DEFENSE – INDUSTRIAL INITIATIVES GROUP

CSIS

Strategic Opportunities and Challenges

Aerospace in the News Executive Symposium

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Commercial Aerospace

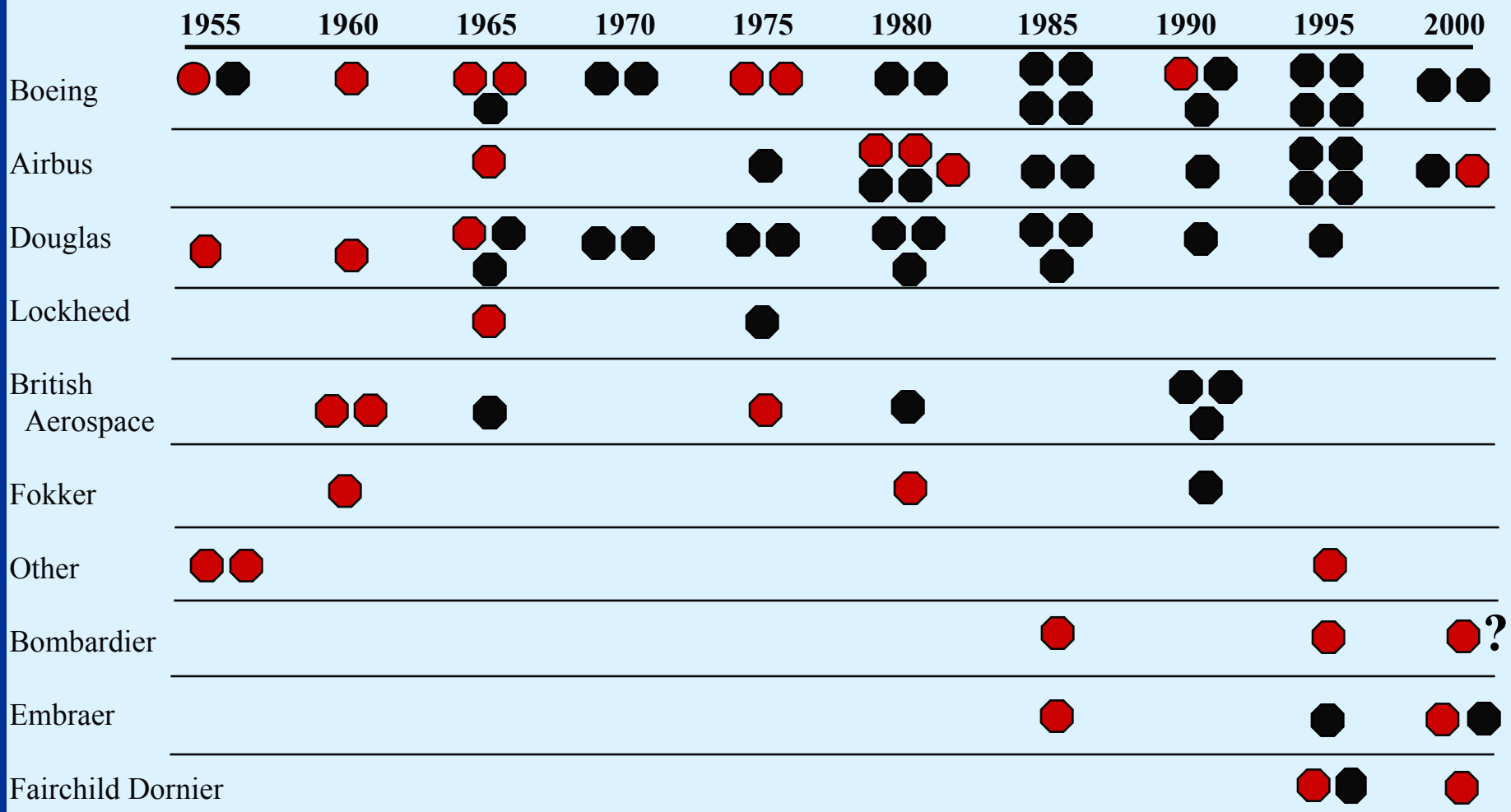
Industry at a Crossroads…

- Drivers of the commercial aerospace industry
  - Economic cycle
  - A customer base undergoing dramatic change
    - Deregulated, privatized airlines
    - Rise of the low-cost carriers
    - Business model of the majors broken?
    - Shift in emphasis from performance/technology to efficiency/cost

Industry at a Crossroads…

- Drivers of the commercial aerospace industry
  - Next increments in technology exponentially expensive
    - Size
    - Speed
    - Range
  - We have filled in all the market niches
    - A380 at one end
    - 19-seat regional jets at other end
    - business jets – air taxi to Global Express/GV

Fewer New Starts (Mostly Regionals)



Industry at a Crossroads…

- **If you hear:**
  - **Fill in market niches – major markets occupied**
  - **Fewer new product introductions – focus on derivatives**
  - **Focus on qualities of product**

- **You are in a mature industry**

Industry at a Crossroads…

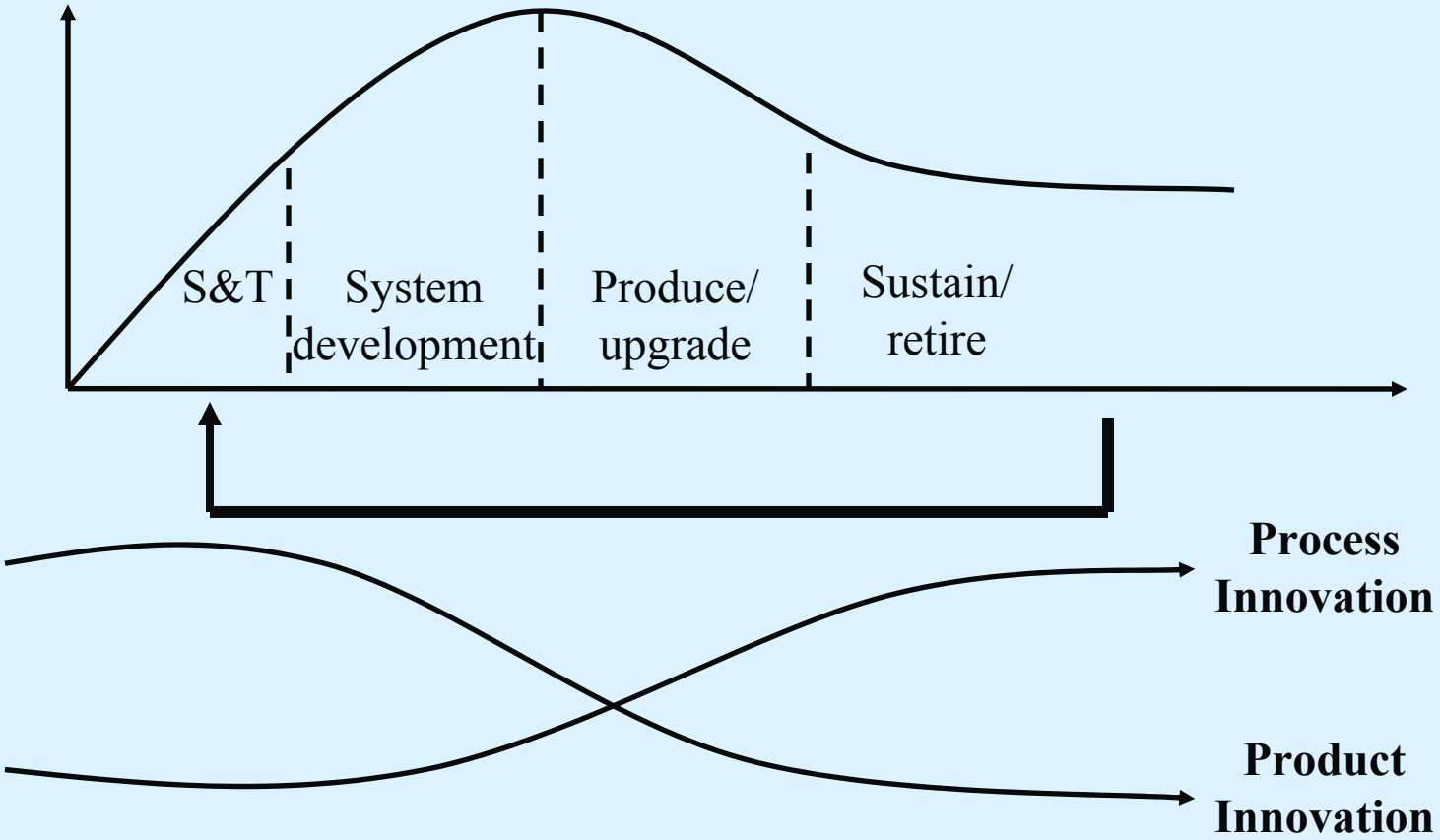
- **Implications:**
  - **Change to match where you are in the cycle**
    - **Focus on process innovation**
    - **Rebalance skills base**
    - **Find ways to reduce capital costs/asset intensity**
    - **Changing relationship with supplier base**
  - **Start a new cycle**
    - **Historically this has been achieved via speed**
    - **????**
  - **Failure to change cedes the future to others who will**

Military Aerospace

1990s Perfect Storm…

		IMPACT
Cyclical Changes		
Budgets	**Pressure from deficits, call for post-Cold War peace dividend, take Procurement Holiday, cut programs/stretch out**	**Horizontal mergers** **Exit from industry**
Structural Changes		
End of Cold War	**Rapidly changing unpredictable security environment, changing military requirements, fewer new program starts**	**Increased risk**
Technological Change	**IT revolution spilling over into defense, increased acceleration of technology cycles** →	**Vertical mergers** **Disconnect**
Globalization	**Of the economy, technology and labor** →	**Export markets** **Int'l competition**
New Philosophy of Business	**Demise of the conglomerate, "stick to your knitting", defense run as business** →	**Exit from industry**

Industry Lifecycle…



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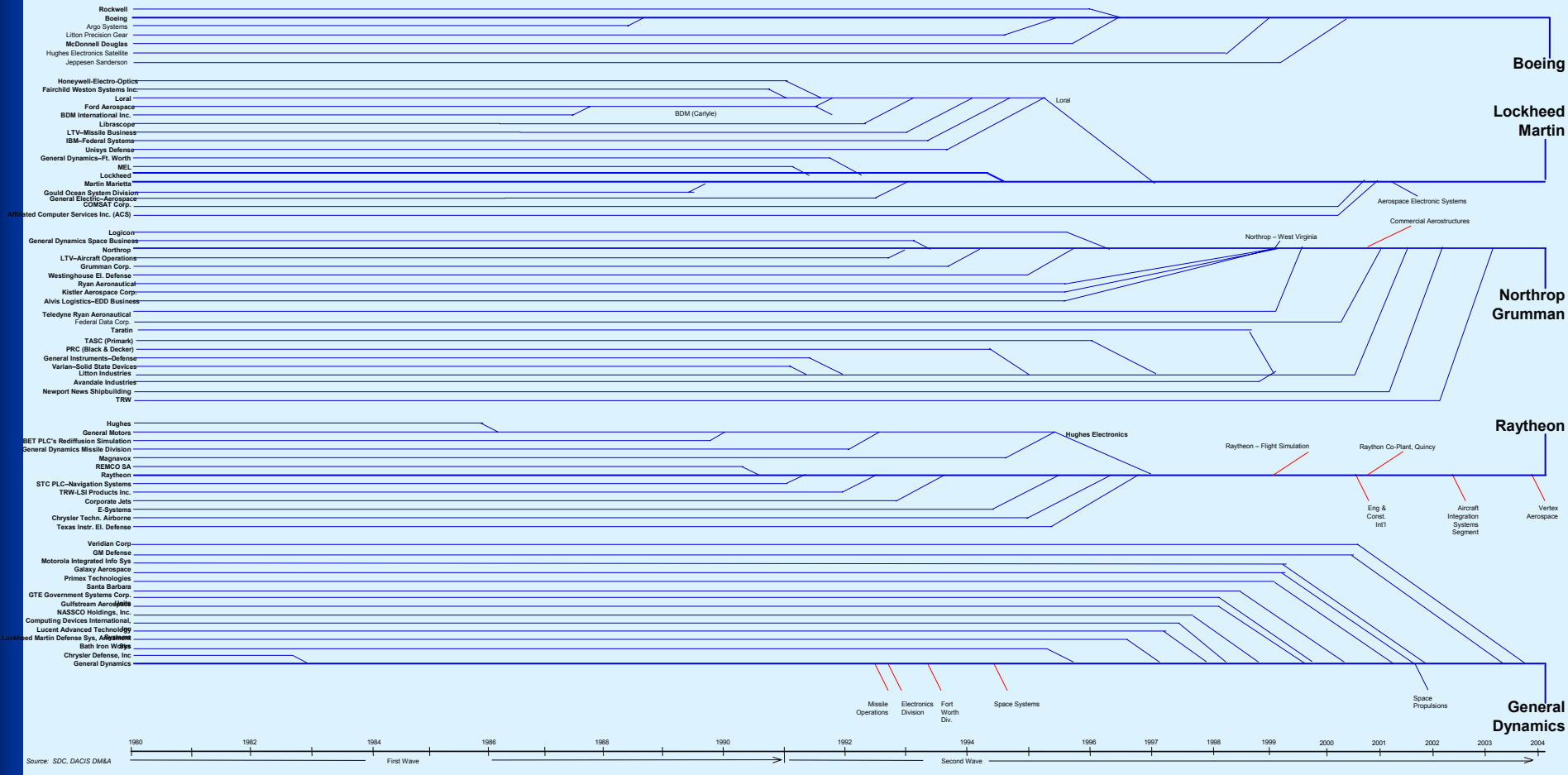
The Result Was Dramatic Consolidation...



