Robert Eller Associates, Inc.

CONSULTANTS TO THE PLASTICS AND RUBBER INDUSTRIES

AUTO INDUSTRY CHANGES IN EUROPE/N. AMERICA AND IMPLICATIONS FOR TPEs

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PREPARED FOR:
JAPAN TPE SEMINAR
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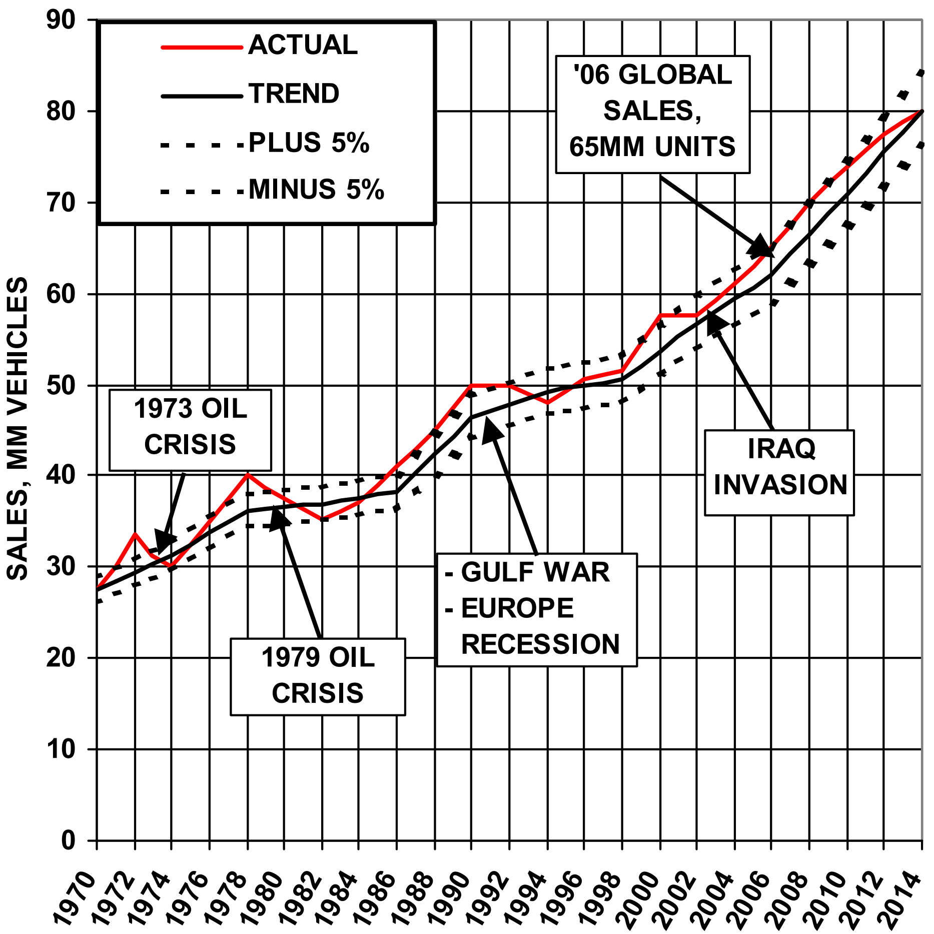
FACTORS AFFECTING AUTO SECTOR

- THE SUPPLY CHAIN WILL BE RESHAPED
- VEHICLE PRICE DECLINES CONTINUE
- "HIGH" N. AMERICAN FUEL PRICES CONTINUE
- NET TECHNICAL INFLOW TO U.S. CONTINUES
- U.S. AUTO INDUSTRY HAS 3-5 YEAR TECH. LAG
- MATERIALS/PROCESS TECHNOLOGY IS A PATH TO ADDING VALUE
- FLEET COMPOSITION ADAPTS TO ECONOMIC PRESSURES (E.G., DOWNSIZING STARTED IN U.S.)
- AUTO MANUFACTURING GROWTH SHIFT TO ASIA

GLOBAL AUTO INDUSTRY CHARACTERISTICS

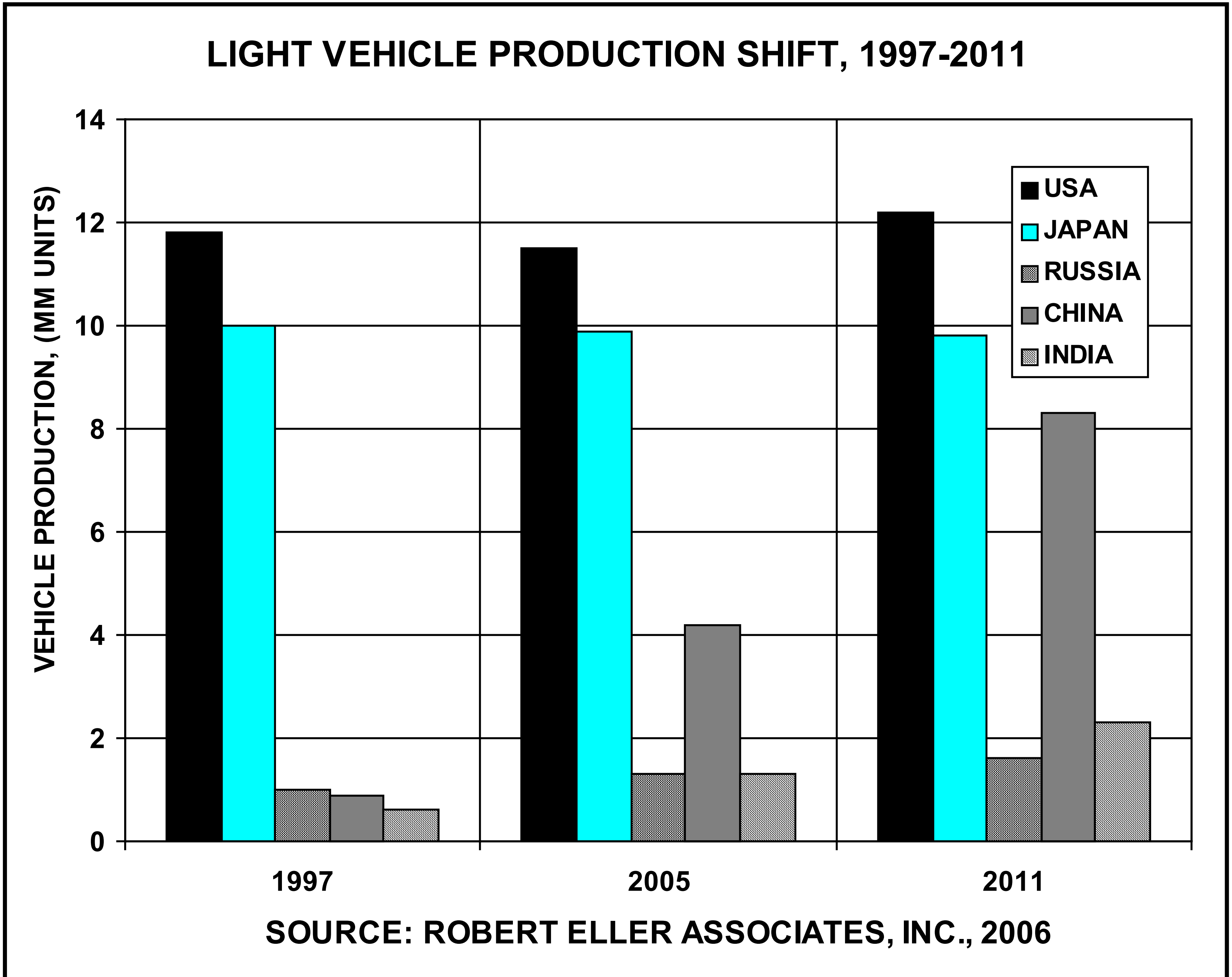
- **PRODUCTION GROWTH 3%/YR. THROUGH 2012**
- **DEMAND HISTORY +/- 5% OFF TREND SINCE 1970**
- **GLOBAL OVERCAPACITY**
- **STAGNANT U.S./EUROPE DEMAND**
- **DEMAND GROWTH SHIFT TO ASIA PACIFIC**
- **MINI/SMALL CAR (B SEGMENT) SHARE GAIN GLOBAL/U.S.**
- **GROWTH OF <u>DOMESTIC</u> ASIA PACIFIC OEMs**
- **SHARE LOSS BY U.S./EUROPEAN DOMESTIC OEMs**

