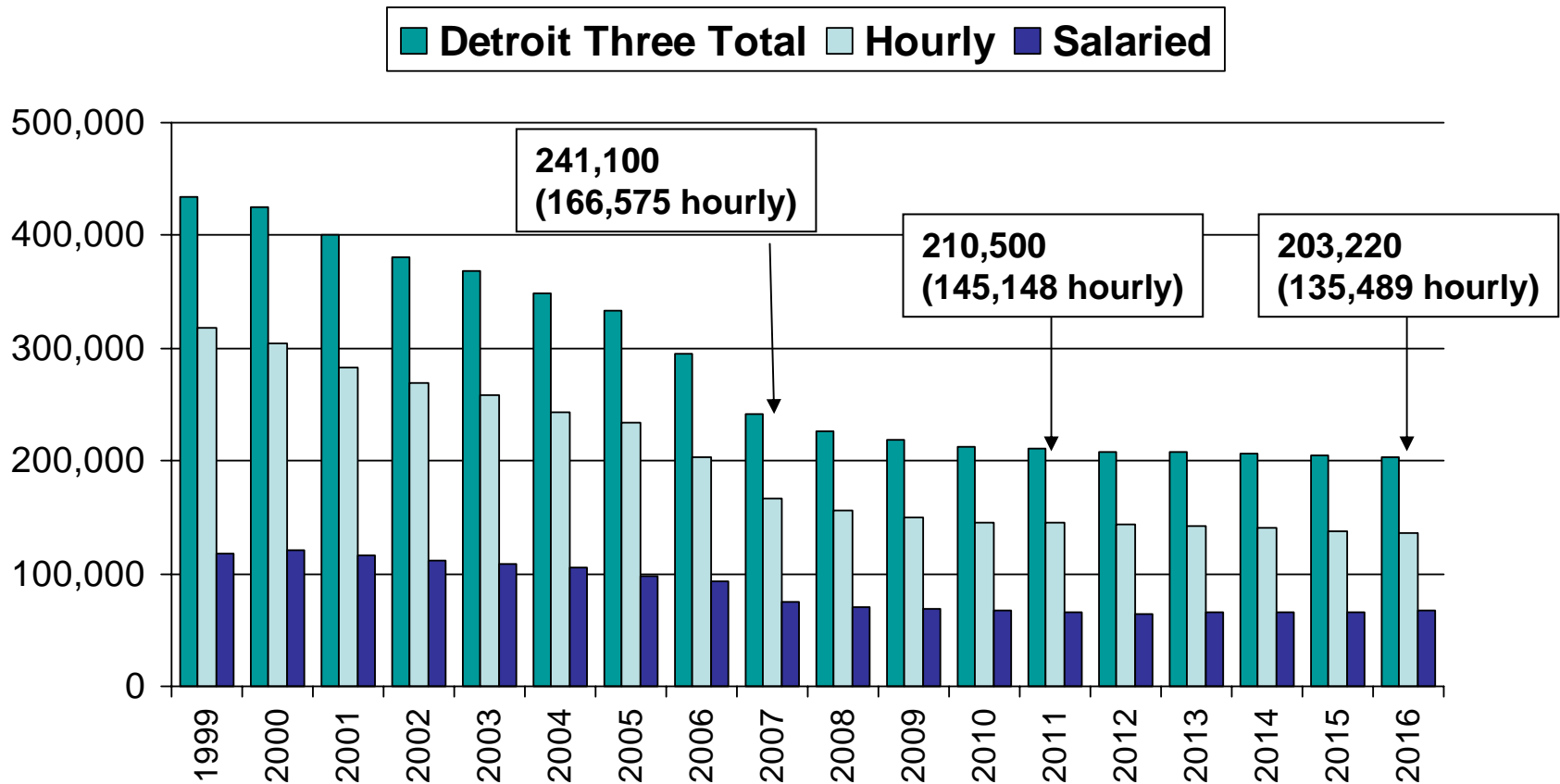
Desired Productivity Model: Detroit Three vs. North American Best Practice Productivity (Vehicles/Core Emp.) 2007-2016



Source: Company Data, The Harbour Report™ (Harbour Consulting), Center for Automotive Research

Leveling Off

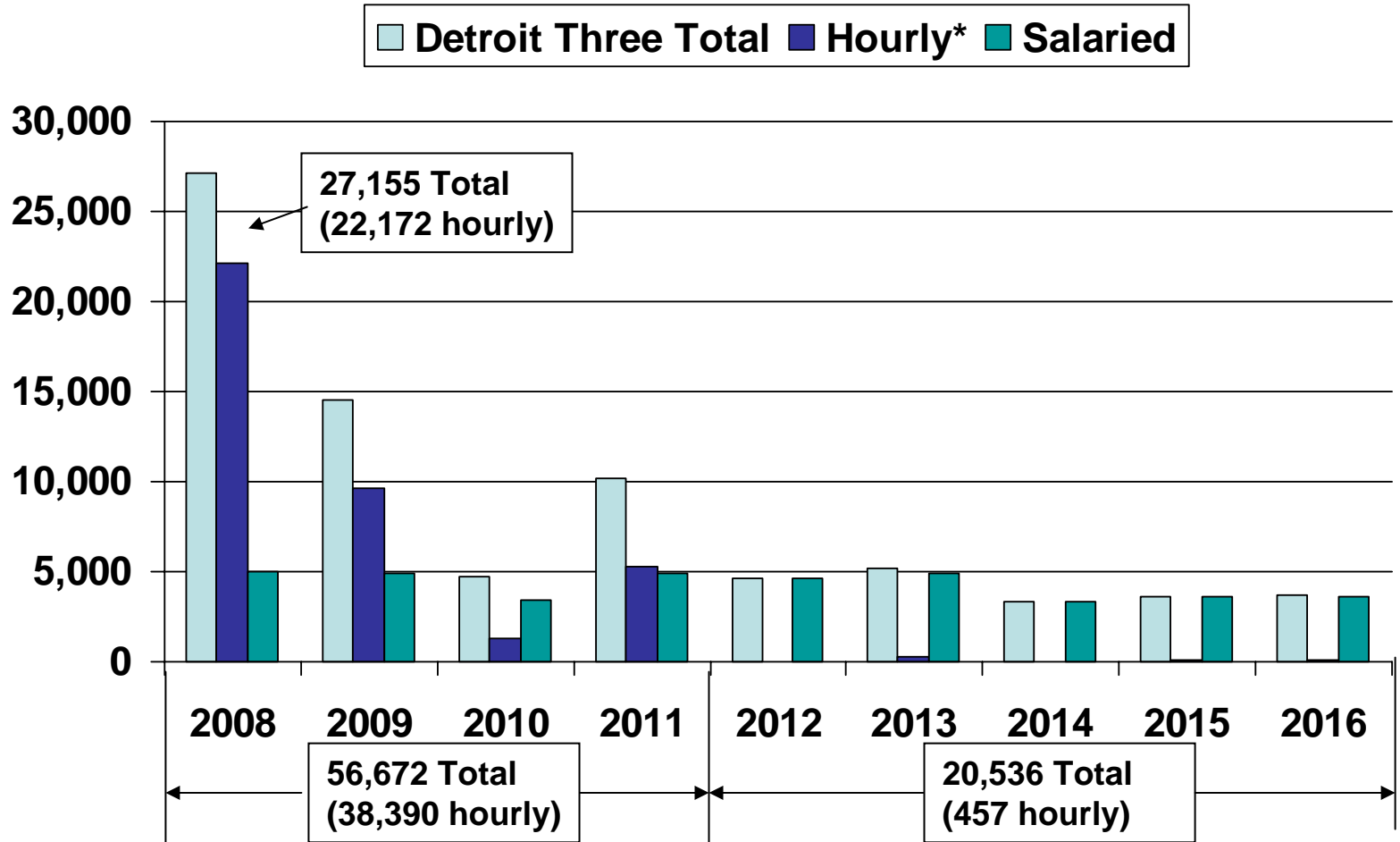
Detroit Three U.S. Employment, 1999-2016