Source: SDC, DACIS DM&A

Budgets That Buys Fewer Platforms…

	1985	2005
Defense Budget Outlays (Constant 2005 $)	**$421 Bn**	**$450 Bn***
Military Personnel:		
Active	**2,152,000**	**1,386,000**
Reserves	**1,078,000**	**863,000**
Troop Strength Europe	**300,000**	**111,000**
Major Military Installations	**221**	**120**
O&M Percentage of Tot. DoD	**29%**	**38%**
Proposed Procurement:		
Fixed-Wing Aircraft	**585**	**188**
Combat Vehicles	**2,031**	**190**
Ships/Submarines	**24**	**8**
Tactical Missiles	**32,714**	**5,702**

Source: DoD, Defense & Foreign Affairs Handbook, Janes, AIA * With anticipated $25B Iraq War Supplemental

And Start Fewer New Large Platform Programs…

Ships/Subs

	New Program Starts	No. Suppliers End of Period
1980-1989	7	7
1990-1999	3	5
2000-2003	2	2

Combat Aircraft

	New Program Starts	No. Suppliers End of Period
1980-1989	6	7
1990-1999	3	3
2000-2003	0	2

Combat Vehicles

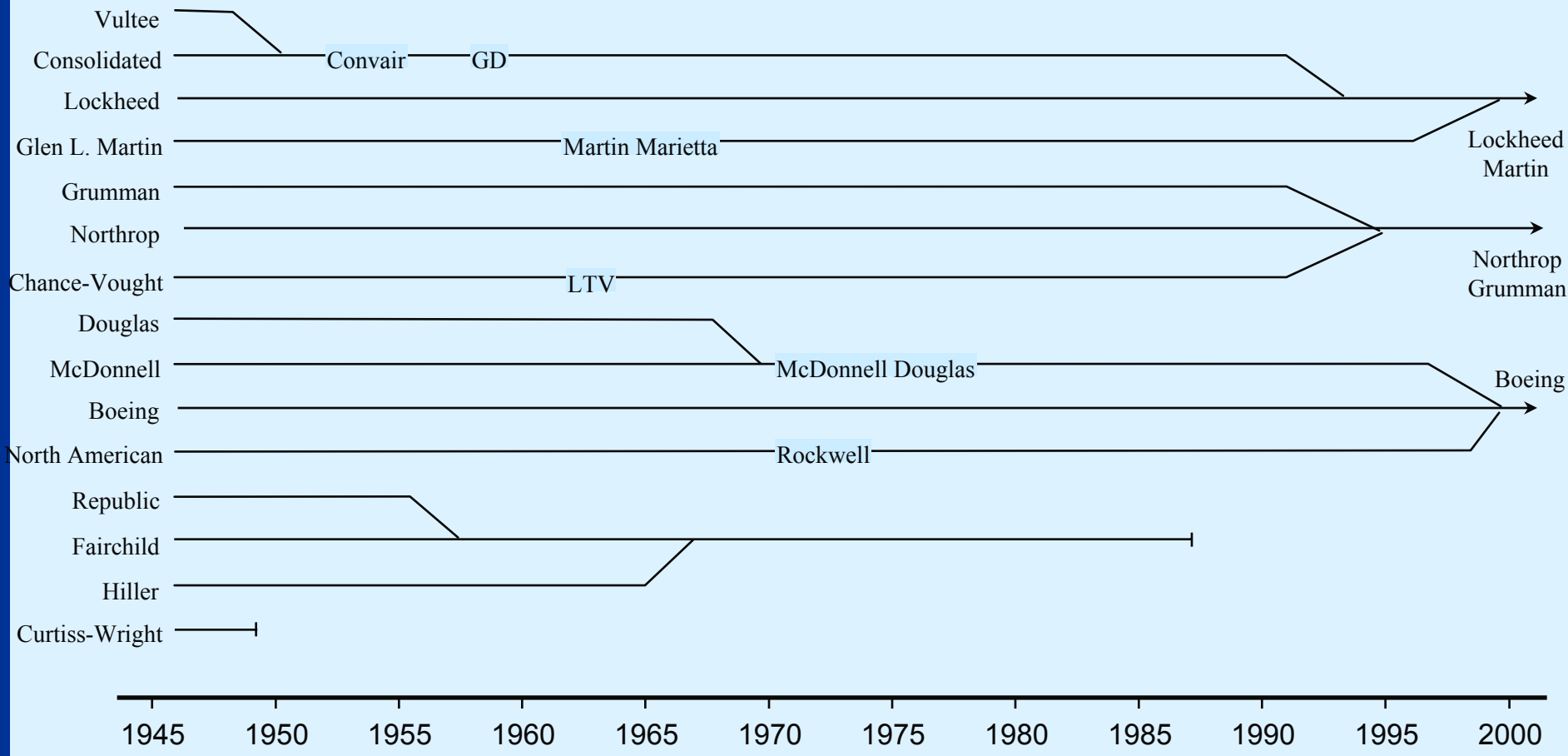
	New Program Starts	No. Suppliers End of Period
1980-1989	6	6
1990-1999	5	3
2000-2003	3	2

Missiles (Non-Strategic)

	New Program Starts	No. Suppliers End of Period
1980-1989	7	9
1990-1999	8	6
2000-2003	4	3

Source: DoD, Janes Defense, FAS, Global Security, DMA Database

Driving Consolidation in the Military Aircraft Industry...



Source: Booz Allen, CSFB Aerospace/Defense Equity Research

Growth in Number of Programs = Increasing Suppliers

- **Budget dollars enhance the health of *companies*, its the number of new programs that drives the health of the *industry***

Tactical Radios

	New Program Starts	No. Suppliers End of Period
1980-1989	8	7
1990-1999	9	9
2000-2003	4	8

UAVs

	New Program Starts	No. Suppliers End of Period
1980-1989	8	8
1990-1999	14	21
2000-2003	9	29

Major Info Networks

	New Program Starts	No. Suppliers End of Period
1980-1989	2	3
1990-1999	7	5
2000-2003	3	6

Battlespace Awareness Systems

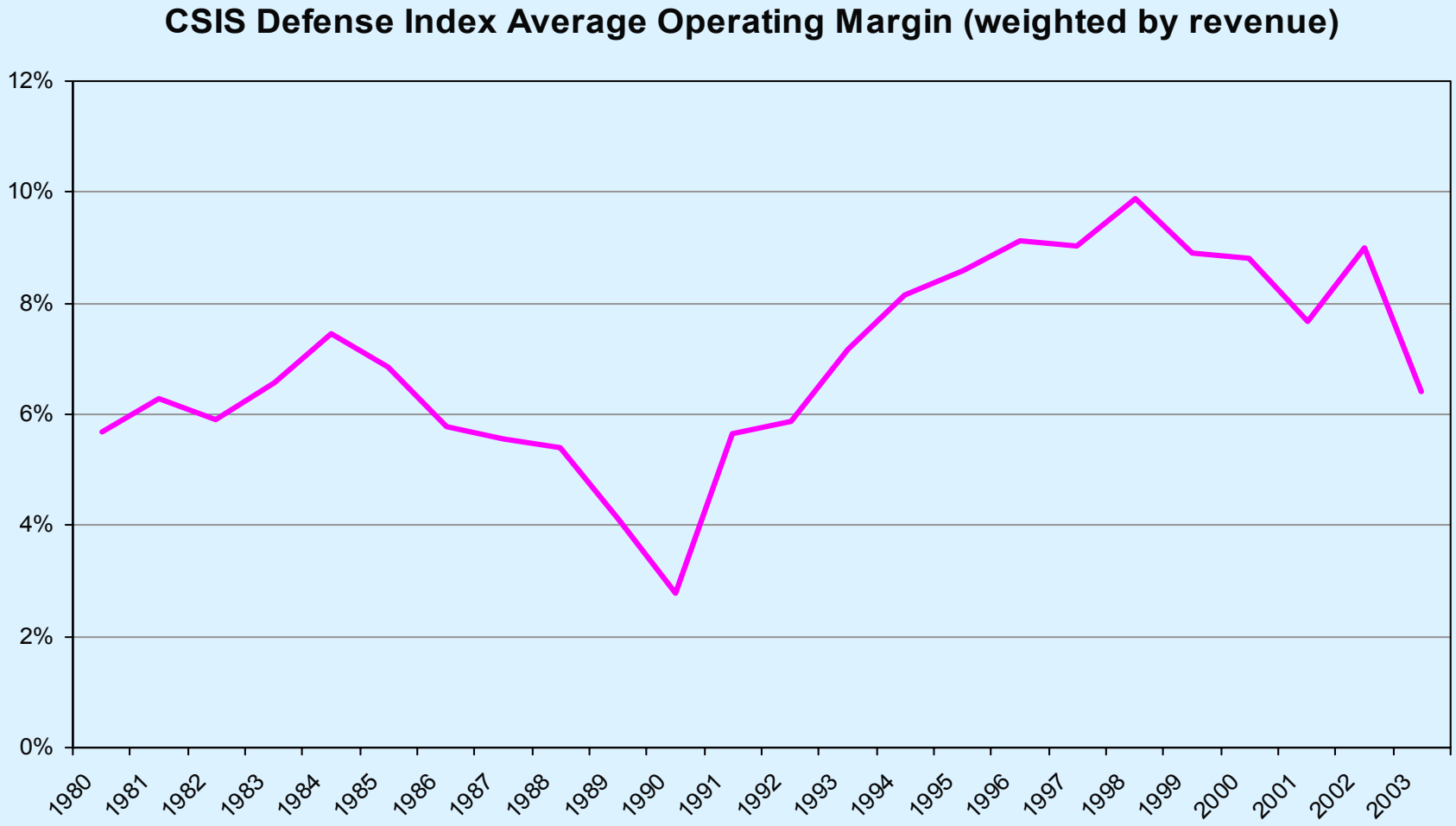
	New Program Starts	No. Suppliers End of Period
1980-1989	6	3
1990-1999	8	4
2000-2003	4	5