GLOBAL LIGHT VEHICLE PRODUCTION TREND LINE

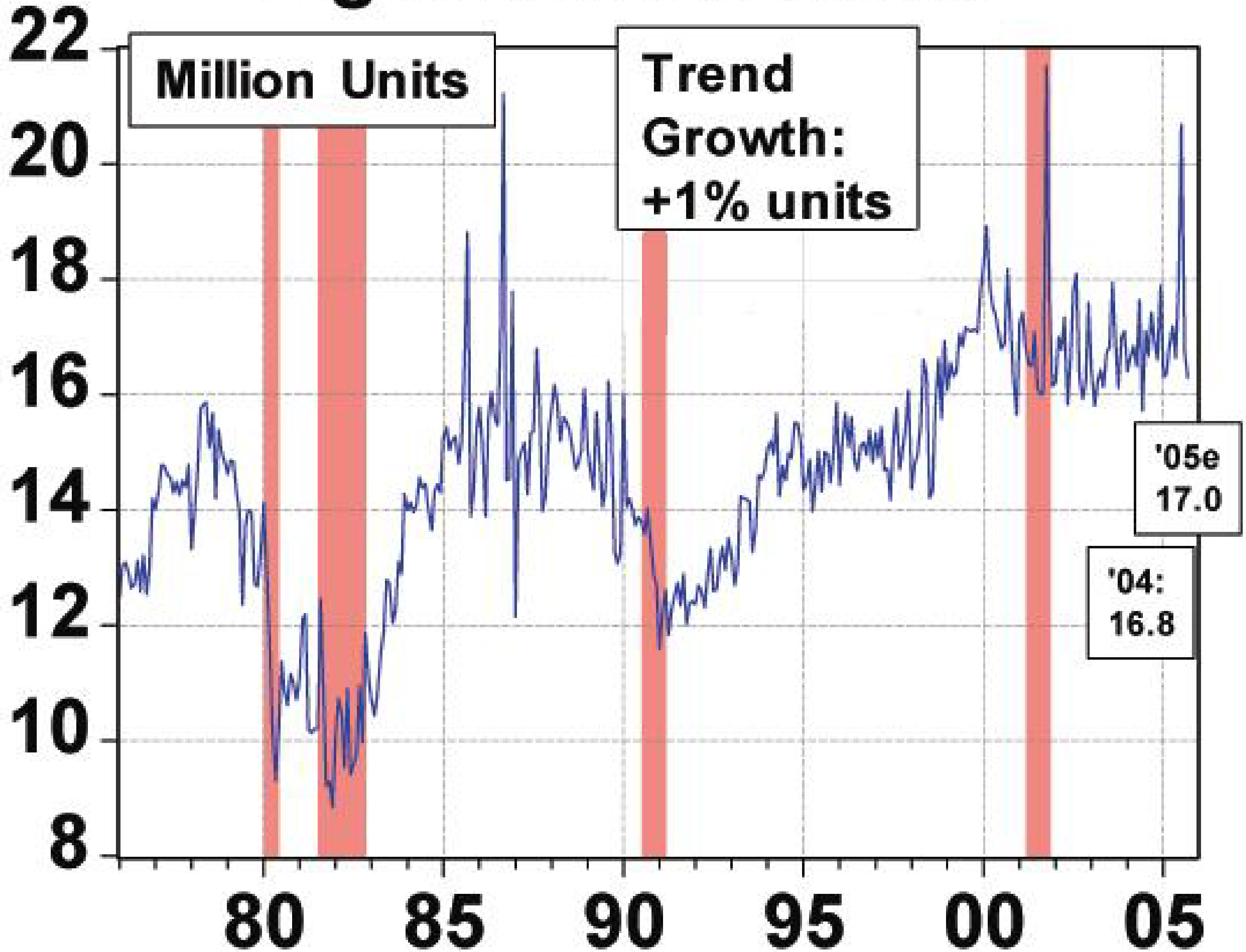


SOURCE: GM, WARDS, ROBERT ELLER ASSOCIATES, INC., 2006

- 2011 GLOBAL SALES COULD REACH 75MM UNITS
- GLOBAL AAG = 3%/YR.
- ASIA PACIFIC GROWTH 7.5-8.5%/YR.?
- WESTERN GROWTH STAGNANT OR DECLINE
- GLOBAL FLEET SHIFT TOWARD SMALLER CARS
- VARIATIONS HAVE BEEN IN +/- 5% BAND SINCE 1970


