

*Comments on*  
**Using Stock Returns**  
**to Identify Government Spending Shocks**  
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**I appreciate Benjamin Brookins' assistance in preparing these remarks. The views expressed are solely my own responsibility and should not be interpreted as reflecting the views of the Board of Governors of the Federal Reserve System or of any other person associated with the Federal Reserve System.**

# Using Excess Returns of Large Defense Firms to Identify Government Spending Shocks

## Advantages

- Large number of observations
- Positive and negative shocks
- Less subjective than the narrative approach

## Potential Pitfalls

- Downward bias in estimated multiplier (noise in excess returns)
- Systematic biases due to other shocks
- Timing issues (anticipation, uncertainty, risk premia, etc.)

Figure 6: Effects Of Government Spending Shocks Using Excess Returns

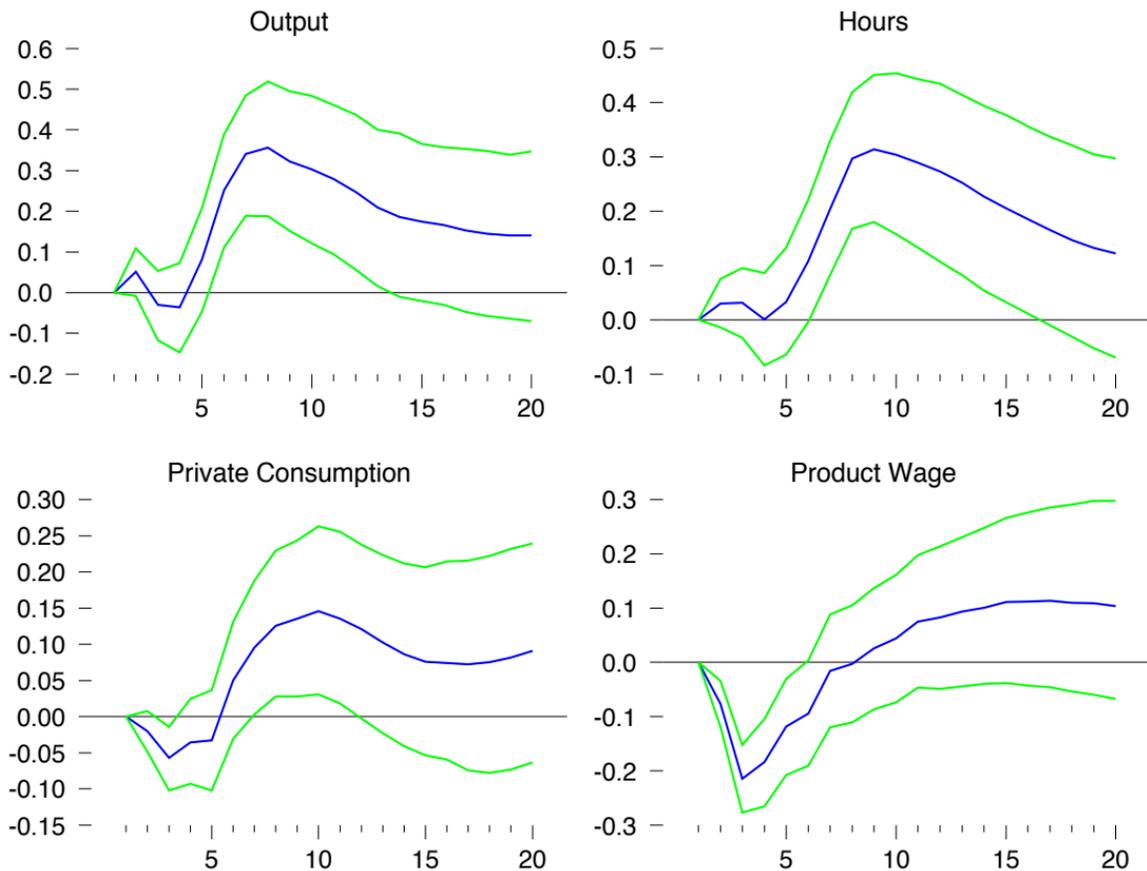
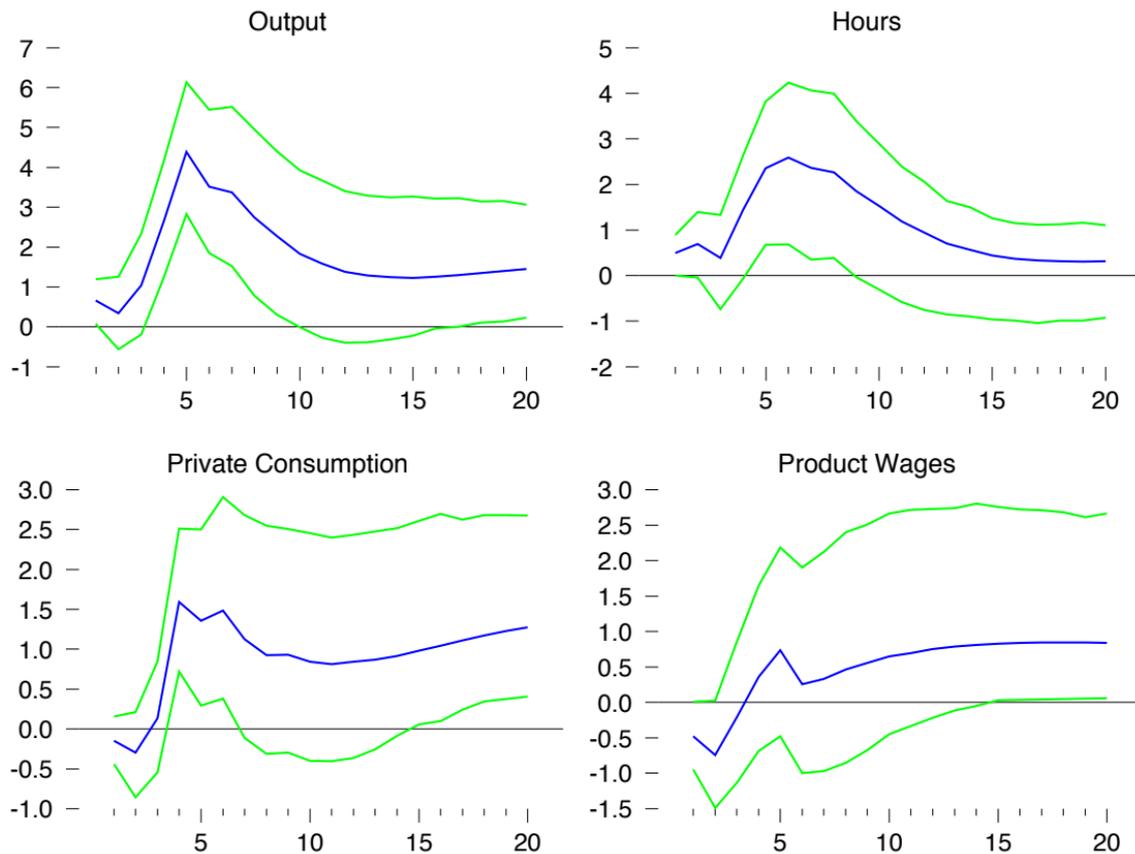