Source: DoD, Janes Defense, FAS, Global Security, DMA Database, Teal Group

Same Story –

The Wall Street View

Defense Industry Margins Improved, BUT…

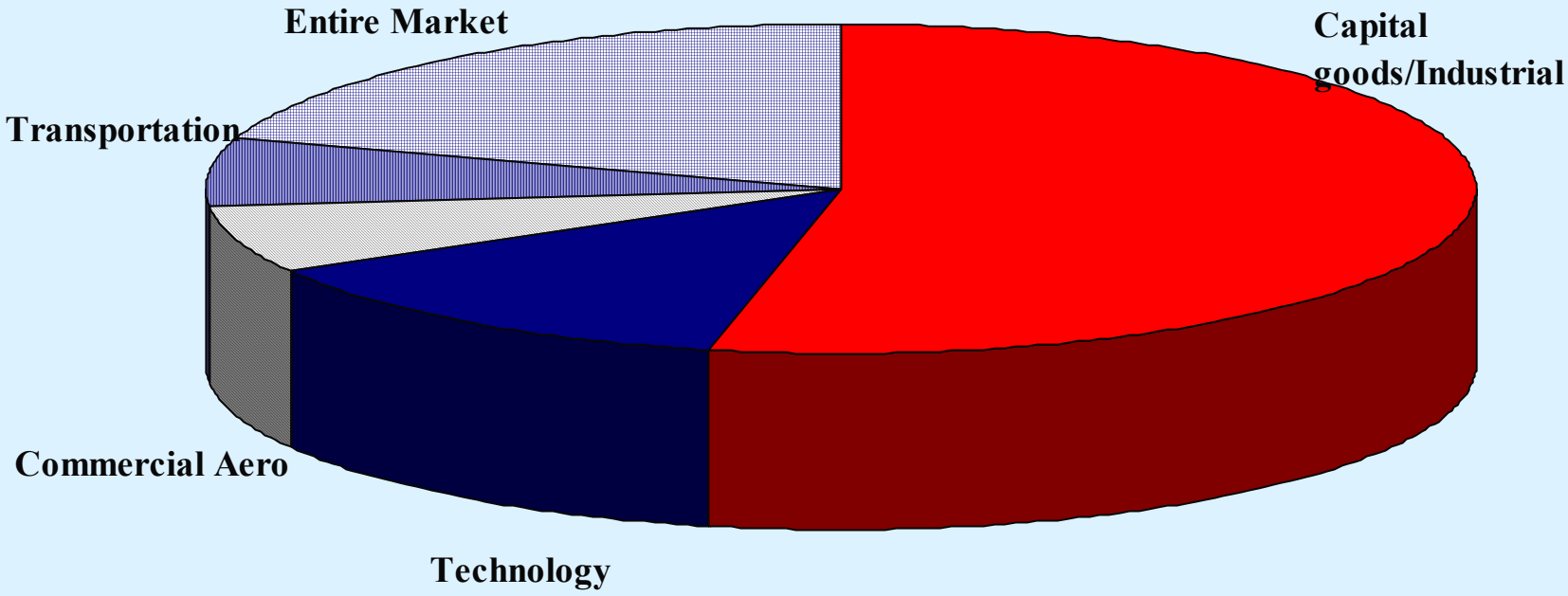


Sources: FactSet, Company Reports, CSIS Analysis.

Note: CSIS Defense Index comprises 36 publicly-traded companies with majority revenues derived from US defense business. Boeing Military results have also been included here.

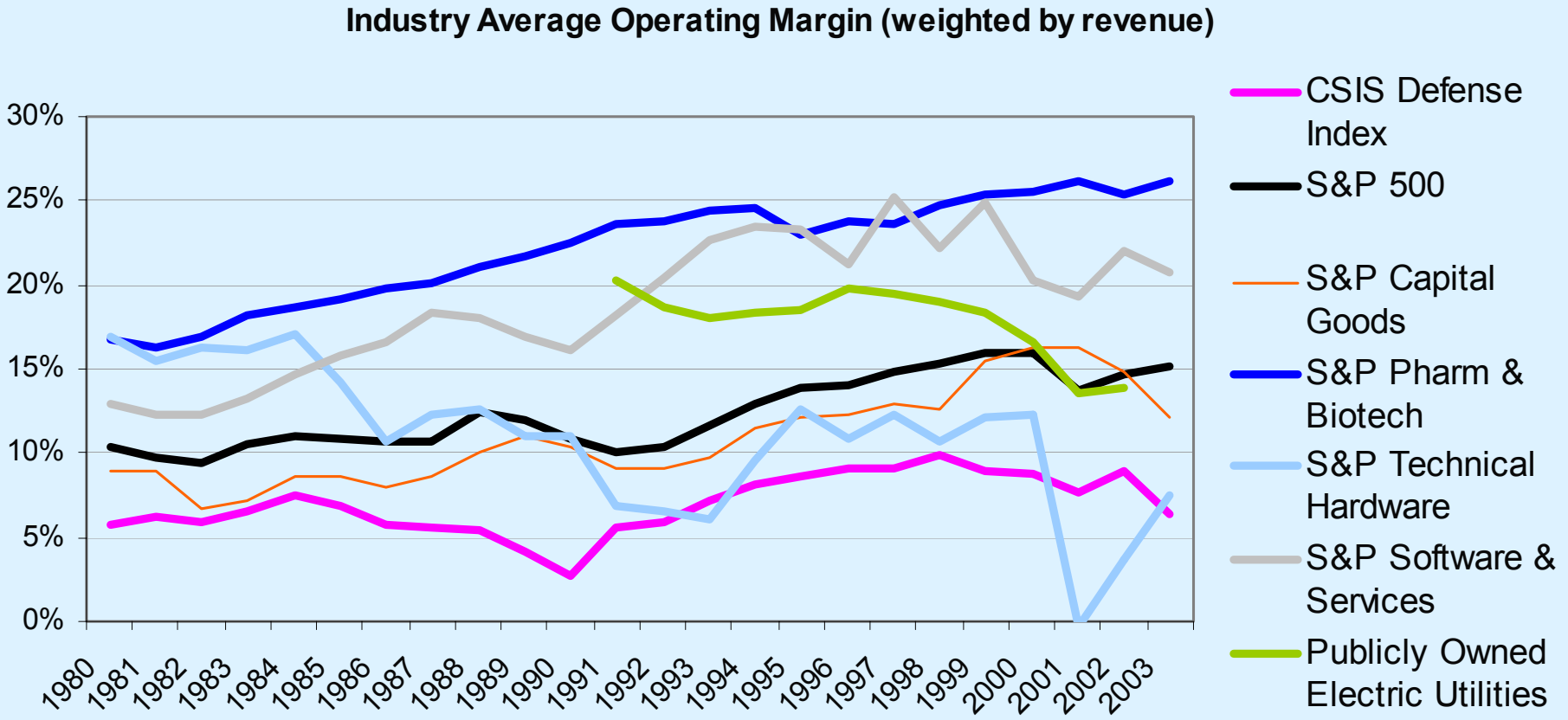
The Industry Does Not Operate in a Vacuum…

- **What are the alternative investments when you consider the defense sector?**



Source: CSFB survey

Defense Returns Improved, But Lowest Relative to Peers…



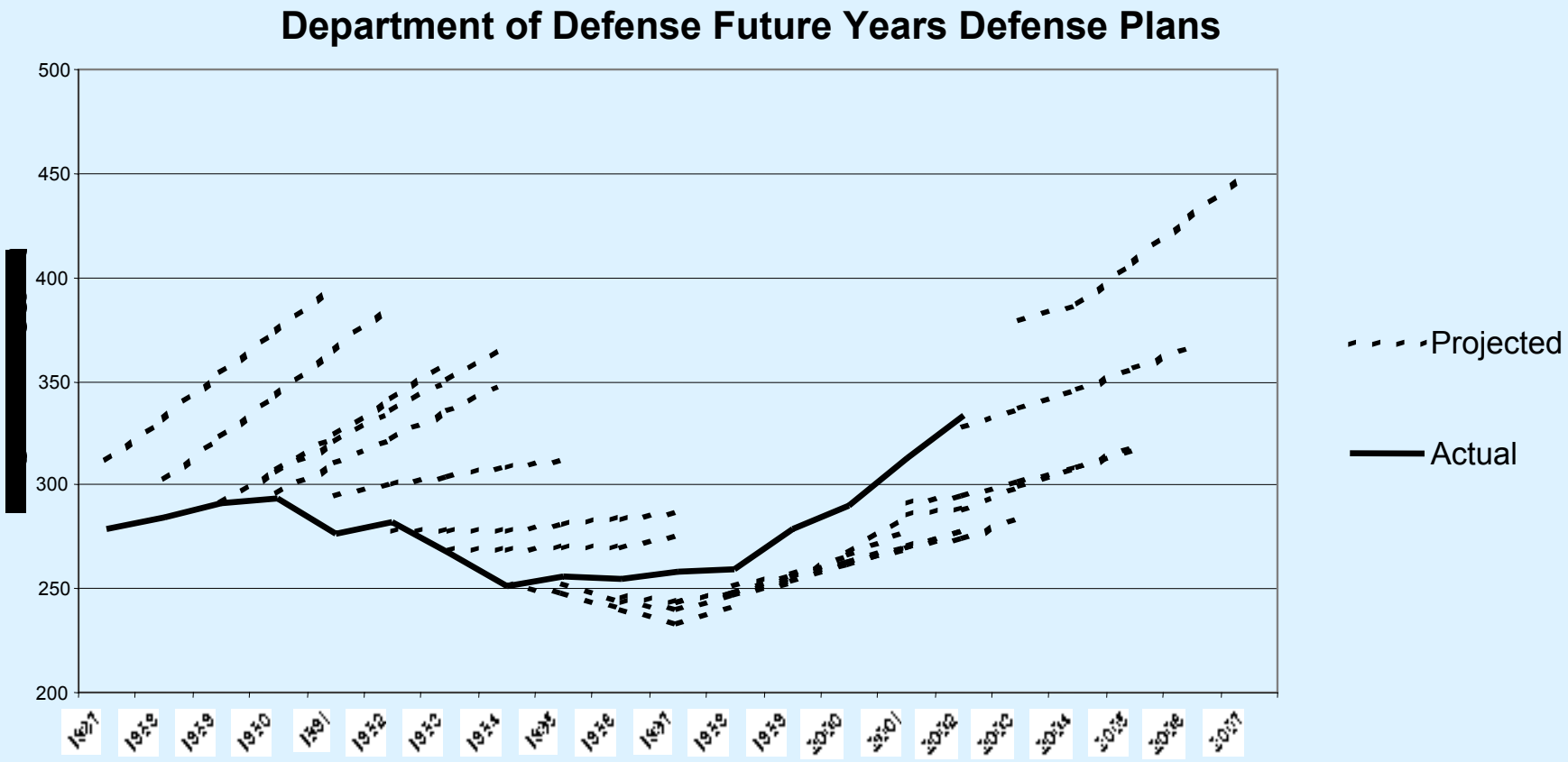
Sources: FactSet, S&P Compustat, Energy Information Administration, CSIS Analysis

Notes: 1) CSIS Defense Index comprises 36 publicly-traded companies with majority revenues derived from US defense business.
(2) S&P Sub-sector constituents accurate back to 1994; composition held constant for years 1980 to 1993.