LIGHT VEHICLE PRODUCTION SHIFT, 1997-2011
VEHICLE PRODUCTION, (MM UNITS)
14
12
10
8
6
4
2
0
USA
JAPAN
RUSSIA
CHINA
INDIA
1997
2005
2011
SOURCE: ROBERT ELLER ASSOCIATES, INC., 2006

Light Vehicle Sales



SOURCE: CLEAR VIEW ECONOMICS L.L.C., 2006

GLOBAL OIL DEMAND WILL REMAIN HIGH

REGION	DEMAND MM BBLS/DAY		AAG, %/YR
	2003	2030	
OECD/NIE	48.9	63.7	1.0%
NON OECD, EX CHINA	25.4	56.0	3.0%
CHINA	5.5	18.7	4.6%
TOTAL	**79.8**	**138.4**	**2.1%**
TRANSPORTATION	46.3	83.0	2.2%
TRANSPORTATION	58.0%	60.0%	

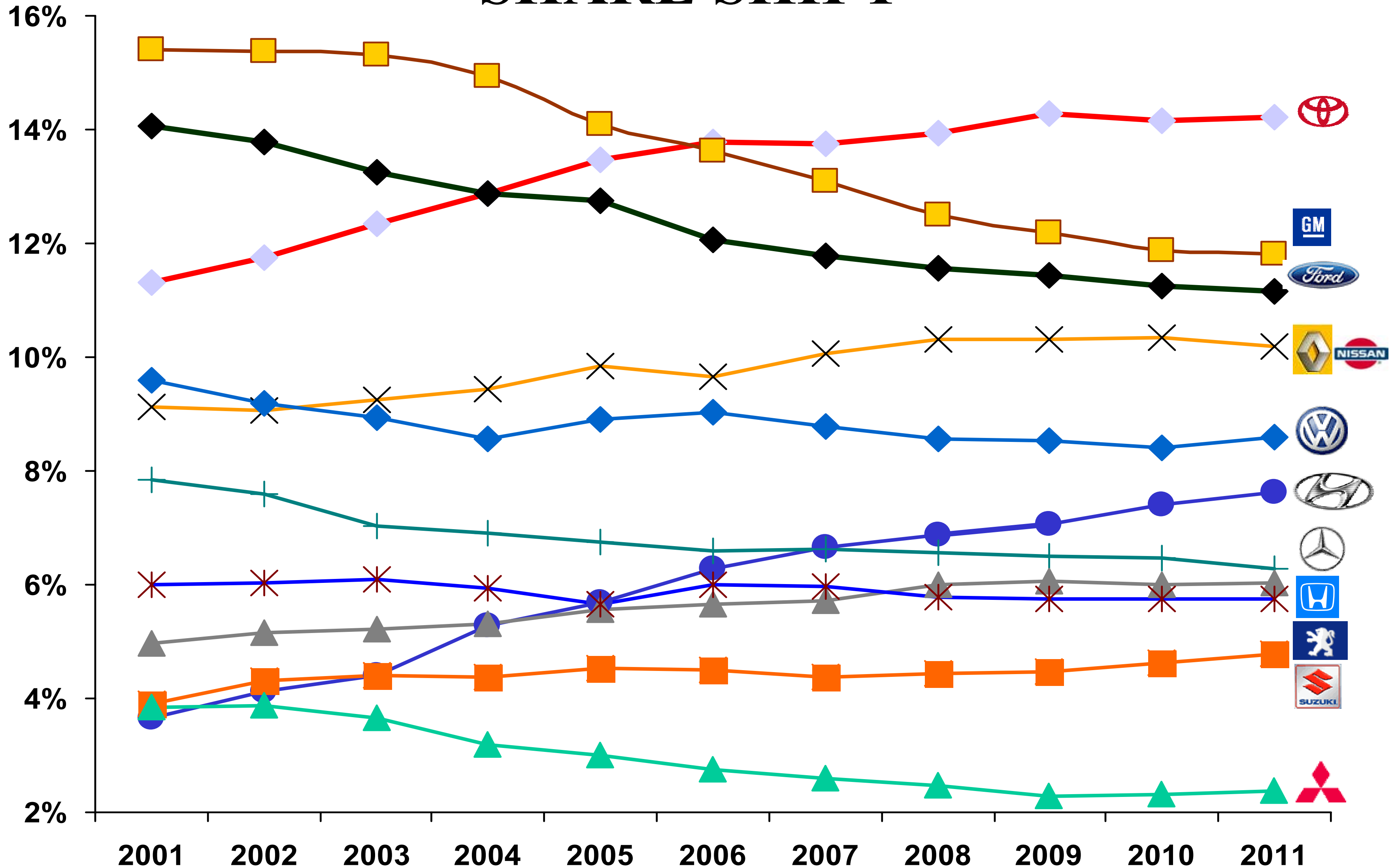
HIGH OIL PRICES:
FUEL PRICES REMAIN HIGH
PLACE PREMIUM ON WEIGHT SAVINGS
SHIFT FLEET TO SMALLER VEHICLES(FAVORS HARD TPOs)
US OEMs WILL CONTINUE TOO LOSE GLOBAL MARKET SHARE
OEMs KEEP PRESSURE ON TPE SUPPLIERS FOR COST REDUCTION

SOURCE: IMF,CLEAR VIEW ECONOMICS, ROBERT ELLER ASSOCIATES,.INC

GLOBAL AUTO MARKET: TPE EFFECTS

AUTO CHANGE	TPE EFFECT
20-30% GLOBAL OVERCAPACITY	DOWNSIZE
SHARE GAIN BY NON-U.S. OEMs	U.S. COMPOUNDERS LOSE SHARE?
SMALL, LOW COST VEHICLE SHARE GAIN	- GAIN FOR HARD TPOs (PP COPO) IN INTERIORS - TPOS IN EXTERIORS GAIN SHARE - MODULES(?)
ASIA IS ONLY GROWTH REGION	COMPOUNDER SHIFT TO ASIA
SEVERE PROFIT PRESSURES: STEEL, PLASTIC PRICE INCREASES	- PRICE PRESSURES ON TPE INTENSIFIES
MODEL PROLIFERATION	- TPO THERMOFORMED GROWTH - SURFACE DECORATED T'FORM
B-SEGMENT GROWTH	- U.S. OEMS SLOW TO COMPETE
GLOBAL STANDARD (E.G., ISO/TS 16,949: 2002)	- ALIGNS US/EURO QUALITY STANDARDS - ELIM. MULTIPLE CERTIFIC'NS - CONSISTENT SUPPLY CHAIN QUALITY - HELPS o-TPVs