Source: Company surveys and Center for Automotive Research estimates

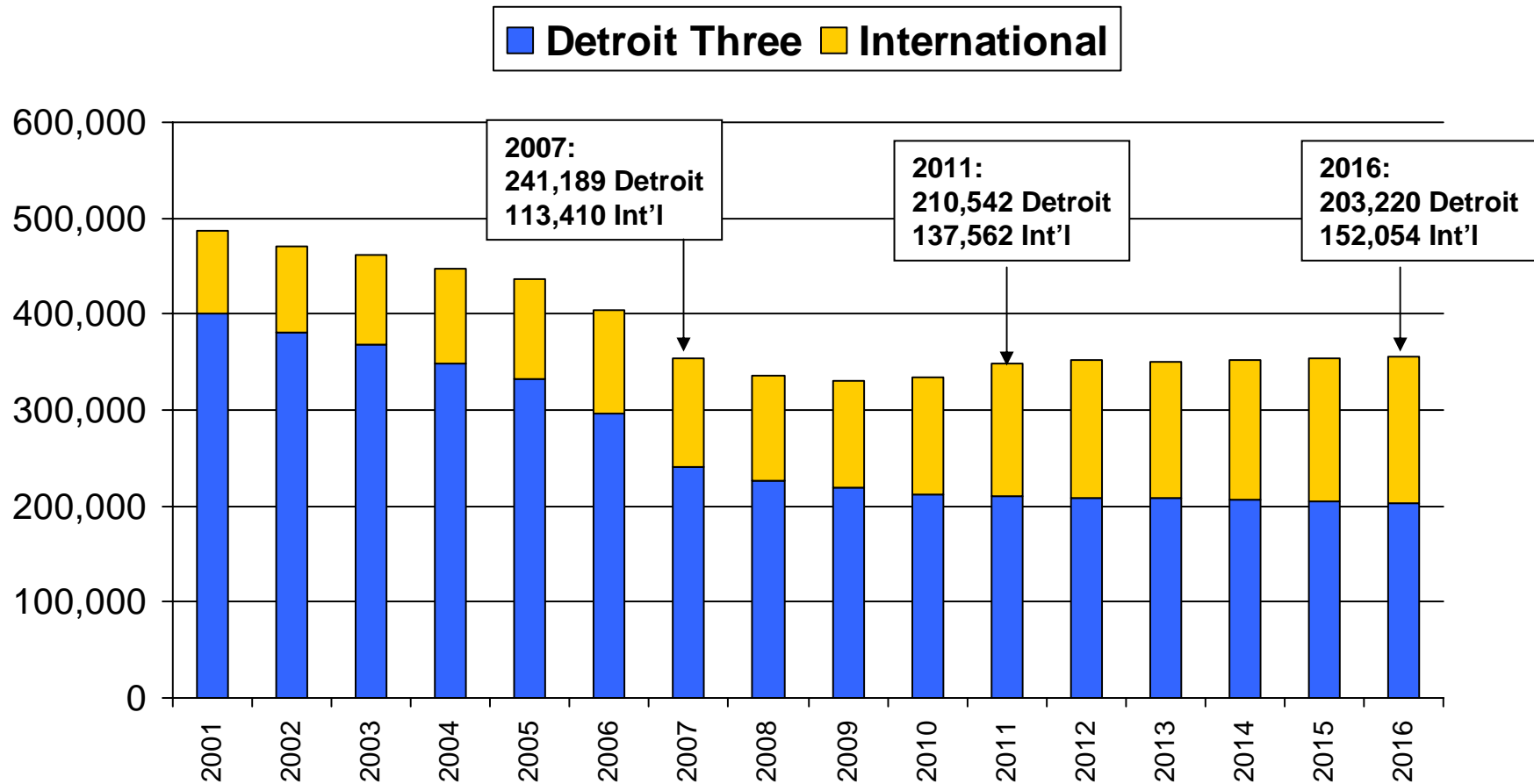
But maybe NOT in '08

Detroit Three U.S. New Hires, 2008-2016



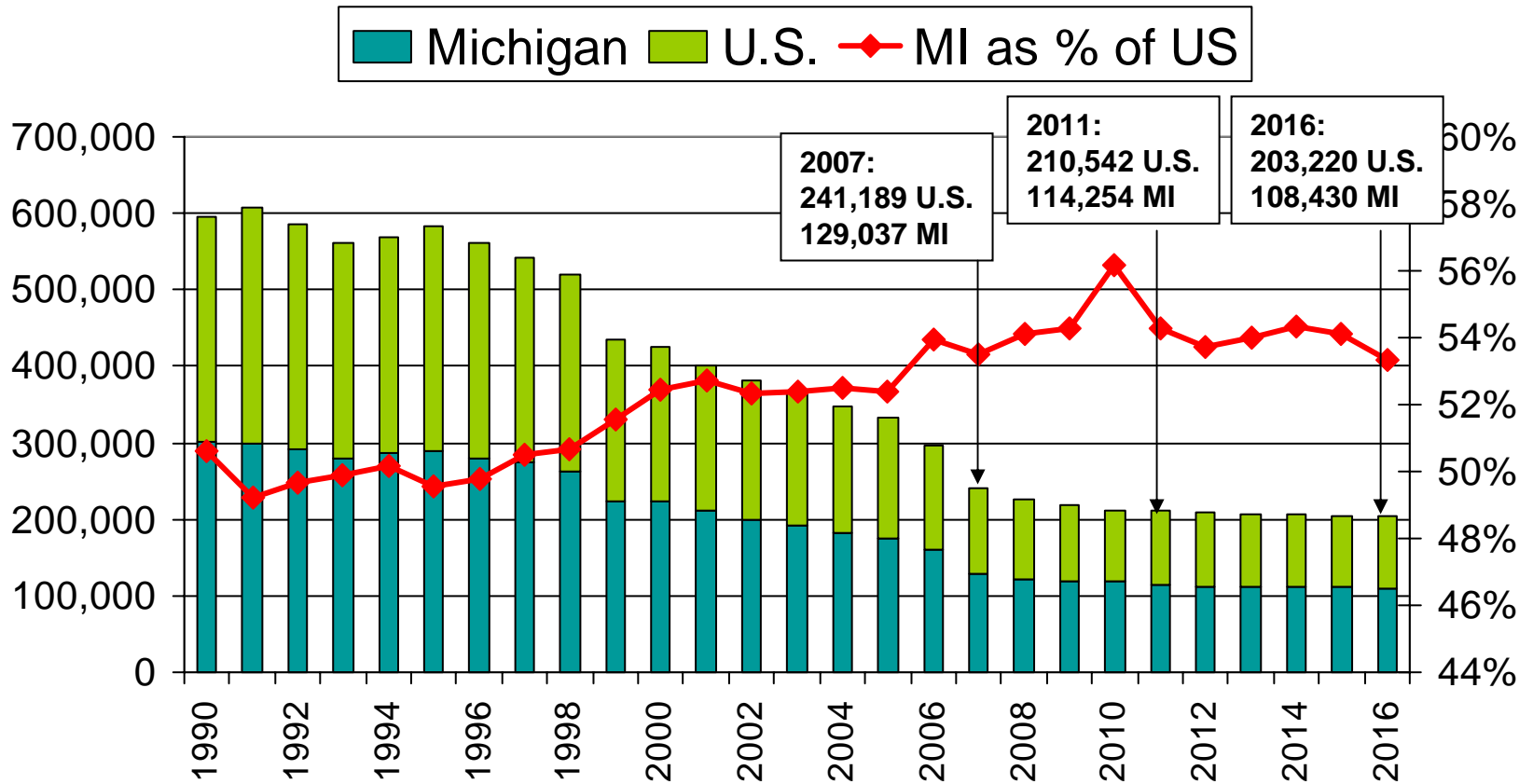
* Not include skilled trades transferred from production.