Conventional Wisdom

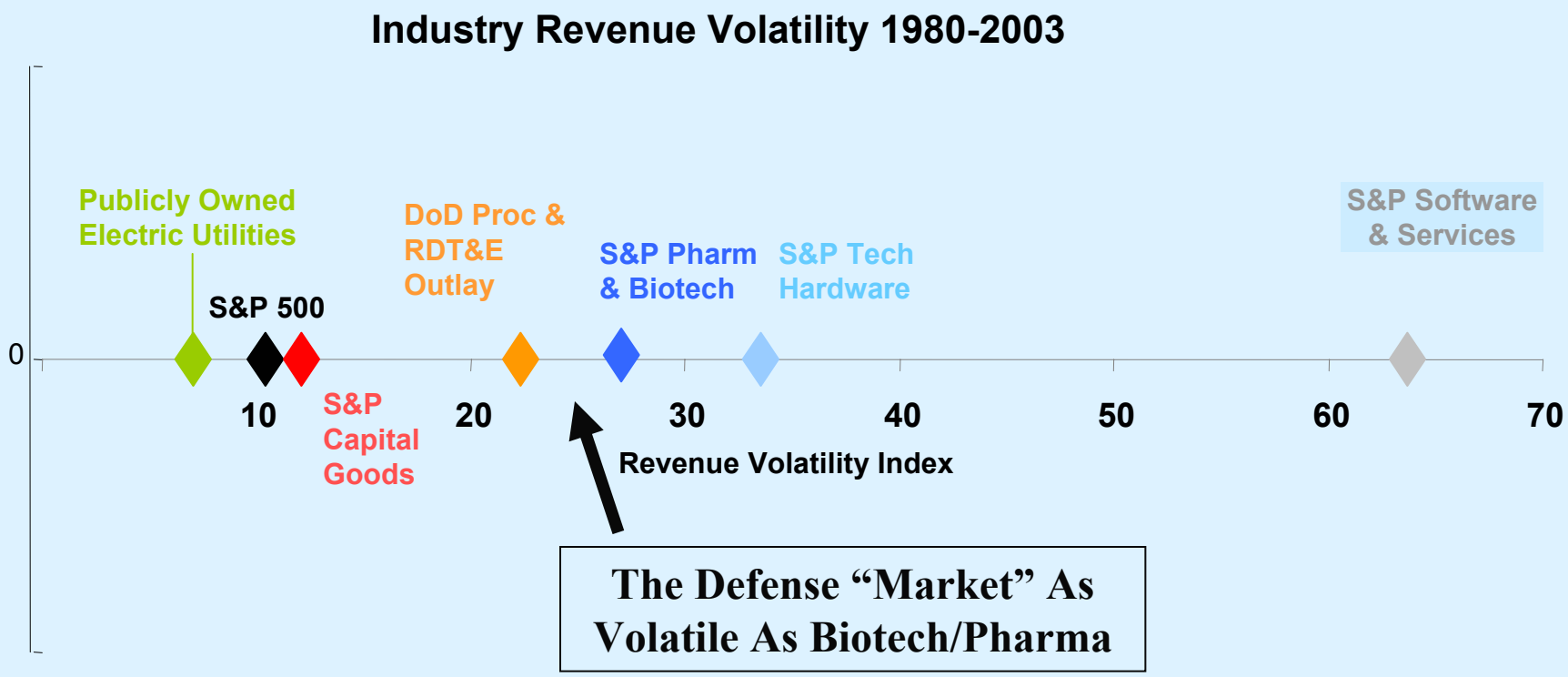
- **Defense industry SHOULD have lower returns than peers because:**
  - **Defense industry has lower risk**
  - **Pentagon pays for "everything"**
  - **R&D and assets paid for**
  - **Industry has long term contracts and the FYDP**
  - **No one allowed to fail**

Reality is Far Less Predictability...



Source: "Defense Budget for FY2003: Data Summary", March 29, 2002, Stephen Daggett and Amy Belasco, Congressional Research Service.

More Volatility Than Conventional Wisdom...



Sources: FactSet, S&P Compustat, Energy Information Administration, National Defense Budget Estimates for FY2004, CSIS Analysis

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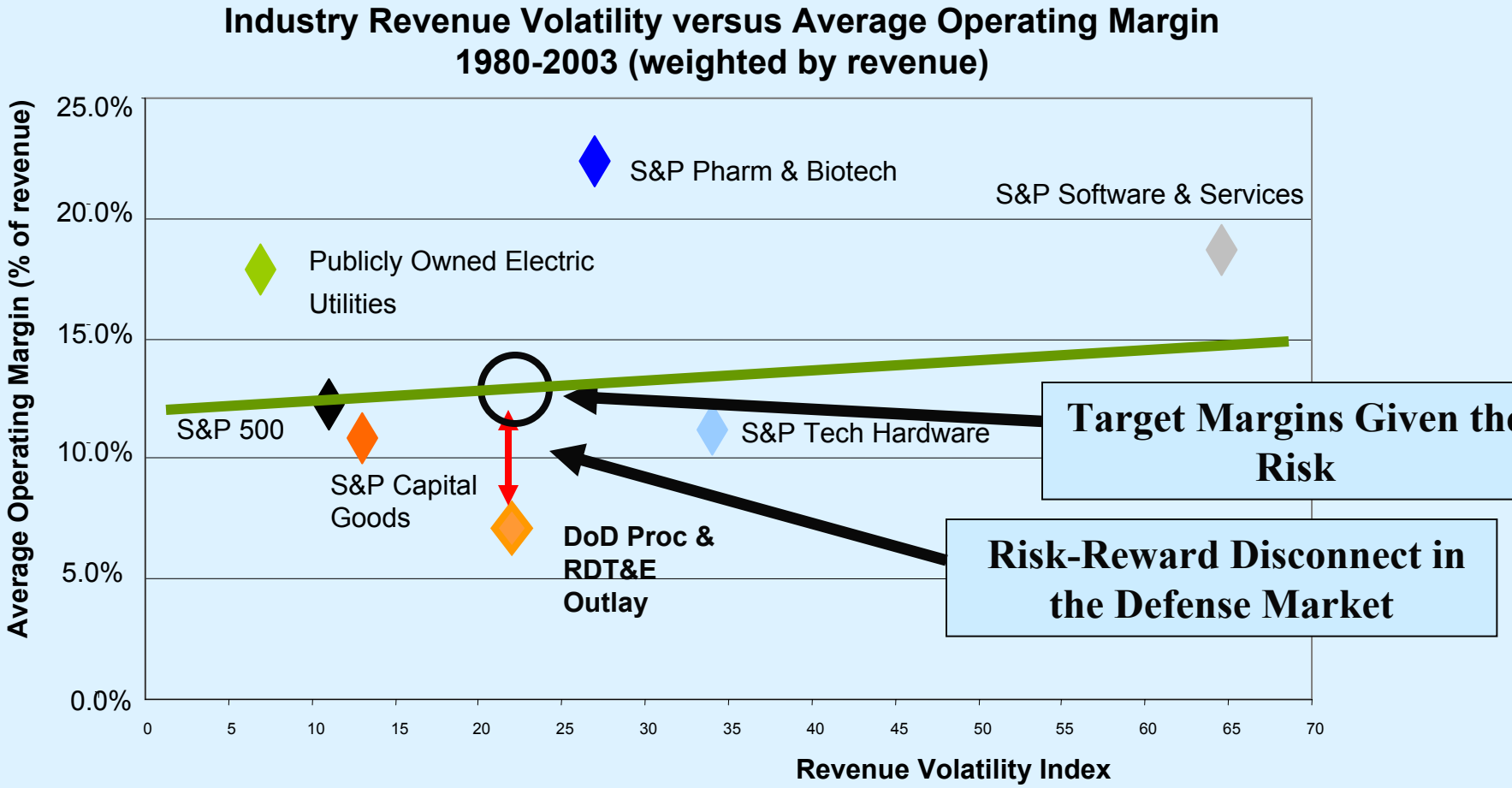
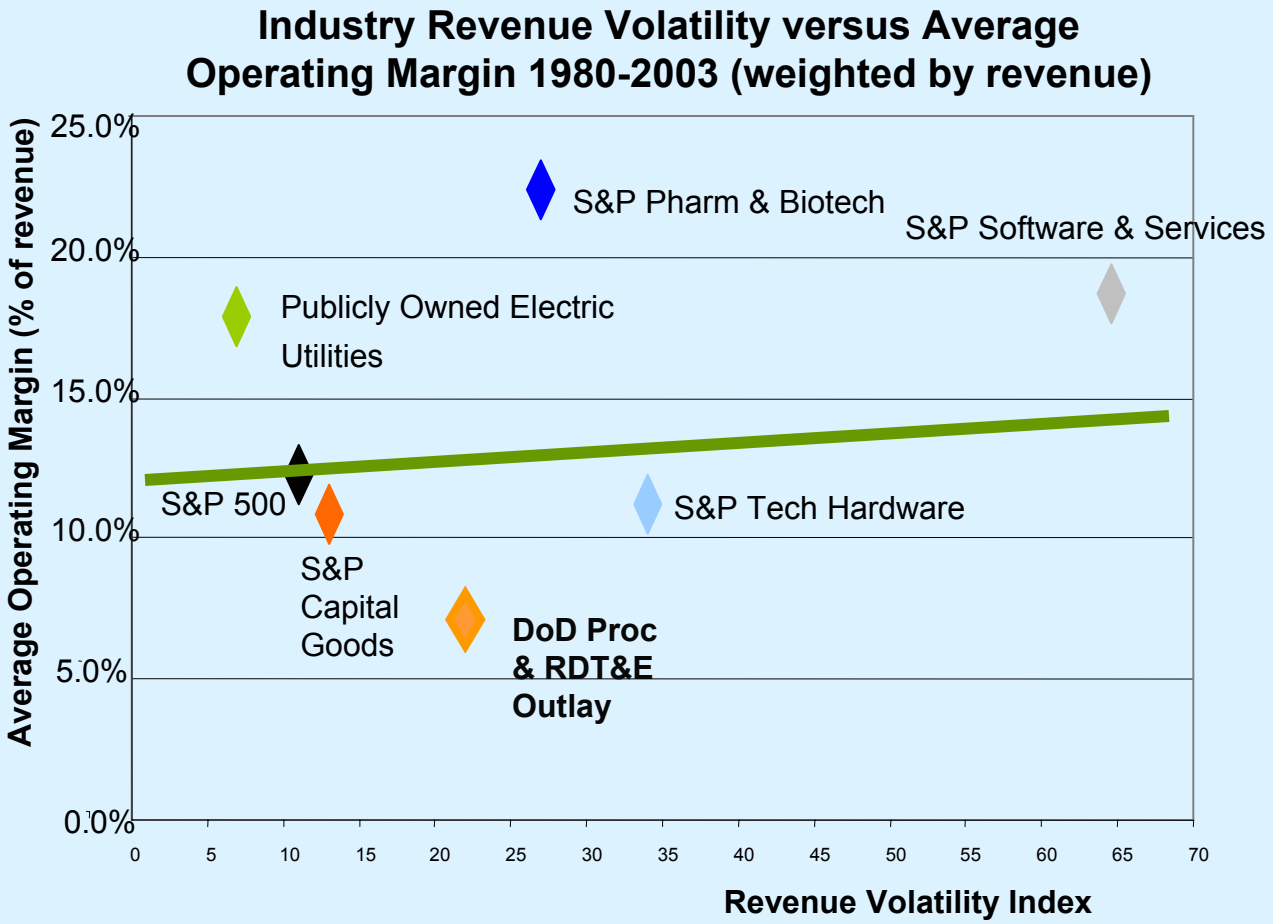
Apparent Risk-Reward Disconnect in the Defense Business...



Sources: FactSet, S&P Compustat, Energy Information Administration, Congressional Reports,