GLOBAL AUTOMOTIVE MARKET SHARE SHIFT

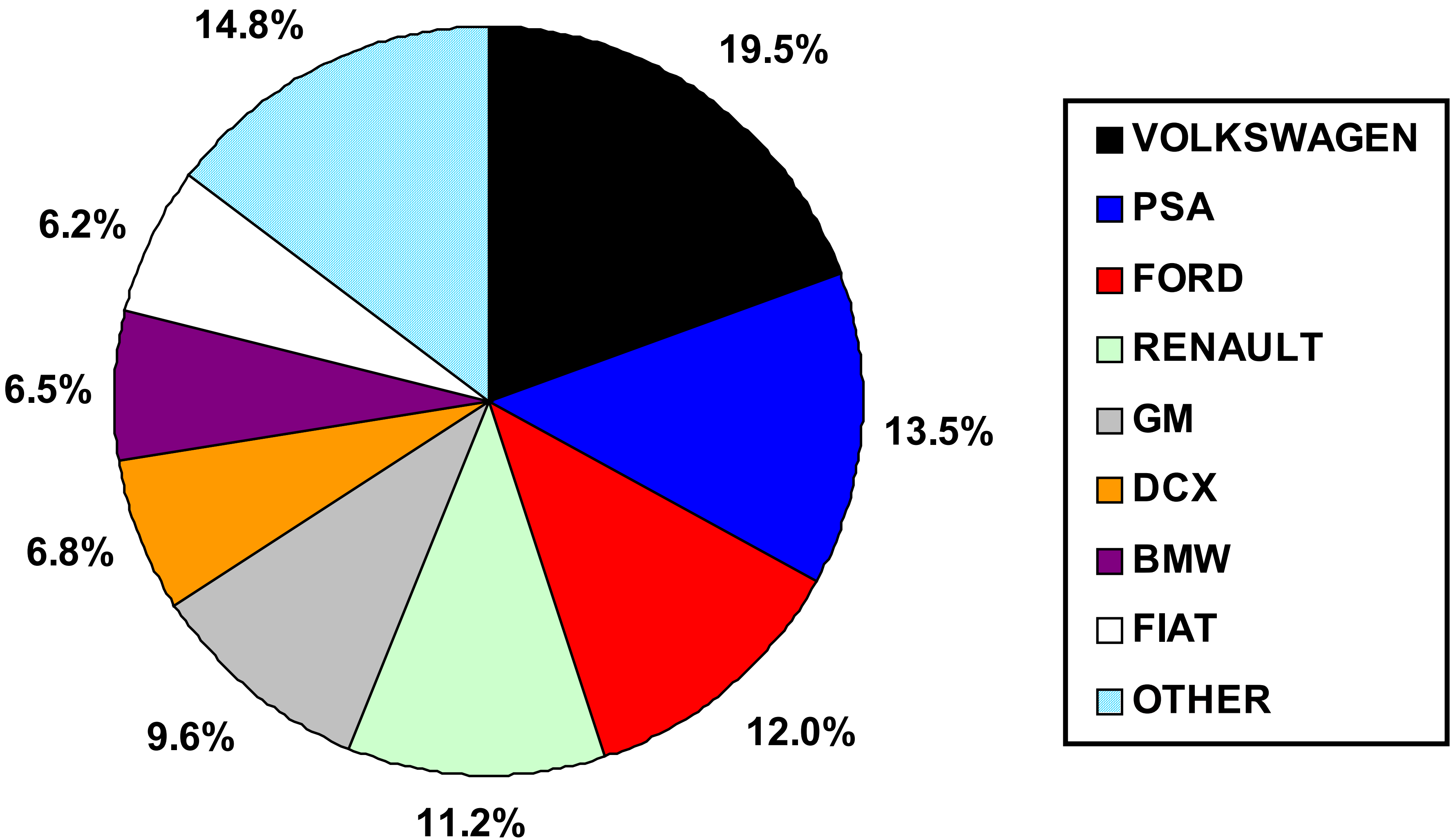


SOURCE: CSM, 2006

EUROPEAN AUTO MARKET: TPE EFFECTS

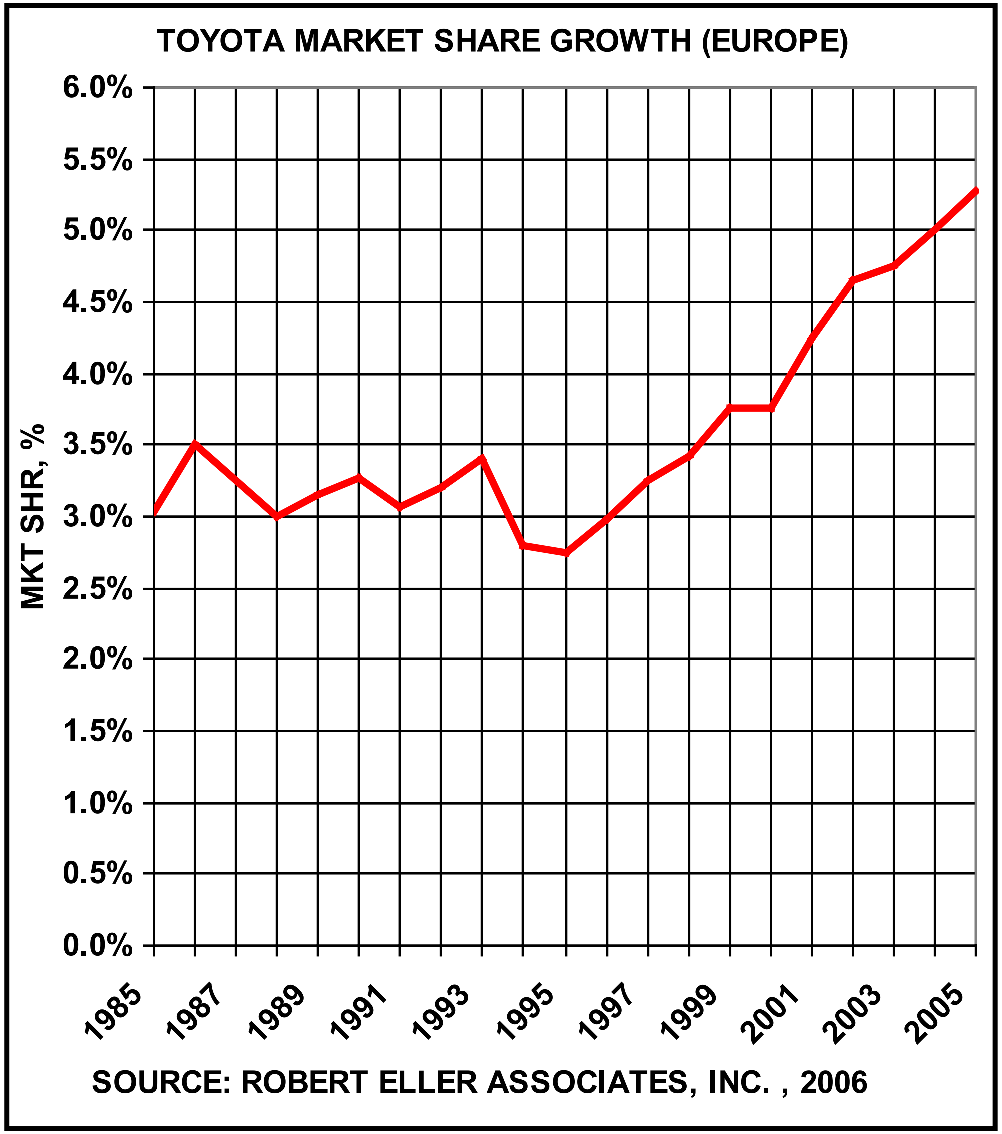
AUTO PARAMETER	TPE EFFECT
-OVERCAPACITY -SLOWED ECONOMIC GROWTH	- DOWNSIZE,JOB CUTS,
AGING FLEET/MODEL RANGE	
MARKET SHARE LOSS TO NEMs	- EUROPEAN COMPDRS LOSE SHARE
VEHICLE LABOR INEFFICIENCY	- SHIFT TO E.EUROPE - SEEK NEW TECHNOLOGY - INCREASE OUTSOURCING - INCREASE MODULES
STRONG EURO/WEAK YEN+WON	- ASIAN OEMs GAIN SHARE