U.S. Employment Detroit Three vs. International 2001-2016



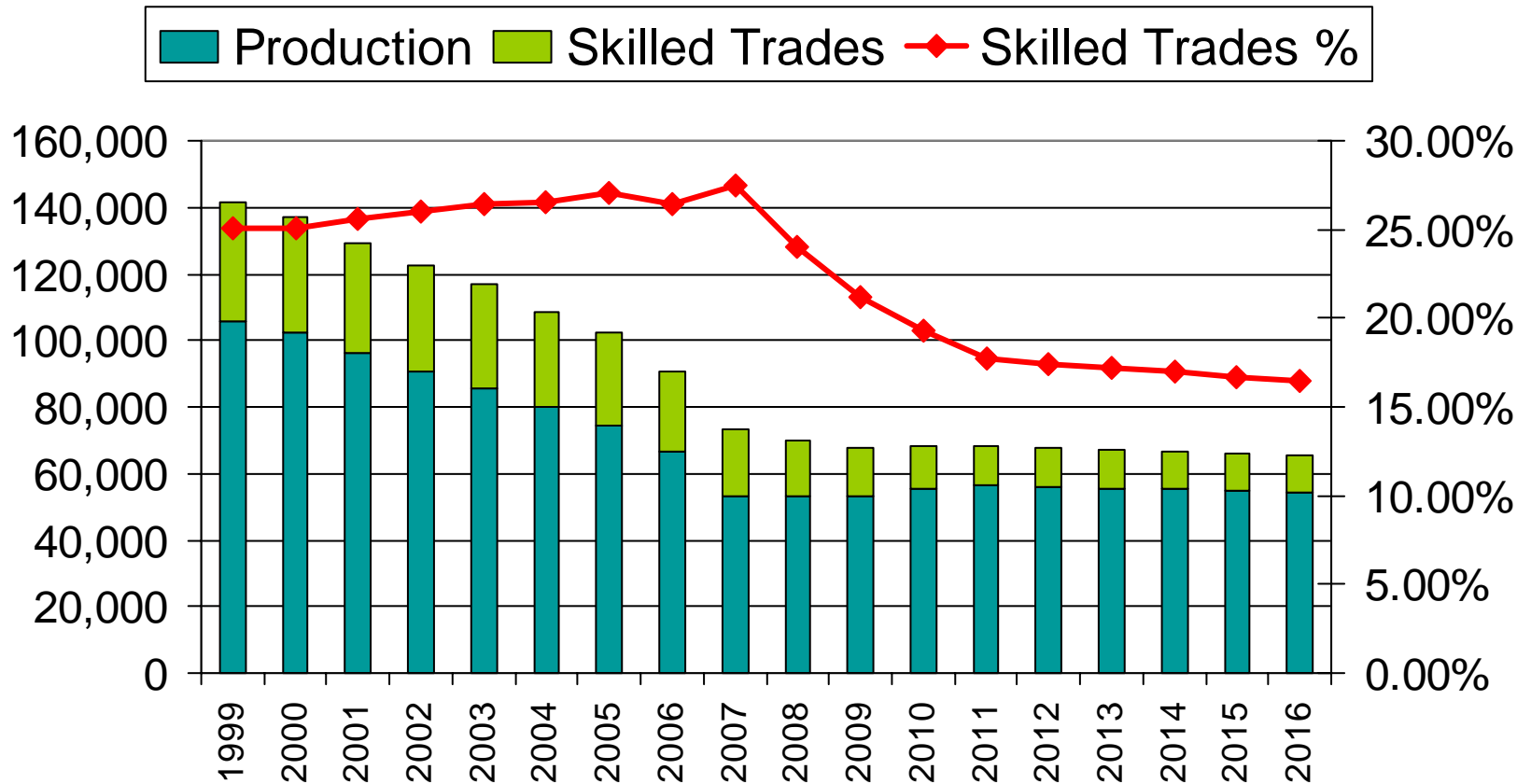
Source: Company surveys and Center for Automotive Research estimates

Detroit 3 Michigan Employment vs. Detroit 3 U.S. Employment



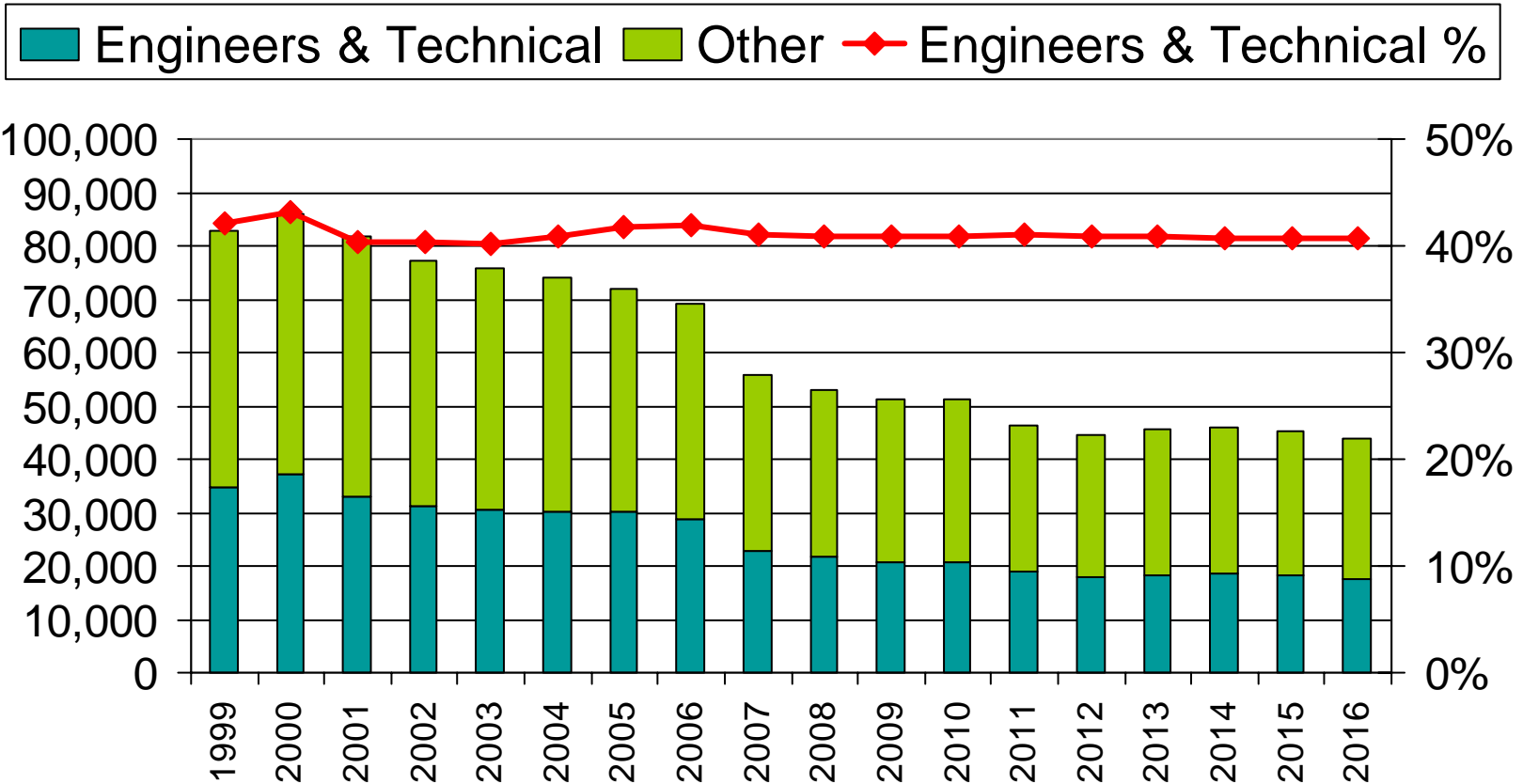
Source: Company surveys and Center for Automotive Research estimates