Policy Realities Leave Industry With Few Levers to Pull…

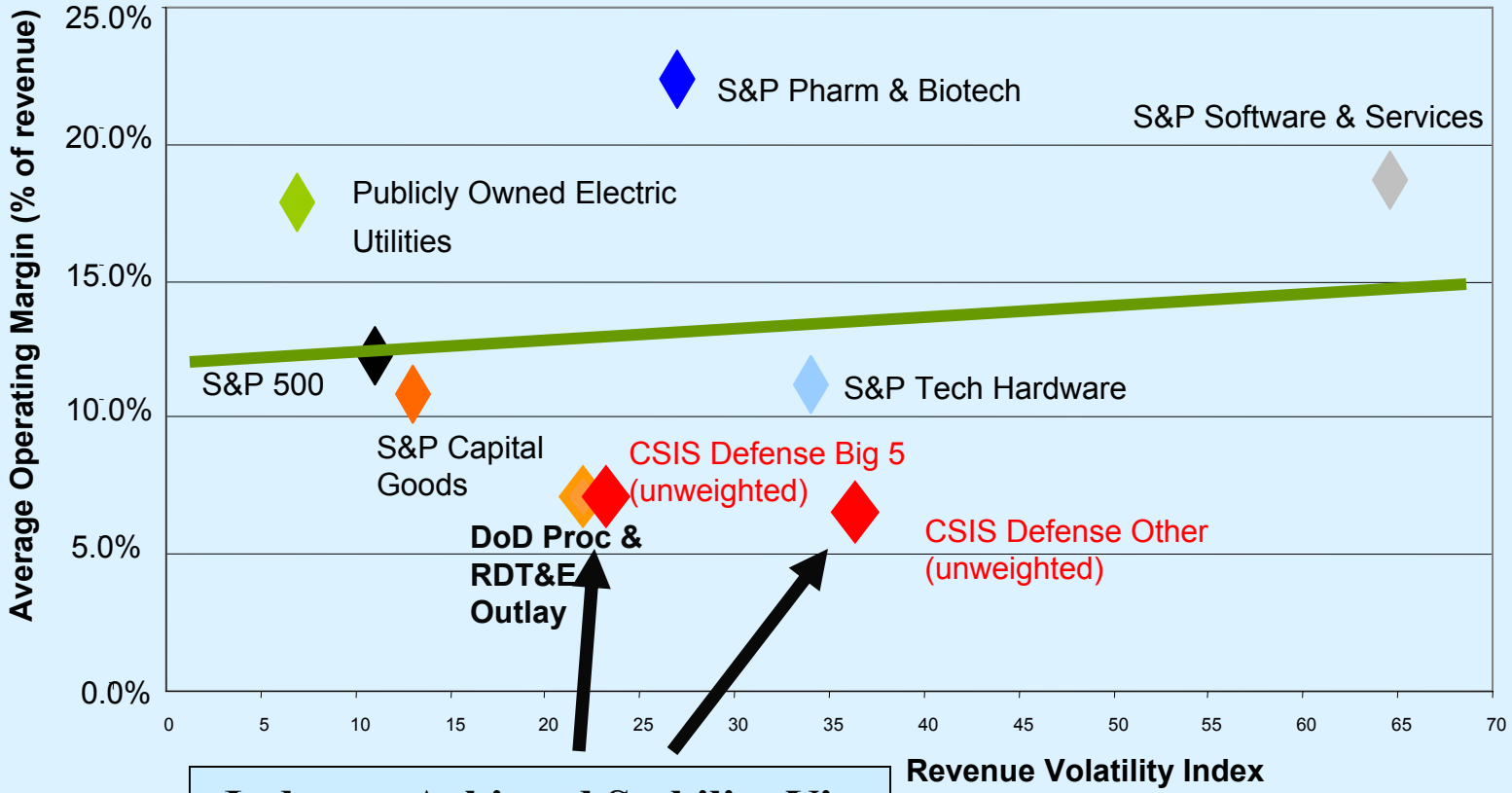
“Glass Ceiling” in Margins, Difficult Politically To Change



SO…Work the Volatility/Risk Side of the Relationship

Consolidation Used To Generate Stability in 1990s

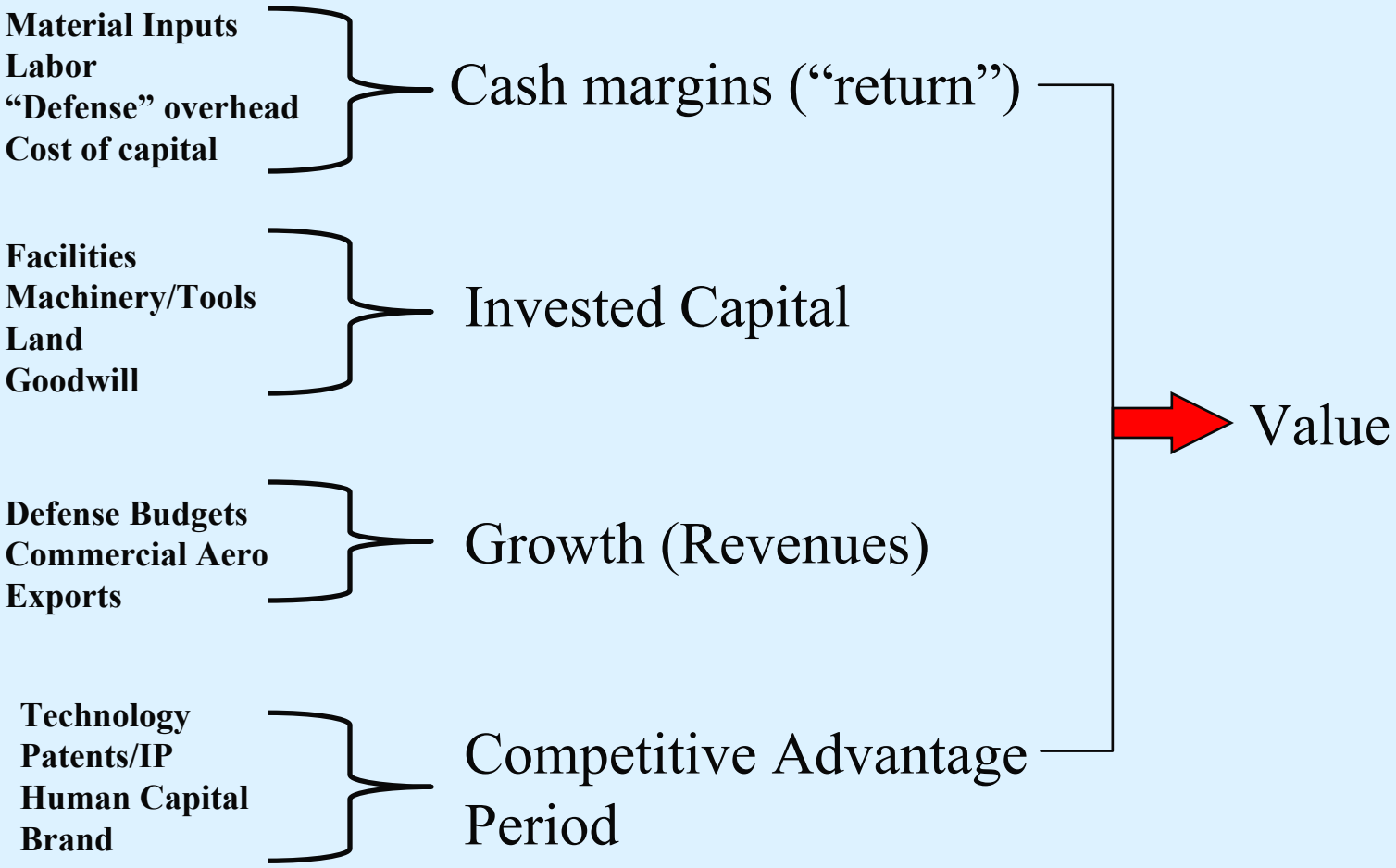
Industry Revenue Volatility versus Average Operating Margin
1980-2003 (weighted by revenue)



Industry Achieved Stability Via Acquisitions – Bought Revenue/Backlog

Sources: FactSet, S&P Compustat, Energy Information Administration, Congressional Reports, CSIS Analysis

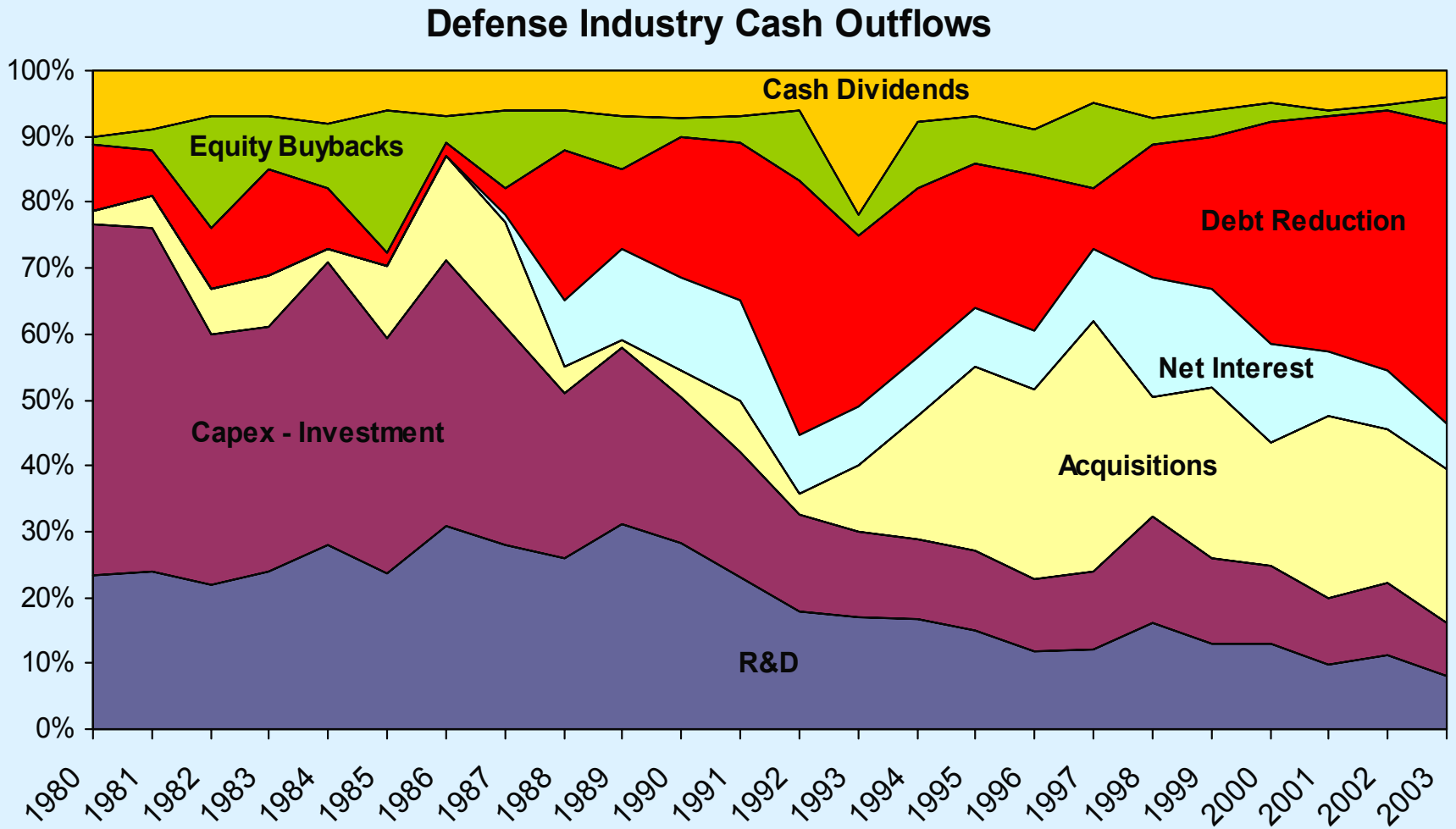
Industry Has Four Key Levers To Create Value