Figure 8: Effects of Government Spending Shocks Using War Dates



## Dates of Extraordinary Returns for “Top 3” Defense Firms

*(absolute value of quarterly change > 2 standard deviations)*

<u>Date</u>	<u>Excess Return (%)</u>	<u>Comments</u>
<b>1950Q4</b>	<b>20</b>	<i>R-S Korean War Date = 1950Q3</i>
1955Q2	-25	???
1959Q3	-21	???
----	----	<i>Vietnam War Date = 1965Q1</i>
1971Q1	20	???
1973Q2	-21	???
1975Q2	24	???
----	----	<i>Carter-Reagan Date = 1980Q1</i>
1999Q4	-32	???
2000H2	49	???
<b>2002Q2</b>	<b>19</b>	<i>9/11 “War Date” = 2001Q3</i>

## What Happened in the Mid-1960s?

“Questions about **the reliability of estimates for the government’s military spending in connection with the Vietnam War** were a very sore subject at this time. Good estimates simply could not be had on any timely basis. **Actual results always turned out to be substantially higher than the figures contained in the federal budgets.** In my role as chief of the Federal Reserve Board’s government finance section during a few of those years...efforts to cage more realistic figures out of the Defense Department were unavailing. And one simply could not arbitrarily add a larger than usual ‘fudge factor’ to office estimates of defense spending just on the hunch—no matter how informed by **bitter experience—that realistic spending figures were being suppressed somewhere in the government.**”