ASIAN OEM INCREASE,E.EUROPE	- ASIAN COMPOUNDS GAIN SHARE (?)
TOYOTA SHARE GAINS (+8%/YR SINCE ’97)	- TOYOTA SUPPLIERS GAIN SHARE
SEVERE VEHICLE PRICE EROSION	- CONTINUED TPE PRICE PRESSURE
OVER RELIANCE ON EUROPEAN SALES	- GEOGRAPHIC SHIFT

SHARE OF EUROPEAN AUTOMOTIVE MARKET BY MANUFACTURER (2005)



SOURCE: AUTOMOTIVE NEWS, 2006

TOYOTA IN EUROPE



- **1985-1995:**

  -STAGNANT MARKET SHARE(3-3.5%)

  -LIMITED PRODUCT APPEAL

  -YEN VALUE INCREASE

- **1995-2005:**

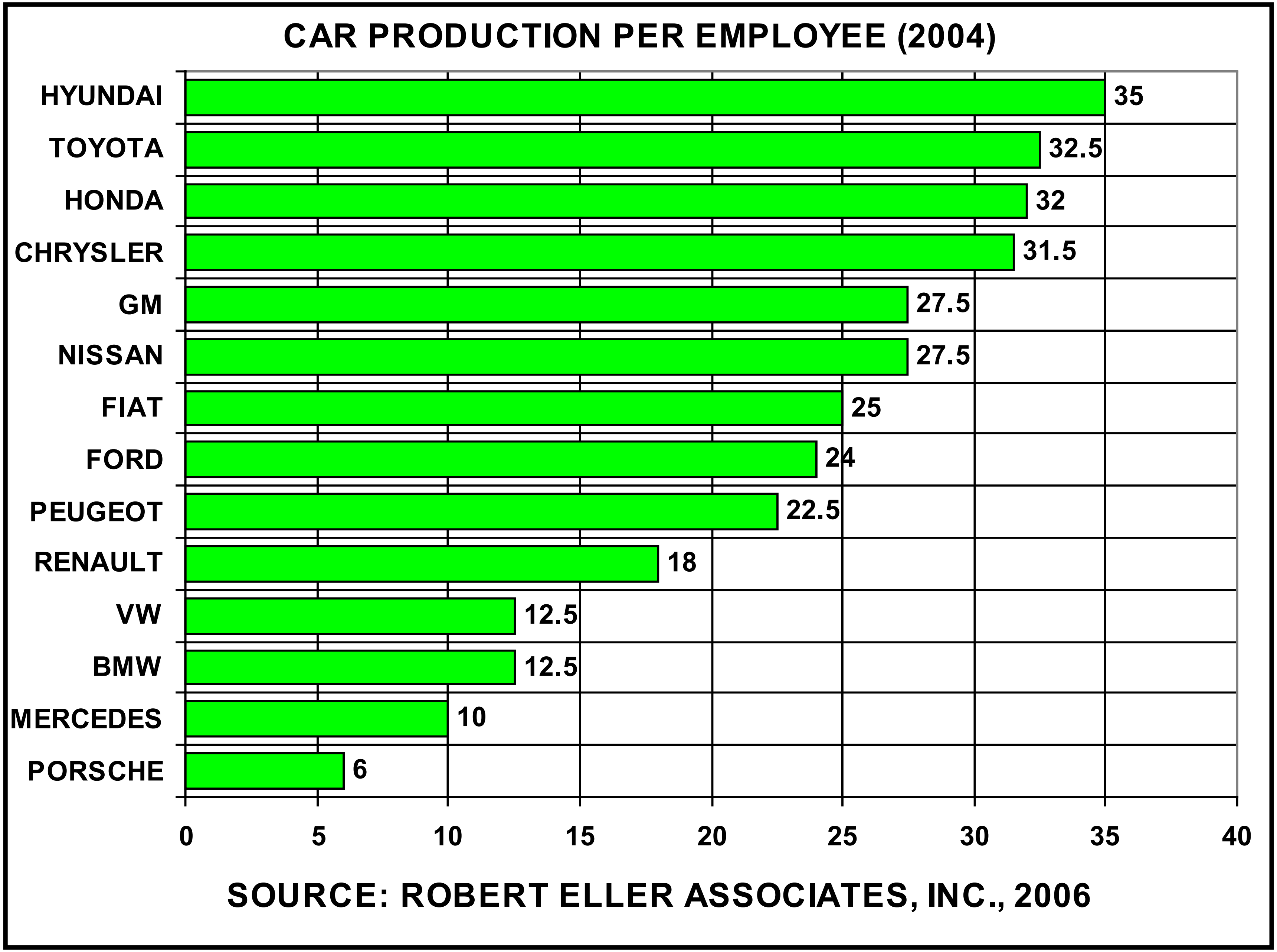
  -STRONG SHARE GAIN(8%/YR SINCE '95)