Industry Strategies Generally Limited…

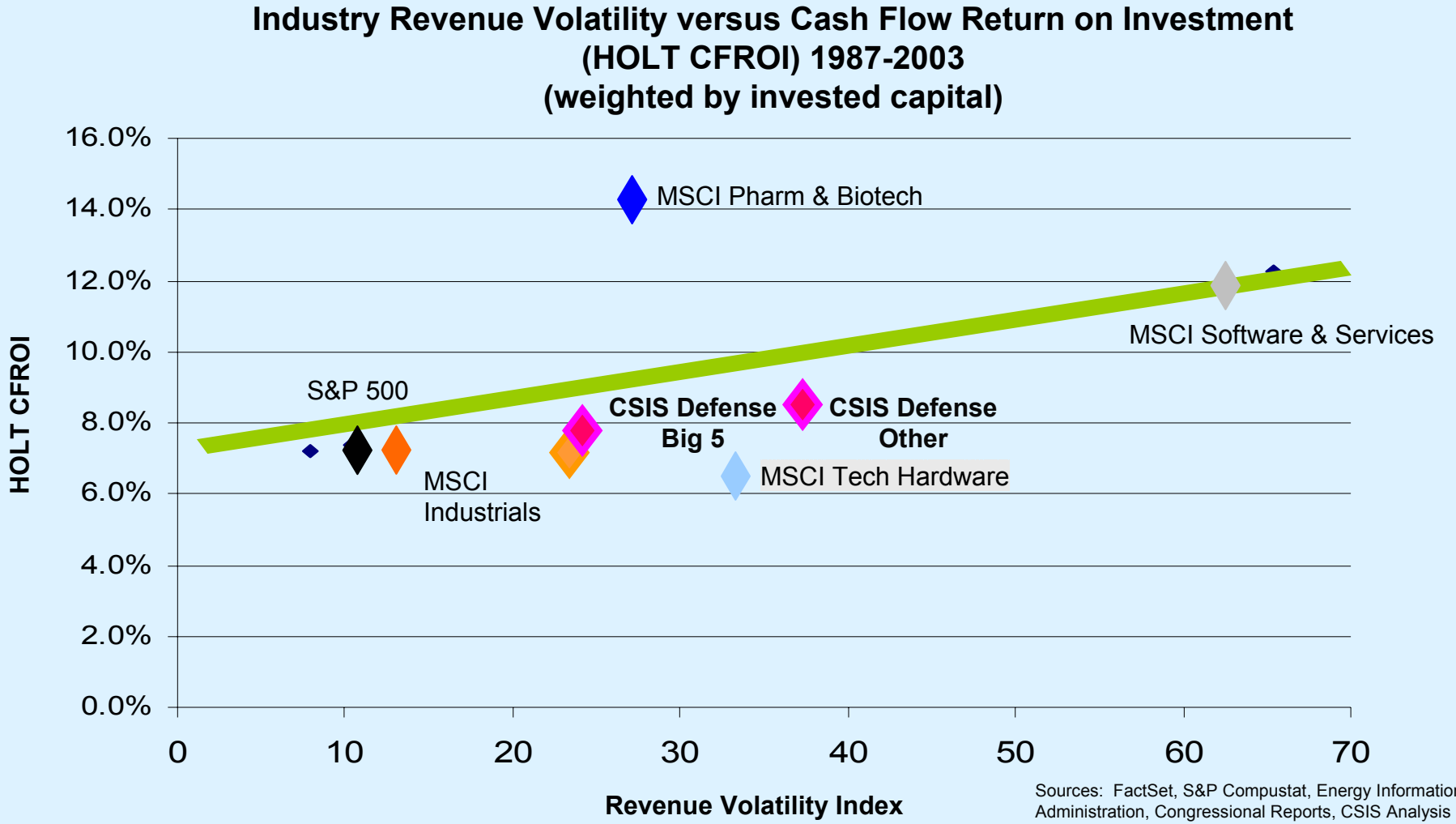
Growth (Revenues)	**- Limited by growth in budgets** **- Acquire it (hit a limit as well)** **- Expand into O&M/services**
Competitive Advantage Period	**- Disrupted by technology shifts** **- Acquire IT/electronics/ architecture skills**
Cash margins (“return”)	**- Cut costs** **- Cut investments** **- Eventually hit the margin glass ceiling**
Invested Capital	**- One of few areas with running room** **- Continue to shrink invested capital** **– keep capx low, acquire and consolidate, give capital back**

Financial Response to the Policy and Market Realities...



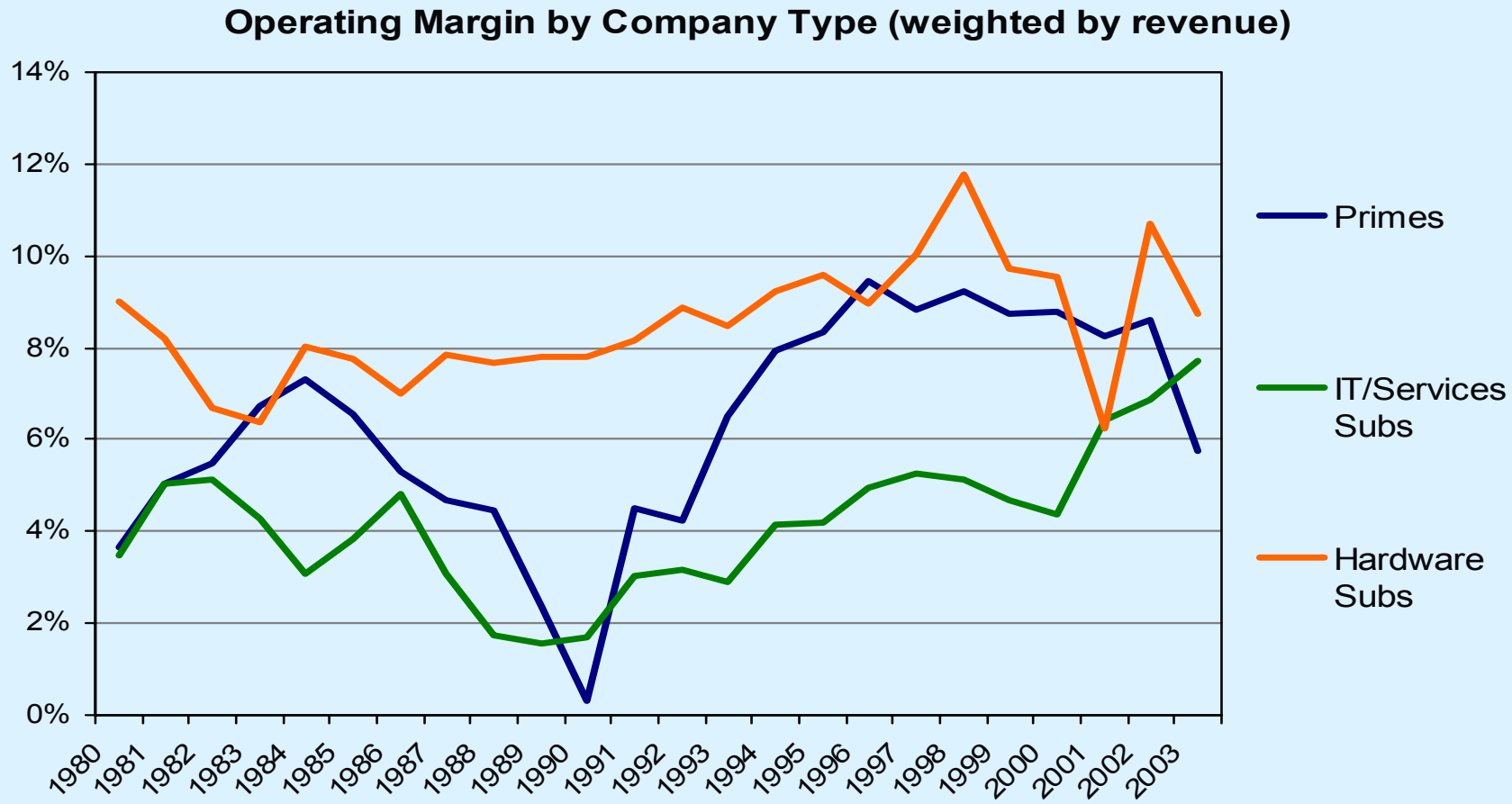
Sources: FactSet, S&P Compustat, Energy Information Administration, Congressional Reports, CSIS Analysis

Industry "Returned To the Line" Via Acquisition and Cuts in Investment/Capital ...



Sources: FactSet, S&P Compustat, Energy Information Administration, Congressional Reports, CSIS Analysis

From A Return Standpoint, Second Tier Does Better.



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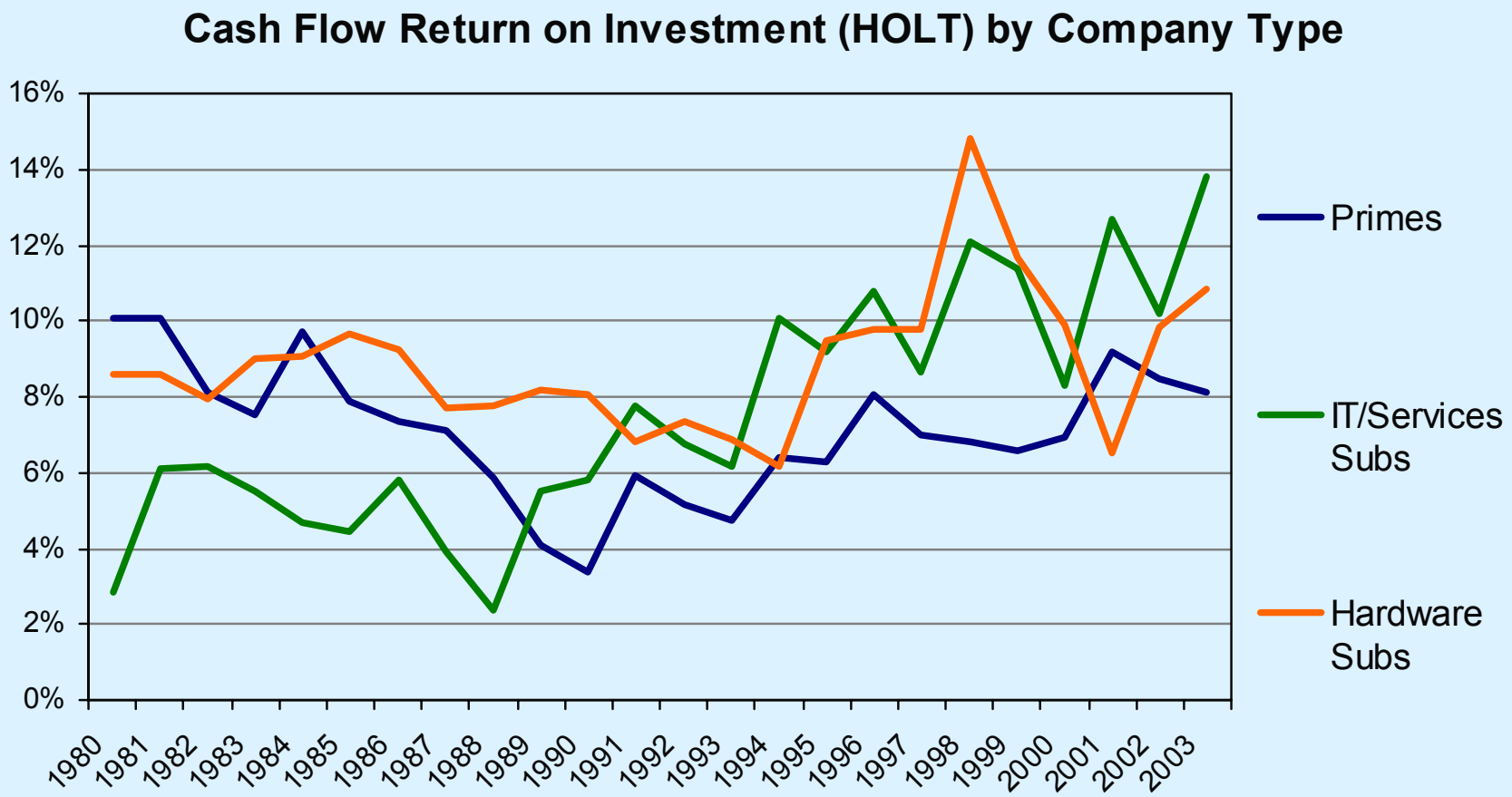
Second Tier Does Better on CFROI As Well…



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Strategic/Policy Issues –

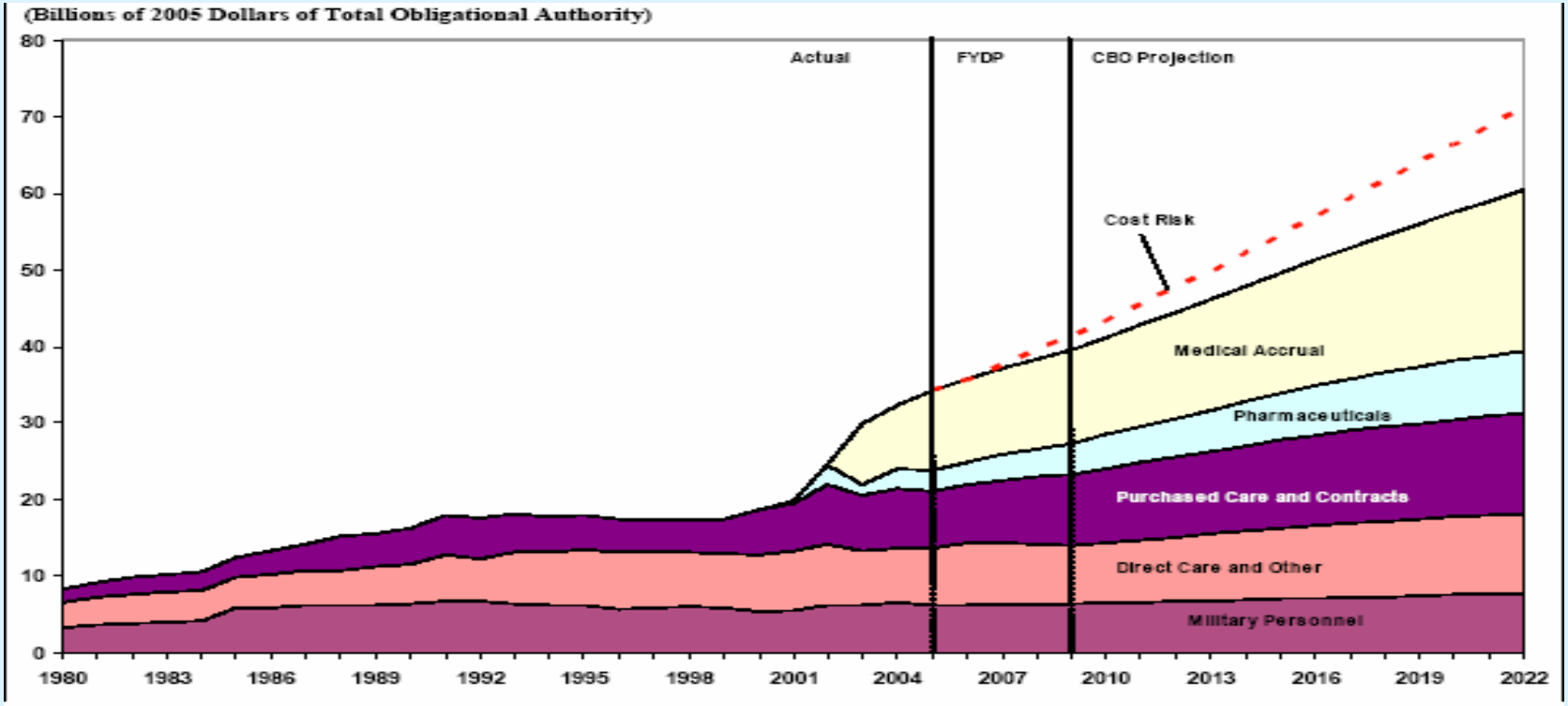
What's on the Horizon

Defense Budget Dynamics. . .