*Stephen Axilrod, Inside the Fed (2009), p.43*

## Excess Returns of Major Defense Firms in 1971Q1

<u><i>Company</i></u>	<u><i>Mkt. Share</i></u>	<u><i>Excess Return</i></u>	<u><i>Contribution</i></u>
<i>General Dynamics</i>	9	13	1
<i>Grumman</i>	6	15	0
<i>Lockheed</i>	4	14	0
<i>Martin</i>	17	10	1
<b>McDonnell Douglas</b>	<b>28</b>	<b>60</b>	<b>13</b>
<i>Northrup</i>	4	-15	-1
<i>Raytheon</i>	16	34	4
<i>United Technologies</i>	16	7	1
<i>All Eight Firms</i>	<i>100</i>	<i>20</i>	<i>20</i>

## What Happened in 1971Q1?



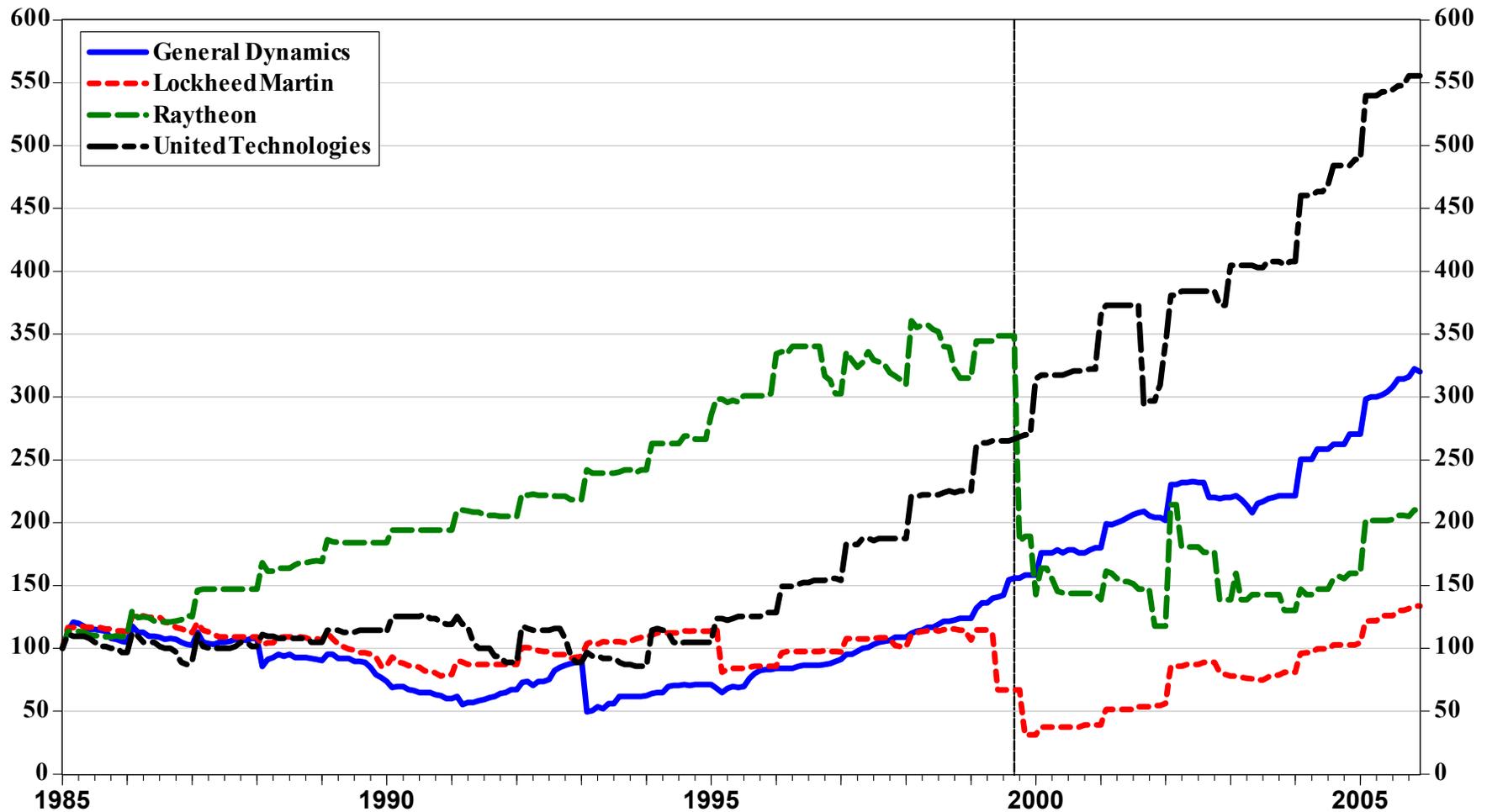
“McDonnell Douglas’ **new DC-10** soars through California skies during **test flight**. New tri-jet will be used mainly for medium hops.”