Detroit Three Michigan Hourly Employment by Occupation



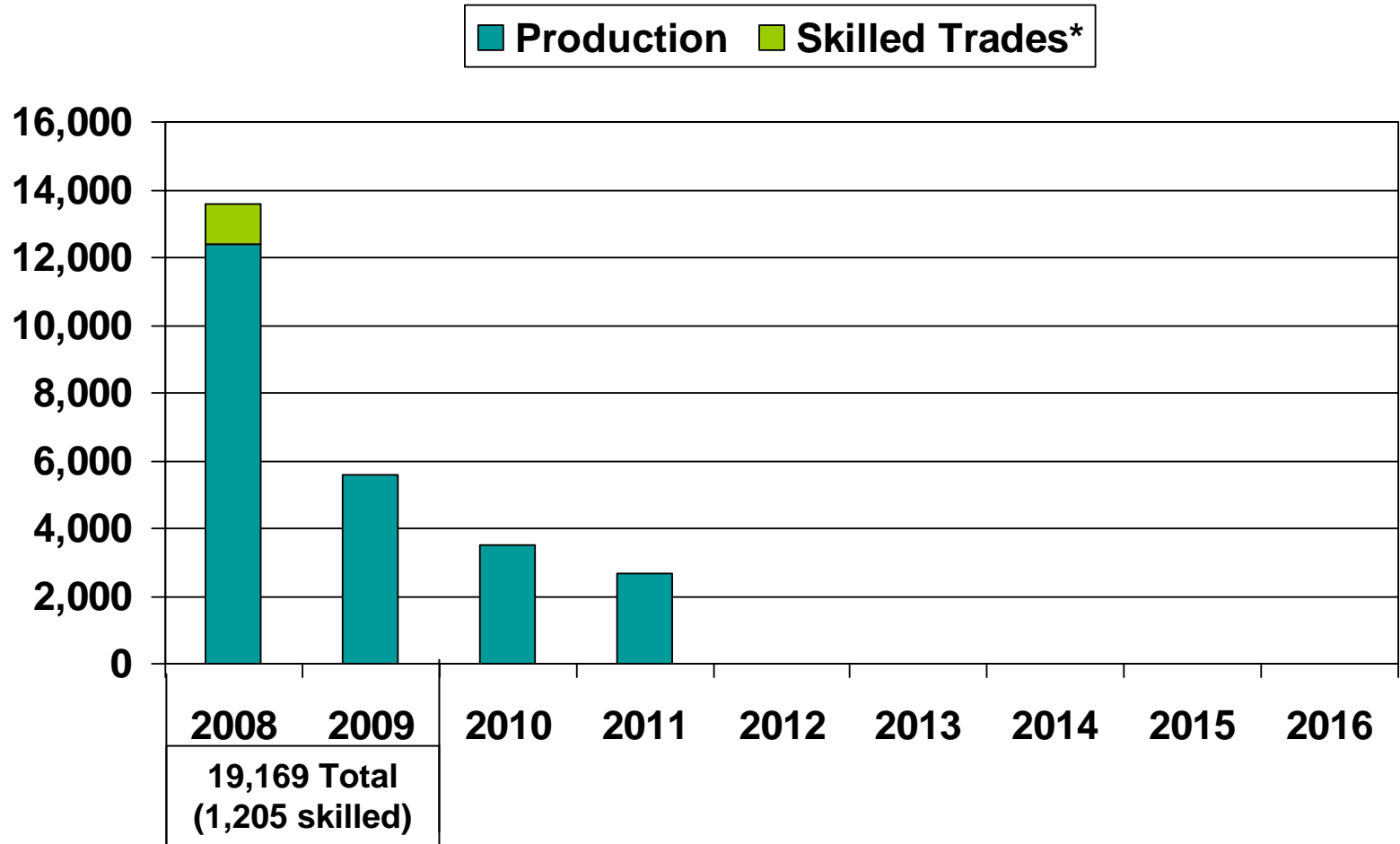
Source: Company surveys and Center for Automotive Research estimates

Detroit Three Michigan Salaried Employment by Occupation



Source: Company surveys and CAR estimates

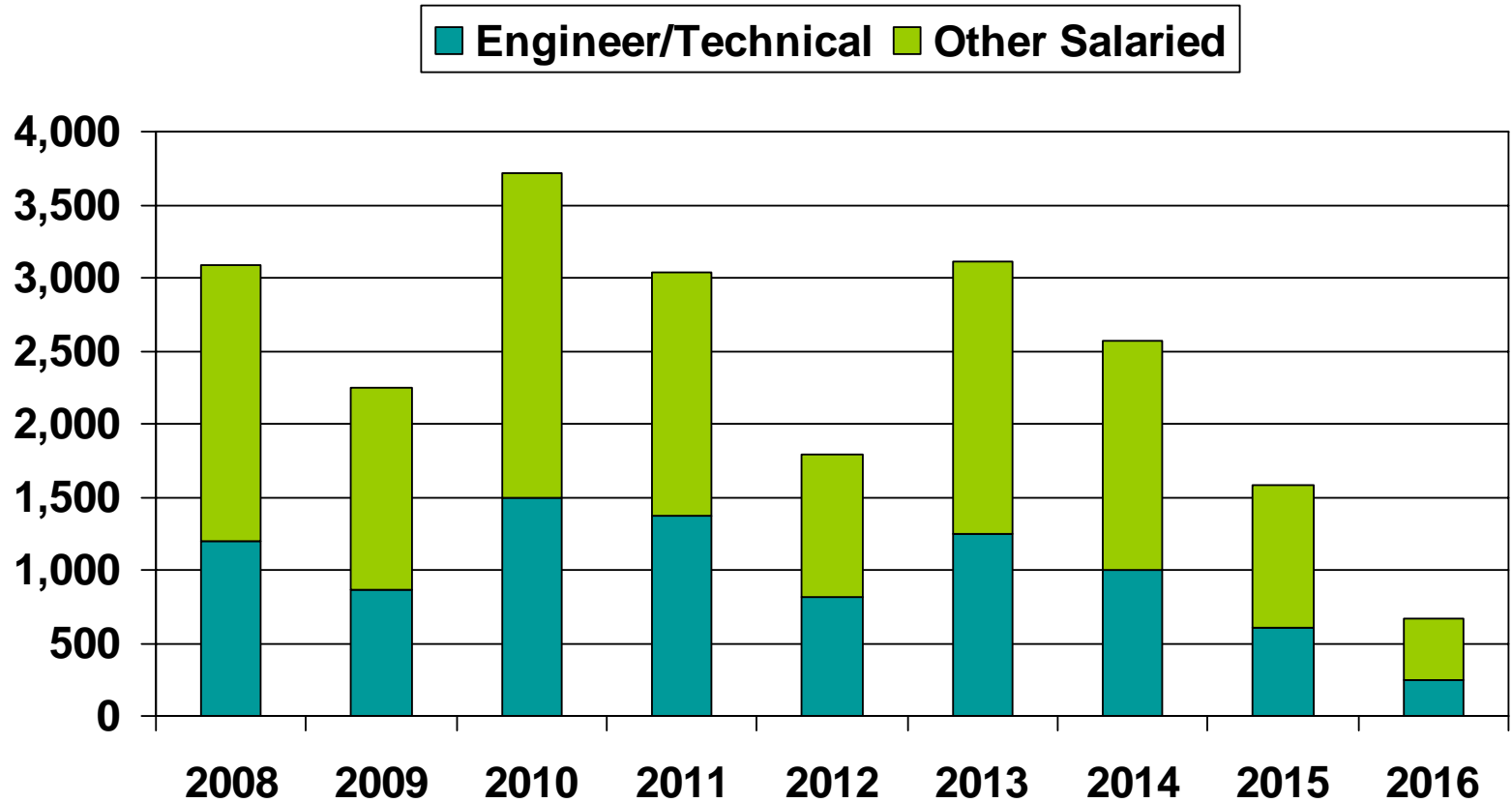
Detroit Three Michigan Hourly New Hires 2008-2016