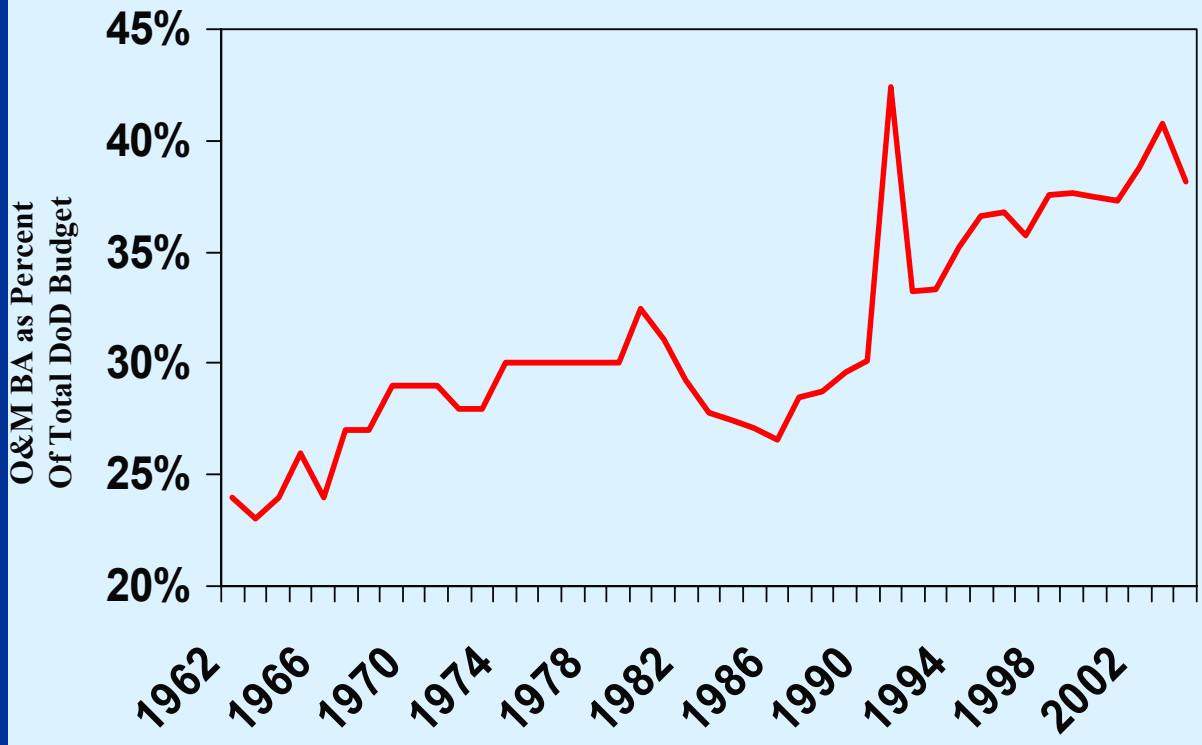
Growth in Personnel Costs ramping up

- **End Strength Growth**
- **Exploding Health Care Costs**

DoD Medical Spending According to CBO



Defense Budget Dynamics – O&M "Death Spiral"…

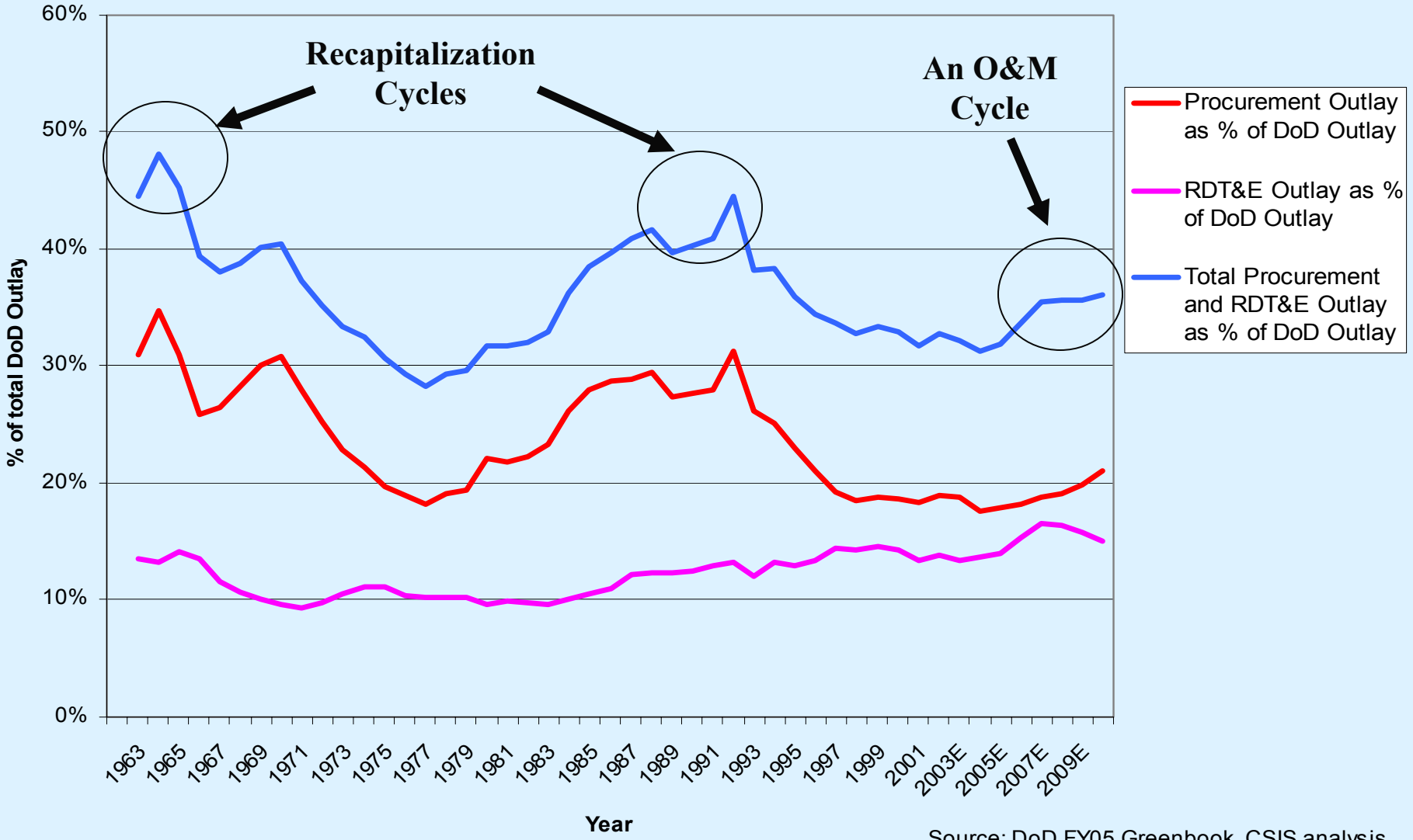


	1990 (Avg Age)	2005 (Avg Age)
Ground Combat Vehicles	~ 6 yrs	~14 yrs
Marine Combat Vehicles	~ 5 yrs	~ 15 yrs
AF Fighters	~ 10 yrs	~ 18 yrs
Navy Aircraft	~ 11 yrs	~ 14 yrs
AF Bombers	~ 21 yrs	~ 30 yrs
AF Tankers	~ 27 yrs	~ 42 yrs
Combat Ships	~ 16 yrs	~ 16 yrs
Marine Helos	~ 17 yrs	~ 24 yrs

- **Old equipment increasingly more expensive to maintain**
- **Iraqi War costs adding to the operations & maintenance bill**