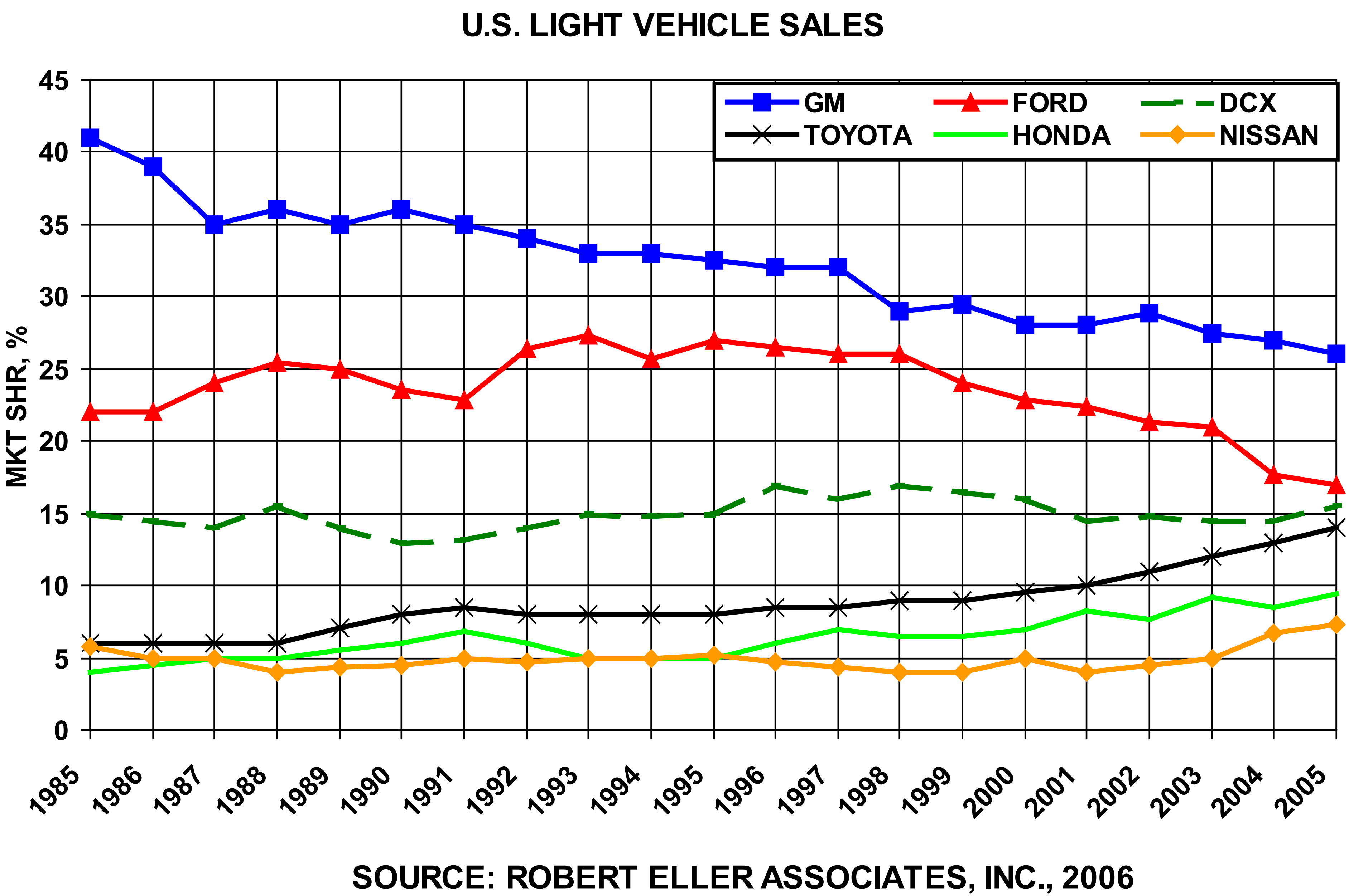
  -YARIS/AVENSIS MAJOR TURNING POINTS

  -2010 TARGET =1.2 MM UNITS

  -FAST GROWTH IN STAGNANT MARKET

  -DESIGN CENTER ESTABLISHED


CAR PRODUCTION PER EMPLOYEE (2004)
HYUNDAI
TOYOTA
HONDA
CHRYSLER
GM
NISSAN
FIAT
FORD
PEUGEOT
RENAULT
VW
BMW
MERCEDES
PORSCHE
35
32.5
32
31.5
27.5
27.5
25
24
22.5
18
12.5
12.5
10
6
0
5
10
15
20
25
30
35
40
SOURCE: ROBERT ELLER ASSOCIATES, INC., 2006


U.S. LIGHT VEHICLE SALES
GM
FORD
DCX
TOYOTA
HONDA
NISSAN
MKT SHR, %
45
40
35
30
25
20
15
10
5
0
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
SOURCE: ROBERT ELLER ASSOCIATES, INC., 2006