**Transfer from production*

Source: Center for Automotive Research

Detroit Three Michigan Salaried New Hires 2008-2016



Source: Center for Automotive Research

Actual and Projected Michigan Detroit Three Employment and New Hires, Public High School Graduates and Degrees Conferred, 1997-2016

	Michigan						
	Detroit Three Employment (1)	Detroit Three Hourly New Hires (1)	Detroit Three Salaried New Hires (1)	HS Graduates (2)	Associate's (3)	Bachelor's (3)	TOTAL Degrees Conferred
1997	273,747			92,700	20,993	44,186	65,179
1998	263,705			94,125	21,731	44,289	66,020
1999	224,124			97,679	18,851	45,754	64,605
2000	222,834			96,515	19,534	46,115	65,649
2001	210,873			95,001	18,768	47,929	66,697
2002	199,464			100,301	21,298	50,178	71,476
2003	192,679			98,823	21,836	51,166	73,002
2004	182,783			101,450	23,509	51,207	74,716
2005	174,290			100,510	20,959	51,547	72,505
2006	159,519			102,990	20,924	52,354	73,278
2007	129,037			108,120	20,890	53,161	74,051
2008		12,378	3,087	107,170	20,856	53,969	74,824
2009		5,585	2,251	104,830	20,821	54,776	75,597
2010		3,501	3,721	102,920	20,787	55,583	76,370
2011	114,254	2,690	3,036	100,550	20,753	56,390	77,143
2012		0	1,784	98,940	20,719	57,198	77,916
2013		0	3,109	96,510	20,684	58,005	78,689
2014		0	2,568	96,120	20,650	58,812	79,462
2015		0	1,575	96,400	20,616	59,619	80,235
2016	108,430	0	668	95,900	20,582	60,427	81,008

Source: (1) Proprietary Company Data and CAR Research, (2) National Center for Education Statistics (NCES), "Projections of Education Statistics to 2016", December 2007, (3) National Center for Education Statistics (NCES), "Digest of Education Statistics", 1997-2006.

Why High School Graduates Will “Matter” in ‘09

- Up to 40% of available Michigan high school graduates will be needed by Detroit 3
- ‘08 hiring will be jammed into ‘09 hiring
- 43% of graduates not in labor pool
- Detroit 3 will be competing with auto suppliers and other employers for the first time with a 2nd tier wage of only \$14/hour
- On the first burst of new entry hires at GM will go quickly to the 1st tier wage rate

Central Conclusions

- Considerable hiring in the U.S. and Michigan automotive industries
- Total U.S. automaker employment will remain constant around 355,000
- Michigan will level off in 2011

Hiring and Training OEM Production and Skilled Employees

Michigan Detroit Three Hourly New Hires 2008-2016

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2016	108,430	0	668	95,900	20,582	60,427	81,008

24,154 Production New Hires
1,205 Transfers to Skilled Trades

Source: (1) Proprietary Company Data and CAR Research, (2) National Center for Education Statistics (NCES), "Projections of Education Statistics to 2016", December 2007, (3) National Center for Education Statistics (NCES), "Digest of Education Statistics", 1997-2006.

Interviews

- Participants were senior level HR executives responsible for hiring and training production and skilled workers/maintenance associates at:



Spring and Summer of 2007 – prior to onset of contract negotiations with UAW

Interview Outline

- Production
 - Hiring qualifications
 - Hiring Process
 - Training
- Skilled Workers/Maintenance Associates
 - Number of classifications and types
 - Hiring qualifications
 - Hiring process
 - Education and training
- Nature of Future Automotive Work Beyond 2010
 - Supervision
 - Teams/Cross-functional work
 - Automation
 - Types of Work
 - Regional Differences
- Performance of Education System (suggested curricula and programs)

Content of Production Work

- More complex as the product and technology become more advanced
- Complexity requires high levels of:
 - literacy
 - numeracy
 - communication skills
 - team skills
 - computer skills
- Fewer physical demands



Hiring Production Workers

APPLICATION FOR EMPLOYMENT

PERSONAL INFORMATION DATE OF APPLICATION: _____

Name: _____
Last First Middle

Address: _____
Street (Apt) City, State Zip

Alternate Address: _____
Street City, State Zip

Contact Information: () () _____
Home Telephone Mobile Email

How did you learn about our company? _____

POSITION SOUGHT: _____ Available Start Date: _____

Desired Pay Range: _____ Are you currently employed? _____
By Hour or Salary

EDUCATION

	Name and Location	Graduate? - Degree?	Major / Subjects of Study
High School			
College or University			
Specialized Training, Trade School, etc...			
Other Education			

Please list your areas of highest proficiency, special skills or other items that may contribute to your abilities in performing the above mentioned position.

- Surplus of applicants for current positions
- All automakers use contract workers
- Temporary workforce is a source of permanent hires
- All respondents concerned about future labor supply

Training Production Workers

- All have extensive corporate training programs
- Initial training: a few weeks to three months
- Annual refresher training:
 - ❖ Health & Safety
 - ❖ Environmental compliance
 - ❖ Quality
 - ❖ Legal issues (EEO, diversity and sexual harassment)
- Voluntary additional training is available
- Most training is in-house
- Vendors provide equipment-specific training

Skilled Trades/Maintenance Associates

Detroit Three

- Have a large number of classifications
- Goal is to have fewer than 10



>25 Percent of Workforce

International Automakers

- Have 2 to 3 maintenance classifications



<12 Percent of Workforce

Hiring Skilled Trades/ Maintenance Associates

- Most promoted from production
- Must demonstrate aptitude (through testing) in:
 - ❖ Math
 - ❖ Technical reading
 - ❖ Computer literacy
 - ❖ Problem solving
 - ❖ Analytical skills
- Detroit Three oversupplied in nearly all trades
- All respondents concerned about the future pipeline of skilled workers



Training Skilled Trades/ Maintenance Associates

Detroit Three

- Union agreements govern apprenticeship
- Technological advances will drive training changes
- Support a first year shared curriculum for all trades