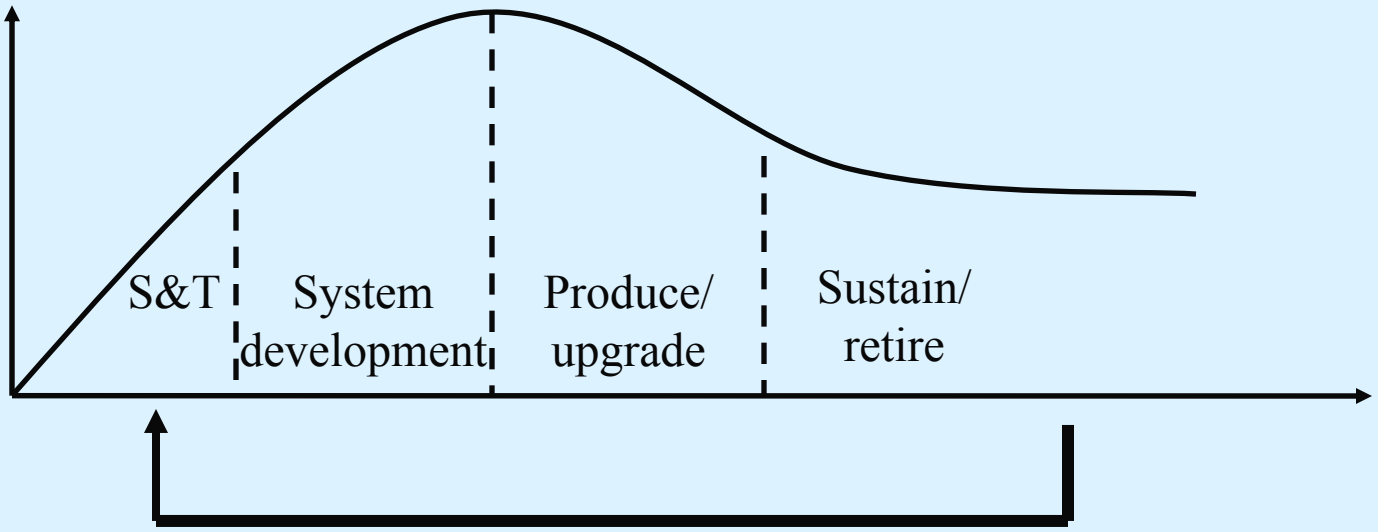
Source: CBO, DoD 2005 Greenbook

This Has Been an O&M Cycle…



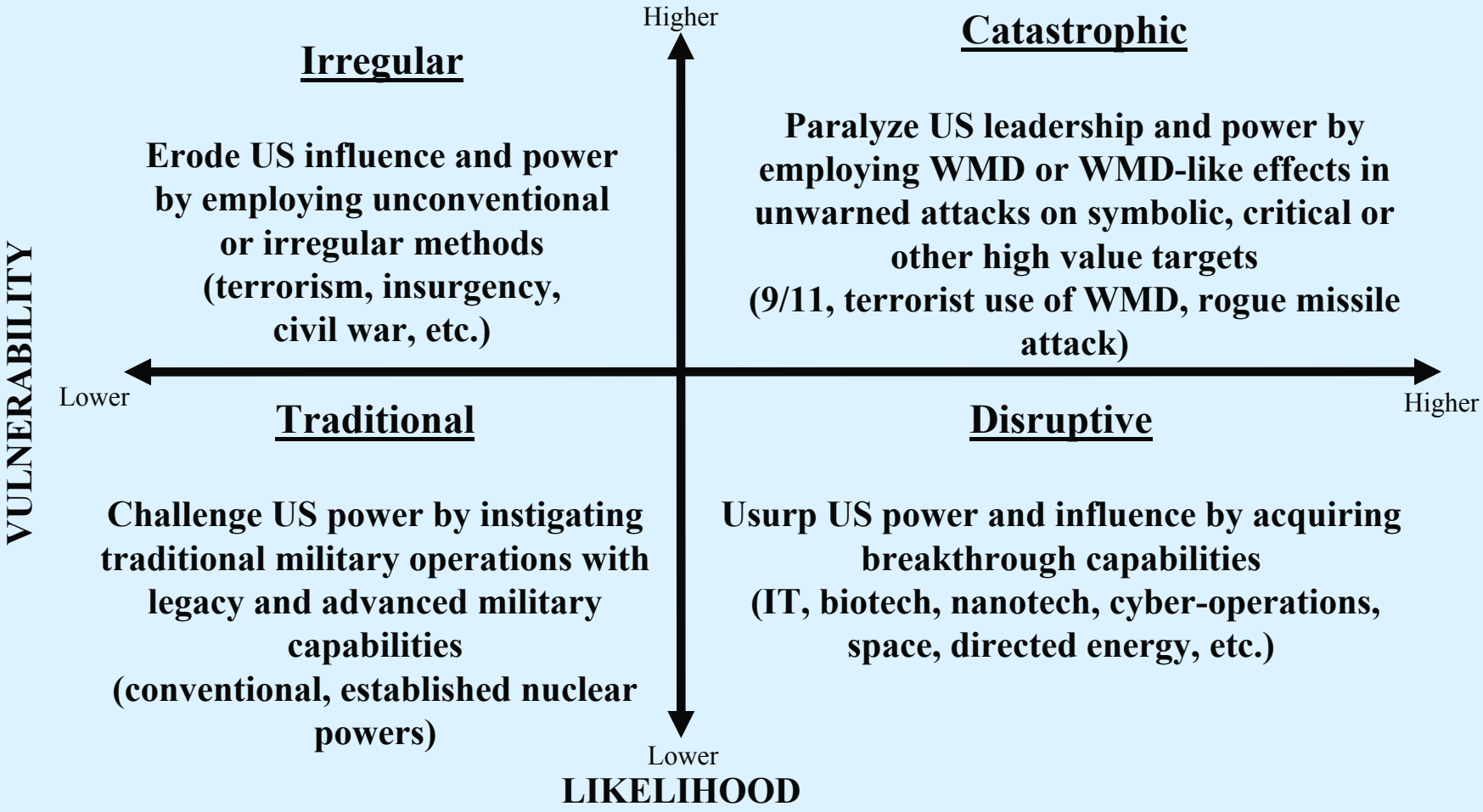
Source: DoD FY05 Greenbook, CSIS analysis

How To Redeploy Assets To Meet New Threats…

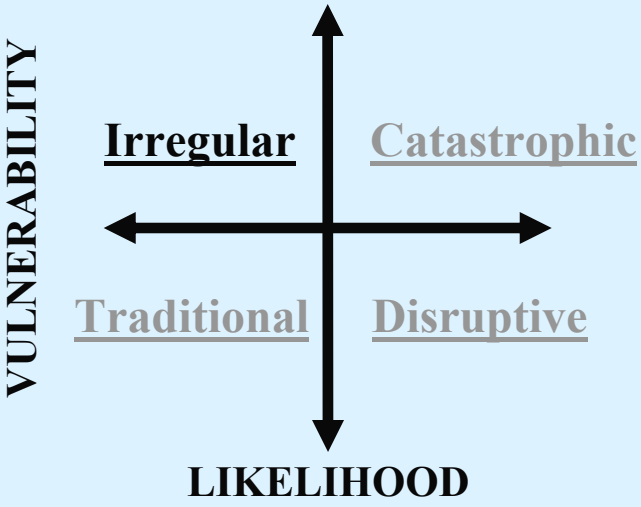


How/where to redeploy assets?

Strategic Challenges...



Irregular Threats...



Historically

- Solved with Traditional forces
- SOCOM ($6.5 billion budget)

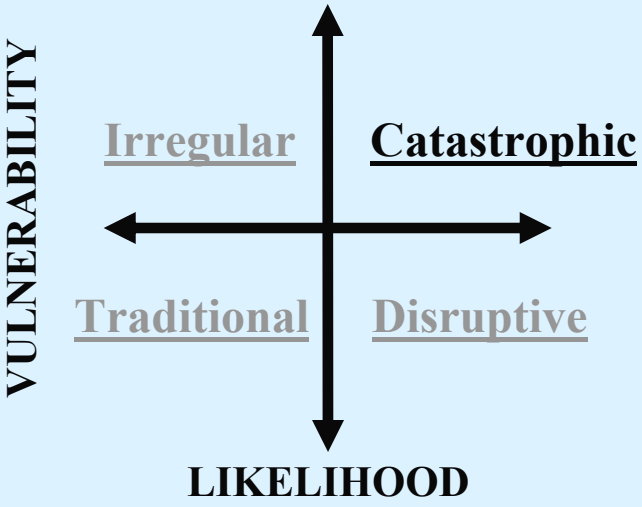
Issues

- What role for non-military or DoD solutions?
- What is the role of allies in manpower intensive tasks?
- Are there viable technical solutions?

Going Forward

- Expanded SOCOM
- Constabulatory forces (new role or new force)
- Non-lethal technologies
- More precise and discriminating strike technologies

Catastrophic Threats...



Historically

- Rely on distance
- Rely on intel agencies

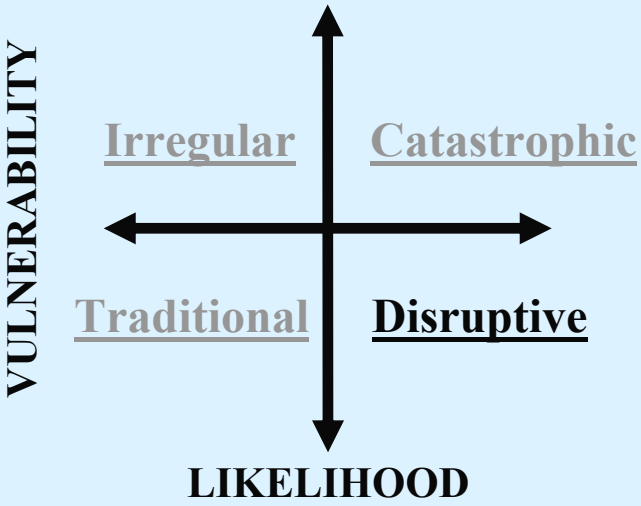
Issues

- What is your strategy – try to prevent/disrupt ahead, try to stop, try to absorb
- What is the role of DoD versus DHS?

Going Forward

- Intelligence (IT, knowledge management, etc)
- Missile defense (Cruise missile defense)
- Sensors (wide and narrow area), security technologies, lot of low tech networked together
- Biodefense

Disruptive Threats...



Historically

- We've been the disruptor
- Addressed with government S&T

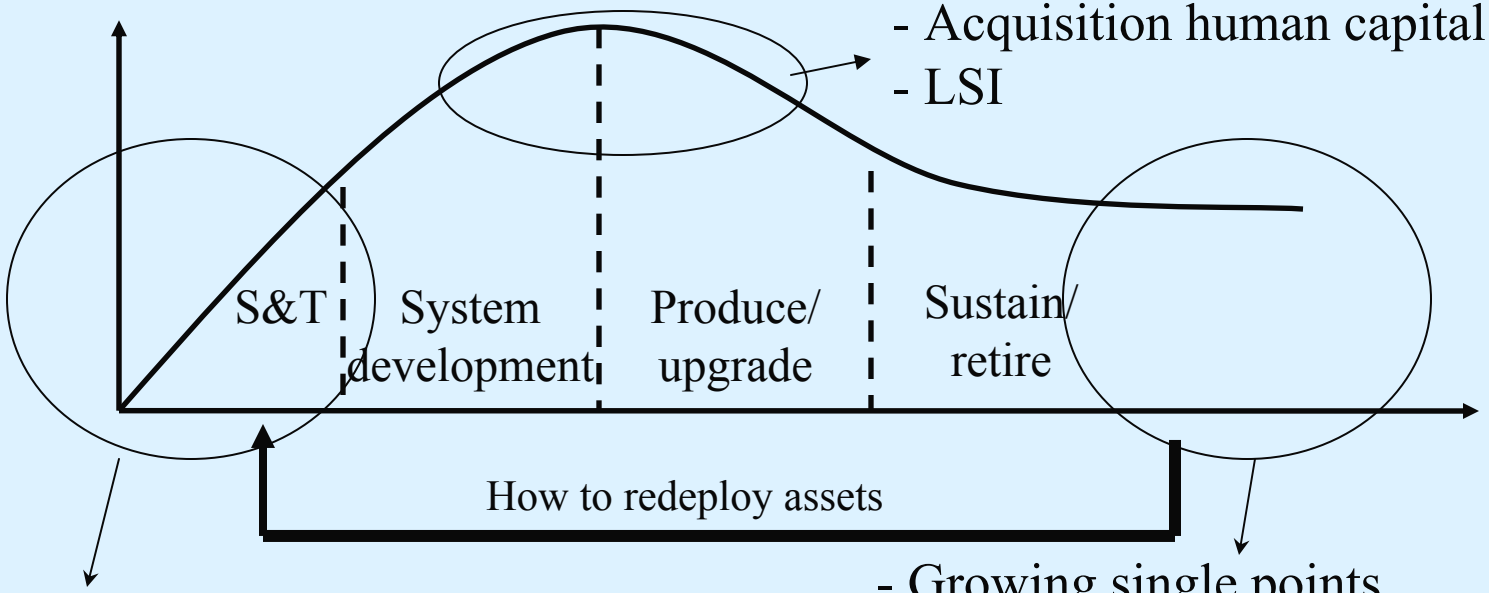
Issues

- Is reliance on harvesting commercial technologies creating vulnerabilities?
- Globalization of technology

Going Forward

- Smaller, smarter, cheaper weapons
- Cyber-operations – targeting single points of failure
- Challenge for industry and USG is "Innovators Dilemma"

Issues From the Industry Lifecycle Standpoint…



- Drop in S&T/IR&D (role of DDR&E)
- Scientific human capital (industrial ROTC)
- Accessing non-defense tech
- Not enough focus on process innovation – complex systems and software (SE university programs, software innovation)

- Growing single points of failure in 2/3rd tier
- Asset intensive, low volume (GOCO)
- Surge
- Reallocation of work/capacity
- Process innovation – flexible manufacturing (return DARPA to mfg process, Mantech)

Areas of Policy Disconnect…

- Due to Landscape Changes
  - End Cold War, Post 911
  - Post consolidation
  - Era of joint
  - More sophisticated financial markets meets pure play defense
- Misapplied Policies
  - Competition everywhere
  - Efficiency everywhere
  - Hardware models applied to software/service
  - Answering complexity with centralization
- Conflicting Policies
  - Competition vs Buy America
- Structural (Pendulum Swings)
  - Oversight vs efficiency
  - Civilian vs military

Increased Imperative for Nimbleness and Creativity

- **In defining solutions**
  - **How to solve non-tradition problems**
  - **How to leverage legacy assets**
  - **Get closer to the end-user**

- **In strategy**
  - **Be conduit for others into the defense world**
  - **Venture capital strategy**
  - **Be willing to destroy your own business**
  - **Break away from solutions industry has optimized around**
  - **Process innovation as critical as product innovation**
  - **More decentralized to address more complex problems**

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