N. AMERICAN AUTO MARKET: TPE EFFECTS

AUTO PARAMETER	TPE EFFECT
BIG-3 OVERCAPACITY	- DOWNSIZE, JOB CUTS - CUSTOMER SHIFT
MARKET SHARE LOSS TO NAMs	- U.S. COMPOUNDERS LOSE SHARE - NON-U.S. COMPOUNDERS GAIN SHARE
WRONG FLEET MIX (B SEGMENT SHIFT)	- HARD TPO SHARE GAIN
U.S. TIER 1s SLOW TO INNOVATE	- ACCELERATE EUROPEAN/ JAPANESE TECHNOLOGY SHIFT
HIGH LEGACY COSTS	- SUPPLIER PRICING PRESSURES - SUPPLY CHAIN MANIPULATION
VEHICLE LABOR INEFFICIENCY	- SHIFT TO OFFSHORE PRODUCTION - INCREASE OUTSOURCING
FINANCIAL DANGER ZONE (OEMs, TIER 1s)	- SLOW TECHNOLOGY INVESTMENT

N. AMERICAN AUTO MARKET: TPE EFFECTS
(Cont'd.)

AUTO PARAMETER	TPE EFFECT
DEEP COST CUTS	- TPE PRICE PRESSURES
PRIVATE EQUITY CONSOLIDATES TIER 1s	- REDUCED TPE PRICING POWER
GLOBAL MKT SHARE LOSS	
NO SIGNIFICANT U.S. ENERGY POLICY CHANGE	-REDUCED TPE PRICING POWER
BIG-3 MARKET SHARE LOSS	- DE-FOCUS TPE DEVELOPMENT EFFORT
QUALITY (RECENTLY AMONG WORLD LEADERS BUT PERCEPTION PROBLEM)	- OFFER QUALITY IMPROVE SOLUTIONS
WARRANTY DISADVANTAGE	- WILL ACCEPT LOWER QUALITY TPEs
POOR BRAND IMAGE	- WILL CONTINUE QUALITY SEARCH/AT LOW COST

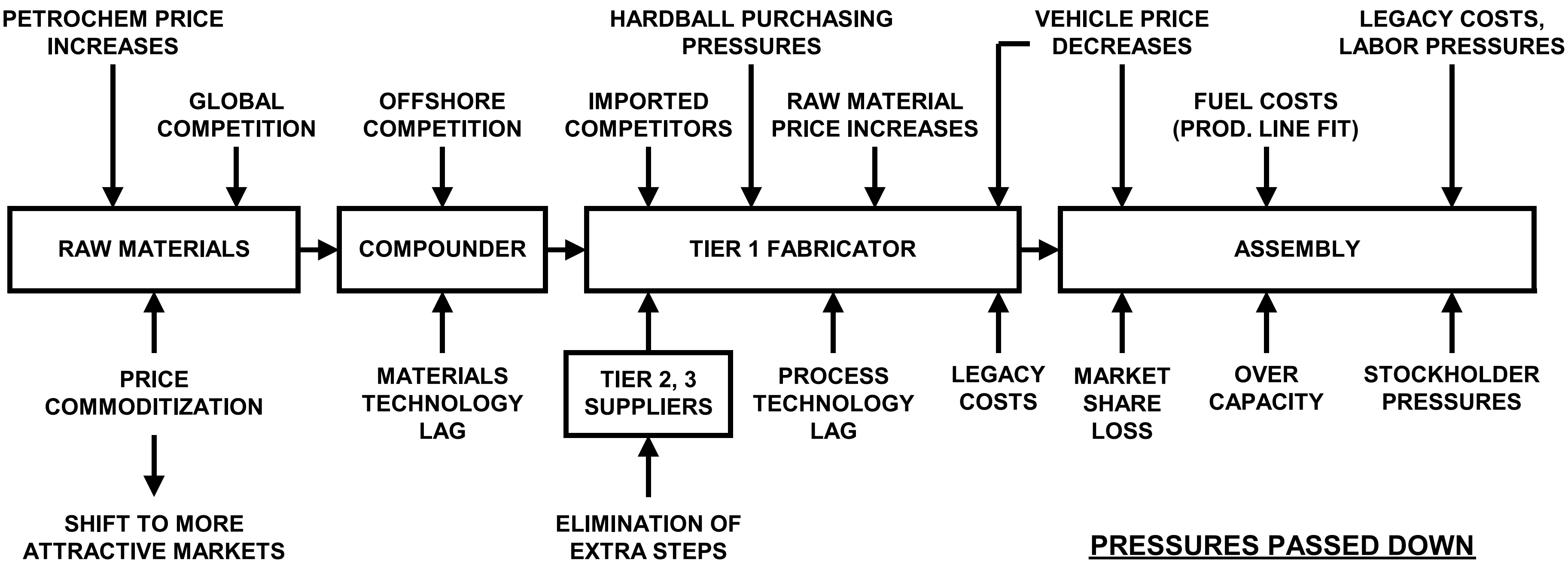
AUTOPLASTICS SUPPLY CHAIN

- **SEVERE PROFITABILITY SQUEEZE:**
  - HIGH RAW MATERIAL PRICES
  - LIMITED PRICING POWER
  - SEVERE FINANCIAL STRESS
  - EUROPE/U.S./JAPAN TECHNOLOGY/INDUSTRY STRUCTURE CONVERGENCE
- **INTERIORS:**
  - ABOUT 85% OUTSOURCED (NO CHANGE)
  - INTERIORS' AVERAGE VALUE $2000/VEHICLE (WILL DECREASE)
- **PRIVATE EQUITY GROUPS ENTERING**
- **FURTHER CONSOLID'N/GLOBALIZ'N LIKELY**

THE INEFFICIENT AUTOMOTIVE PLASTICS SUPPLY CHAIN WILL:

- SEE INTENSIFIED GLOBAL COMPETITION
- FURTHER CONSOLIDATE
- FLATTEN
- FURTHER GLOBALIZE
- REMAIN OUTSOURCED(85%)
- DECLINE? IN VALUE
- CONTINUE TO MODULARIZE
- INCREASE ASIA PRESENCE
- ACCELERATE EUROPE/N. AMERICA /JAPANESE TECHNOLOGY/OWNERSHIP CONVERGENCE
- SEEK TECHNOLOGY SOLUTIONS TO PROFIT SQUEEZE

AUTOPLASTIC SUPPLY CHAIN IMPLOSION



<u>PRESSURES PASSED DOWN THE SUPPLY CHAIN</u>:

- ← **PRICING PRESSURES**
- ← **SUPPLY CHAIN "MANAGEMENT"**
- ← **DEMAND SLOWDOWN**
- ← **REVISED SPECIFICATIONS**
- ← **GLOBALIZATION PRESSURES**

<u>ELIMINATE/REDUCE THE INEFFICIENCIES</u>:
-MULTIPLE STEPS
-EXCESSIVE LOGISTICS
-SCRAP GENERATION
-INEFFICIENT PROCESS TECHNOLOGIES
-SALES/MARKETING COSTS
-EXCESS LABOR COSTS
-OVER-GLOBALIZATION?