International Automakers

- Offer 2-3 years of training
 - Almost exclusively OJT at one company
 - A combination of job rotations and classroom training at the other

All

- Ongoing training is provided – more intense with new equipment/processes
- Technical and community colleges are key providers

Changes in Skilled Trades/ Maintenance Associate Work

Detroit Three Want

- Fewer classifications
- Higher utilization
- More flexibility in assignments
- Want to eliminate “deep” maintenance
- Greater use of team concept among the trades

International Automakers Have

- Cross-skilling
- Team approach to maintenance work
- No “deep” maintenance
- No foreseen changes

Nature of Future Automotive Work

All

- Teams will be integral
- Most custodial, grounds and housekeeping work either is or will soon be outsourced
- Flexible manufacturing equipment requires workers who can problem solve (software)
- Work is commonized across global operations
- Any remaining skills gaps between U.S. and other regions are closing quickly

Detroit Three

- Less supervision
- More empowered work teams
- Seek to outsource
 - Building maintenance
 - Specialized and rare projects

International Automakers

- No change in supervision
- No change in team duties
- Utilize in-house maintenance as much as possible

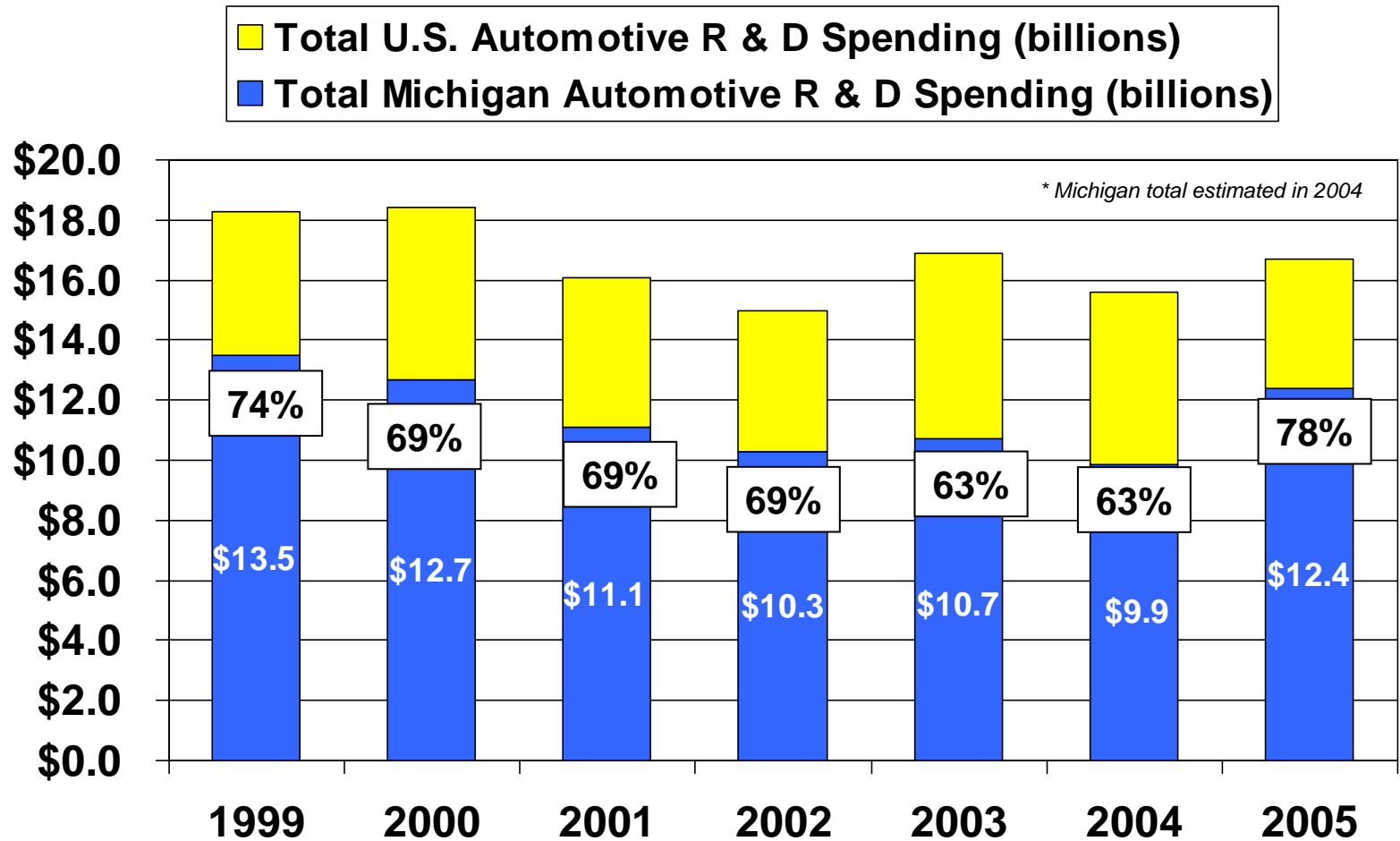
Performance of U.S. Education System

- Need to set very high skills standards in preparing the future workforce
- The basics—reading, writing, math and computer literacy—will continue to be key
- Attracting students to a career in the auto industry is a challenge—and one that must be met in middle school/junior high classrooms



Hiring and Training OEM Engineering and Technical Employees

Michigan Share of U.S. Automotive R&D



Source: National Science Foundation

They Will Hire . . .

- Detroit 3 will employ 22,300 engineers in the U.S. in 2016 (24,700 in 2007).
- Will hire 12,890 during 2008-2016 in U.S.
- Will hire 8,850 during 2008-2016 in Michigan or 1,000 per year.

INTERVIEW OUTLINE

AUTOMOTIVE HR ISSUES OF 2010 AND BEYOND:

Engineers and Technicians

- Recruiting and training future automotive engineers and technicians
- Current and major changes expected
- Level of demand/size of market for various types of engineers and technicians
 - Manufacturing
 - Industrial
 - Mechanical
 - Electrical
 - Other
- Hiring qualifications
 - Work experience (types and lengths)
 - Education and certification (level and achievement)
 - Specific skills
 - Business
 - Teams/Cross-functional work
 - Language and cultural
 - Other
 - Other
- Hiring process
 - Sources of new hires
 - Referential
 - Universities and colleges
 - School to work, coop, internships
 - Contract workers
 - Other automotive firms
 - Other
 - Screening criteria
 - Other
- CAD Technical and engineering fields that will be “core v. non-core” in 2010
- Changes in engineering & technical employment NOT related to changes in company size in 2010 and beyond
 - Design consolidation
 - Partnerships with suppliers
 - Use of contractors
 - Global sourcing
- Engineering/technical employment strategy in 2010 and beyond
 - Proportion of engineers vs. technicians
 - Future changes in allocation of work to degreed engineers vs. technicians
- Adequacy (2010 and beyond)
 - Supply/U.S. relative position as a source of engineering and technical labor
 - U.S. technical and engineering educational programs as a source of engineering and technical labor
- Training
 - Future engineering/technical skill needs
 - Language and cultural training
 - Business and management
 - Other
 - Suggested curriculum changes at
 - Technical and community colleges
 - Four-year degree institutions
 - Importance and description of required internship or school-to-work

Future Engineers

- Mechatronic engineering will dominate future hiring at motor vehicle firms not only for vehicle design and engineering, but also manufacturing engineering.
- The use of electrical engineers will also increase as electronic content greatly increases in the vehicle.
- Knowledge of specific powertrain technologies will also become critical.

Hiring Requirements

- A four-year degree in engineering.
- Well-versed in computer design and CAE techniques
- Must work in teams, must possess business acumen and project management skills, and be culturally aware.
- New engineers will be hired from other companies, on referral, and straight out of educational institutions. Useful experience is highly valued.
- The hiring of engineering graduates from cooperative engineering programs (often company-based) will expand dramatically for graduate hires.
- Required education levels for both engineering and technician applicants will rise in the future.
- Technicians will need a four-year diploma and even auto service technicians at dealerships will require an associates degree.

Core Fields

- Vehicle integration
- Powertrain engineering
- CAE
- Modularity will be reversed.
- The use of contract engineers is expected to decline in the future at all of the firms, but not so in the case of technicians.
- Fewer technicians will be used in the future by a number of the companies. The CAD drawing work in particular will be contracted out.

Recommendations for educational institutions

In general, the following types of programs were recommended:

- Training in the use of CAD drawing and CAE connected to actual subject material
- Education in subjects of fuel economy technologies and alternative fuels
- Training in quality analysis methods such as Six Sigma
- Education in project management and other business skills
- The development and maintenance of cooperative education programs connected to motor vehicle firms.

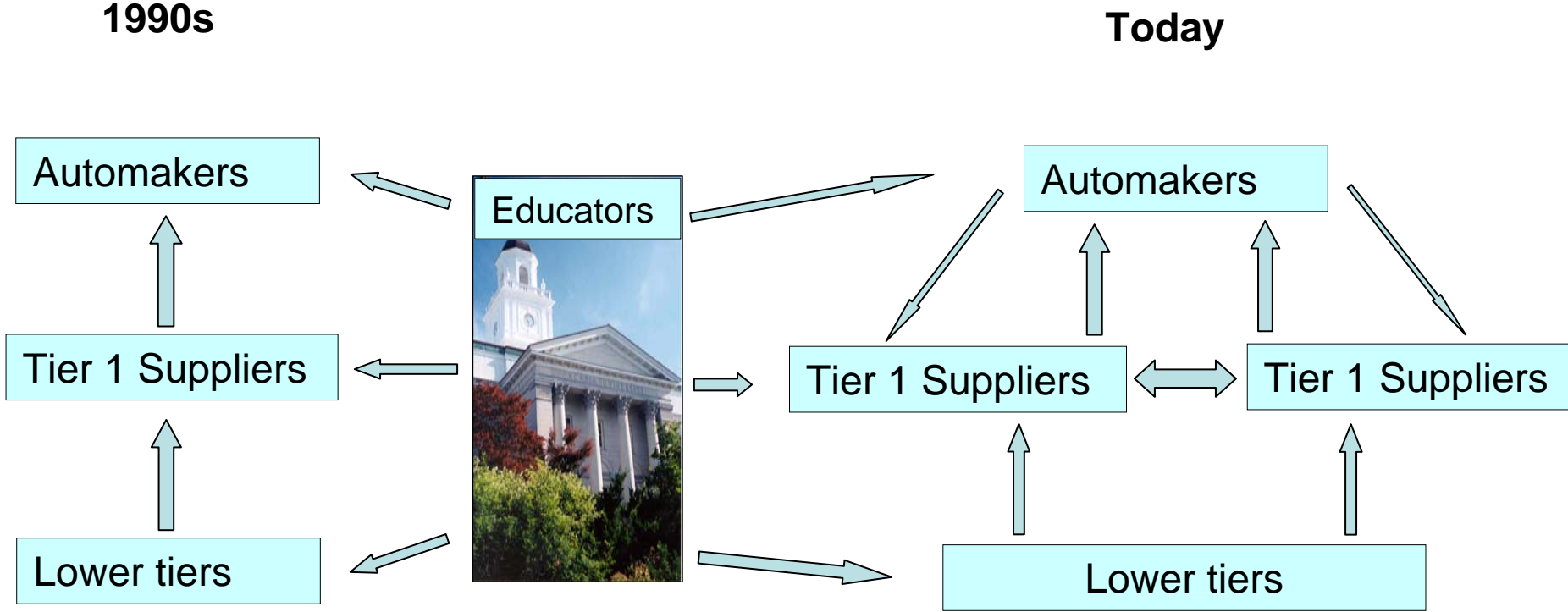
The companies are generally comfortable about the adequacy of the supply of engineers in the future. However, there were worries by at least one firm about not being the first choice of graduates. All of the firms had worries about the skills imparted to students by educational institutions in terms of practical hands-on knowledge, business skills, and attitudes towards employment.

Hiring and Training Supplier Engineering Employees

The Labor Needs of Automotive Suppliers - Engineering Highlights

- The study covers engineers and production workers – engineers are discussed here
- Results based on interviews with seven large Tier 1 automotive suppliers

A Transformation of the Automotive Engineering Labor Food Chain



Traditional Engineering Fields Expected to Grow Steadily

- Electrical engineering (largest growth)
- Mechanical engineering (steady growth)
- Industrial engineering (less rapid growth)

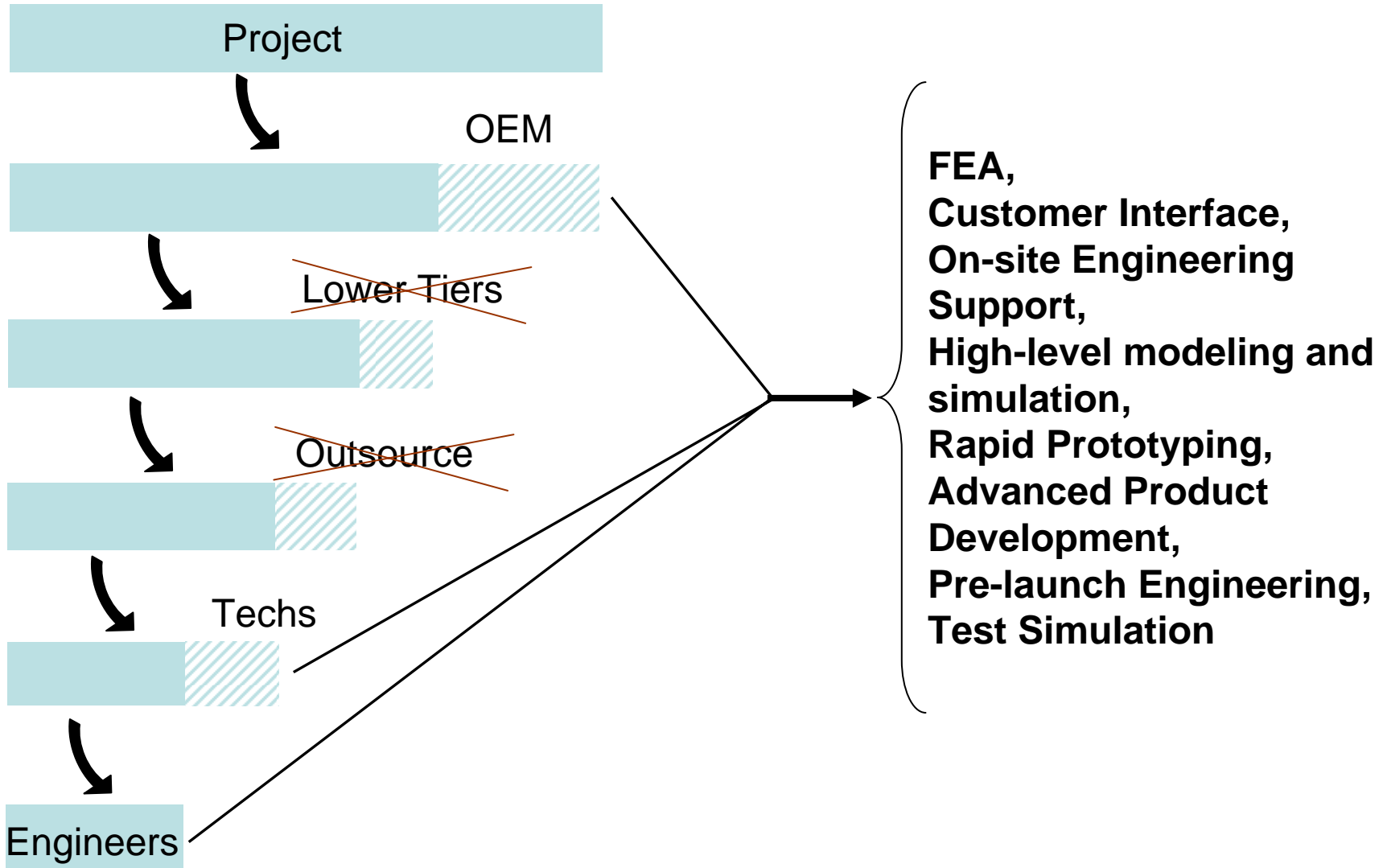
Emerging Engineering Fields Expected to Grow Rapidly