SOURCE: ROBERT ELLER ASSOCIATES, INC., 2006

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EXAMPLES OF SUPPLIER NETWORK FOR GLOBAL VEHICLE (2006 HONDA CIVIC)

SUPPLIER	MODULE									REGION		
	SKIN	D T	HOOD SEAL	H L	PILL TRIM	CAR-PET	CON-SOLE	I P	AB SYST	NA	EUR	JPN
TS TECH		X		X						X	X	X
ANTOLIN				X SUB						X?	X	
PELZER						X				?	X	
AMTEX						X				X		X
INTIER							X	X		X	X	
VISTEON								X		X	?	
R-TEK											X	
FAURECIA						X				X	X	
YAMATO	X									X	X	X
SIMOLDES					X						X	
TAKATA									X	X	X	X
TRW									X	X	X	
METZELER			X							X?	X	

NOTE: PRODUCTION TARGET IS 650,000 CARS

SOURCE: ROBERT ELLER ASSOCIATES, INC., 2006

INTERIOR TPE APPLICATIONS (2006 HONDA CIVIC)

- VEHICLE: 2006 HONDA CIVIC
- PART: SEAMLESS AIRBAG DOOR
- KEY FEATURES:
  - SEAMLESS
  - NO PAINT
  - LOW GLOSS
- MOLDER: VISTEON
- TPO SKIN SUPPLIER: OKAMOTO
- TPO SUPPLIER: MITSUBISHI CHEMICAL
- MOLDING PROCESS: VISTEON VLIM

SOURCE: VISTEON, 2005

ELEMENTS OF AN AUTO OEM RESTRUCTURING / TPE EFFECTS

AUTO ELEMENTS	TPE SUPPLIER EFFECT
REDUCTION (BLUE/WHITE COLLAR)	- SYSTEMS/LABOR SAVE DESIGNS
GEOGRAPHIC SHIFT/REGIONAL OFFERING	- MUST FOLLOW - ADAPT TO REGIONAL REQUIREMENTS
REDUCE MATERIALS USE/PURCHASING COSTS	- PRICE PRESSURE - FAVOR LOWER COST TPEs - SUPPLY CHAIN MANIPULATION - INCREASE OPERATIONS EFFICIENCY
MANUFACTURING EFFICIENCY INCREASE	- SYSTEMS/ASSEMBLY COST SAVINGS
FLEXIBLE ASSEMBLY PLANTS	
MANUFACTURING PROD. DEV. BUDGET CUT (Cont'd next slide)	- TPE SUPPLIERS INCREASE PRODUCT DEVELOPMENT - FAVORS LARGE, GLOBAL TPE SUPPLIERS

ELEMENTS OF AN AUTO OEM RESTRUCTURING / TPE EFFECTS
(Cont'd.)

AUTO ELEMENTS	TPE SUPPLIER EFFECT
MANUFACTURING PRODUCT DEVELOPMENT BUDGET CUT (Cont'd.)	- OFFER BROADER TPE LINE
BROADEN VEHICLE OFFERING	- SHORT RUN CAPABILITY
INCREASE MODULARIZATION	- SHIFTS TARGET CUSTOMERS/SUPPLY CHAIN
INCREASE PRODUCT DEV. SPEED	- FAST SOLUTIONS REWARDED - INCREASE PROD. DEV. STAFF
INCREASE LAUNCH FREQUENCY	- FAST SOLUTION REQ'D
GLOBAL VEHICLE DESIGNS (a)	- AMORTIZE DEV. EFFORT
DRASTIC SUPPLIER REDUCTION	- SURVIVAL REQUIRES CAREFUL GLOBAL PARTNER/CUSTOMER ANALYSIS
GLOBAL QUALITY STANDARDS	- GLOBAL TPE GRADE OFFERING

(a) HONDA CIVIC BUILT IN 13 COUNTRIES IN COMMON, FLEXIBLE, TOOLING PLANTS

AUTO DEMAND/ OPPORTUNITIES

65 MM UNITS / 3%/YR GROWTH

50 % OF TPE DEMAND

RADICAL RESTRUCTURING

AGGRESSIVE COST SAVE SEARCH

FLEET COMPOSITION SHIFT

REGIONAL SHIFT

CHINA/ASIA VEHICLE SHARE GAIN

SUPPLIER REDUCTION

ENABLERS

ENABLERS	TPE CANDIDATES
NEW PROCESS TECHNOLOGY	SBC-TPV
THERMOPLASTIC ADVANTAGES	O-TPV
SYSTEMS COST SAVE POTENTIAL	r-TPO, c-TPO
RUBBER REPLACEMENT POTENTIAL	S-TPV

SOURCE: REA TPE MULTICLIENT, 2006

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TPE VALUE CREATION AND SURVIVAL

- TARGET SYSTEMS COST SAVINGS
- SEEK ROLE IN IMPLODED SUPPLY CHAIN
- LOWER COST MATERIAL SUBSTITUTION/COMBINATIONS
- OEM REGIONAL SHIFT/CUSTOMER MUST FOLLOW
- BODY/GLAZING SEALS CONCENTRATION
- SBC-TPVs
- PRODUCT LINE DIVERSIFICATION
- NEW FABRICATION TECHNOLOGIES
  - 2-SHOT MOLDING/LOW PRESSURE MOLDING
  - MONOMATERIALS CONSTRUCTIONS
  - ON-BOARD FUNCTIONS (ACOUSTIC, ENERGY ABSORPTION)
  - FOAM TECHNOLOGY
  - ROLE IN MODULAR CONSTRUCTION

THANK YOU

ANALYSIS TECHNICAL ECONOMIC MARKET Management DECISIONS

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