- Software engineering
- Materials engineering
- Environmental engineering
- Specialized engineering fields, e.g., Heat, Ventilation, and Air Conditioning (HVAC), Radio Frequency (RF), and circuit board design

Drivers of Change in Automotive Engineering

- Growing vehicle electronics content
 - due to government regulations (largely tied to traditional engineering fields, less profitable)
 - due to consumer demand (largely tied to emerging engineering fields, more profitable)
- Truly global, as opposed to international, operations

The Path to the First Tier Supplier Engineer's Desk



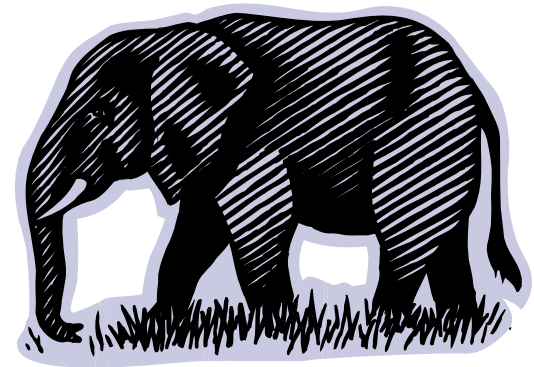
Suppliers' Recommendations for Educational Institutions

- More intensive CAD and engineering basics coverage
- Increase focus on business acumen
 - project management
 - understand financial implications of decisions
- Stress working in a team environment
- Provide experience in multi-cultural environment
- Maintain close relationship with the automotive industry

PALE Program Launch

The Whole Picture

Educators serve local employers needs well, but may not see the whole picture of the automotive industry's future from that vantage point



Power in Numbers

Together, a group of educators and workforce development professionals can gain greater access to:



- Auto company HR leaders
- Nationally-known experts
- Federal, state and local government officials
- Federal and foundation funding
- Economic developers and potential global investors

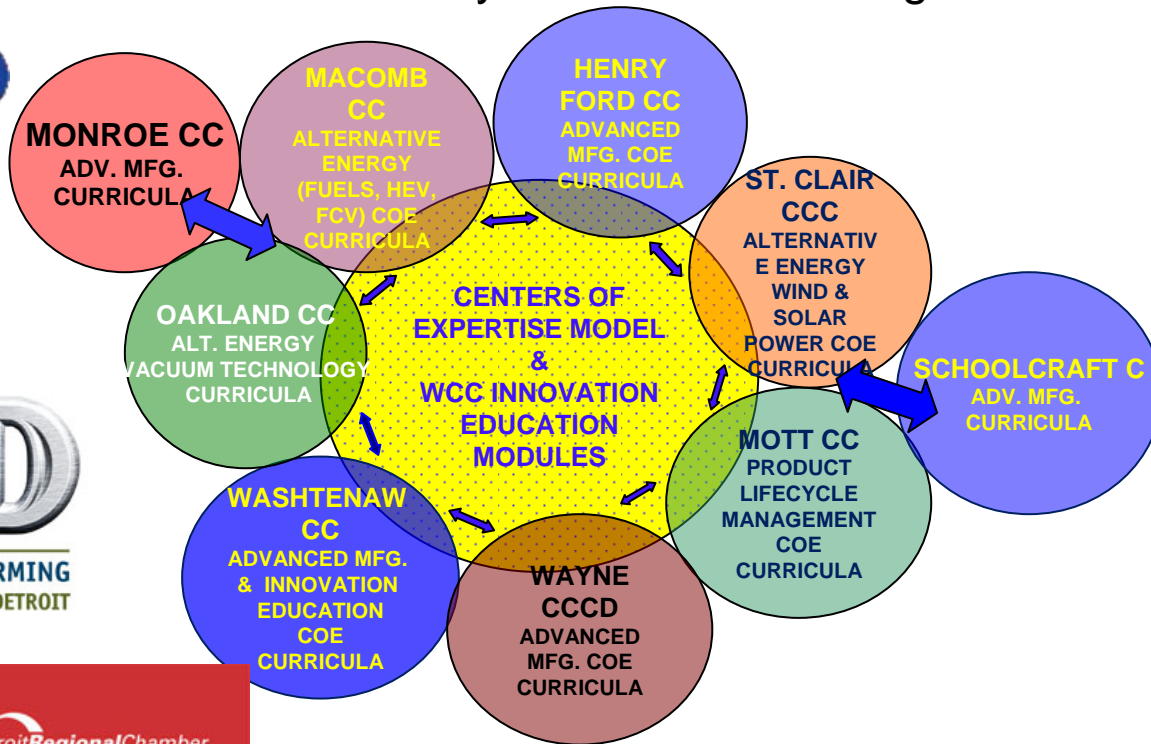
The Program for Automotive Labor and Education

- Membership:
 - Automaker and auto supplier HR executives
 - Educators (secondary and post-secondary)
 - Training professionals
 - Workforce development professionals
 - Organized labor
 - Other interested parties
- Geography:
 - Target traditional automotive region of North America (Michigan, Ohio, Indiana, Illinois, Missouri and Ontario – CAR's Automotive Communities Program footprint)

Existing Advanced Manufacturing and Automotive Education Efforts



Southeast Michigan Community College Consortium
USDOL Community-Based Job Training Grant



PALE Services

- Quarterly meetings
- Connect existing collaborative programs and regional/local partnerships
- Link to automotive economic developers
- Brief members on public policies and programs
- Support student outreach
- Increase visibility for automotive workforce hiring and training issues
- Provide members with broad automotive industry intelligence and data

PALE Sponsored Research

- Key Project:
 - Annually update (and expand) the automotive hiring forecast and study of the automakers' and suppliers' future hiring and skill needs
- Other Potential Projects:
 - Resource guide on automotive education/training best practices
 - Create database of automotive-related curricula and equipment
 - Catalog the region's university-based automotive research resources

Program Funding Model

- Current:

- Funding for the “Beyond the Big Leave” study: Charles Stewart Mott Foundation



- Funding for 2008 research dissemination: Mid-Michigan Innovation Team (MMIT)/ U.S. Department of Labor’s Workforce Innovation for Regional Economic Development (WIRED) initiative



- Future

- Goal: program core (meetings, study updates) will be member-supported
- CAR will seek foundation and government support for:
 - Special research projects
 - Outreach initiatives
 - Conference activity
 - Other endeavors supported by the membership

For More Information

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