*(Popular Science, December 1970, p.49)*

“**Production of the DC-10 is accelerating** at the Douglas Aircraft division in Long Beach, California,” the company said. “**The flight development program is progressing very satisfactorily**, with 3 aircraft flying and more than 280 hours of flight time already accumulated.” *(NYT, 1/28/1971,p.3)*

“For the fiscal year starting July 1, the proposed budget projects that... measured in constant 1972 fiscal dollars...**the Defense Department’s planned outlays would fall \$2.6 billion.**” *(WSJ, 2/1/1971, p.6)*

# Earnings Forecasts of Industry Analysts, 1985-2005



*Source: median of analysts' 2-year-ahead earnings forecasts in Thomson Reuters I/B/E/S survey*

## What Happened to Earnings of Major Defense Firms During the Early to Mid-1990s?

“**The wave of consolidation** that swept through the U.S. defense industry after the Cold War ended in 1989 caused **prolonged problems for a number of giant aerospace and defense companies including Lockheed Martin and Boeing Co.** **Raytheon, though, appeared to take a different approach** to its acquisitions of the defense-electronics businesses of Texas Instruments and Hughes Electronics Corp. Analysts said Raytheon aggressively set out to create a **homogenous entity**, moving to consolidate its missile and related operations in Tucson, Ariz.”  
*(Wall Street Journal, 10/12/1999, p.A3)*

## Excess Returns of Major Defense Firms in 1999Q4

<u>Company</u>	<u>Mkt. Share</u>	<u>Excess Return</u>	<u>Contribution</u>
<i>General Dynamics</i>	18	-35	-7
<i>Lockheed Martin</i>	15	-51	-10
<i>Northrup Grumman</i>	7	-33	-3
<i>Raytheon</i>	14	-65	-14
<i>United Technologies</i>	46	-9	-4
<i>All Five Firms</i>	100	-32	-32

## What Happened to Raytheon in 1999Q4?

### Raytheon

“Raytheon Co., long viewed as a successful example of defense-industry consolidation, is **over cost or behind schedule** on more than a dozen of its Pentagon **fixed-price contracts**, according to people familiar with the programs.... Raytheon's problems are causing concern on Wall Street, which had viewed Raytheon as the rare case of a defense company that had appropriately managed its acquisitions. ‘People had looked at Raytheon as a strong performer,’ said ING Barings analyst Sam Pearlstein. Now, ‘there's **general uncertainty about the ongoing earnings potential and outlook** for this company.’”

*(WSJ, 10/12/1999, p.A3)*

## What Happened to Lockheed in 1999Q4?



“The House and Senate tonight struck a deal that would allow the Air Force’s **\$70 billion F-22 fighter jet** to proceed to the assembly line if it could pass new stringent flight tests. The F-22 [is] projected to be the most expensive fighter jet ever built at \$200 million a plane....Congress and the Air Force **had been set to start full-scale production...as early as this month....** Congress almost never cuts off money for a major weapons system that is about to enter production, and the **overwhelming vote in the House to stop production of the F-22 (pending further tests) shocked the Pentagon and Lockheed Martin.**”

*New York Times, 10/7/99, p.A24*

## What Happened to Lockheed in 1999Q4? (contd.)

### Commercial Aerospace

“The Lockheed Martin Corp., the nation’s largest military contractor, posted a 32 percent decline in third-quarter income today and, after **cutting in half its profit forecast for next year**, said its president was stepping down. Lockheed...has been hobbled by failed rocket launchings as well as rising costs for its C-130J transport plane. Lockheed said ...that its **profit margins would narrow...and cited its commercial rocket launching and satellite business**....The satellite communications companies that are its customers are facing financial difficulties. Two satellite-telephone companies, Iridium LLC and ICO Global Communications Ltd., filed for bankruptcy protection this year....**‘This is ugly,’** said a Prudential Securities analyst, Todd Ernst.”

*New York Times, 10/30/1999,p.C4*

## Excess Returns of Major Defense Firms in 2000H2

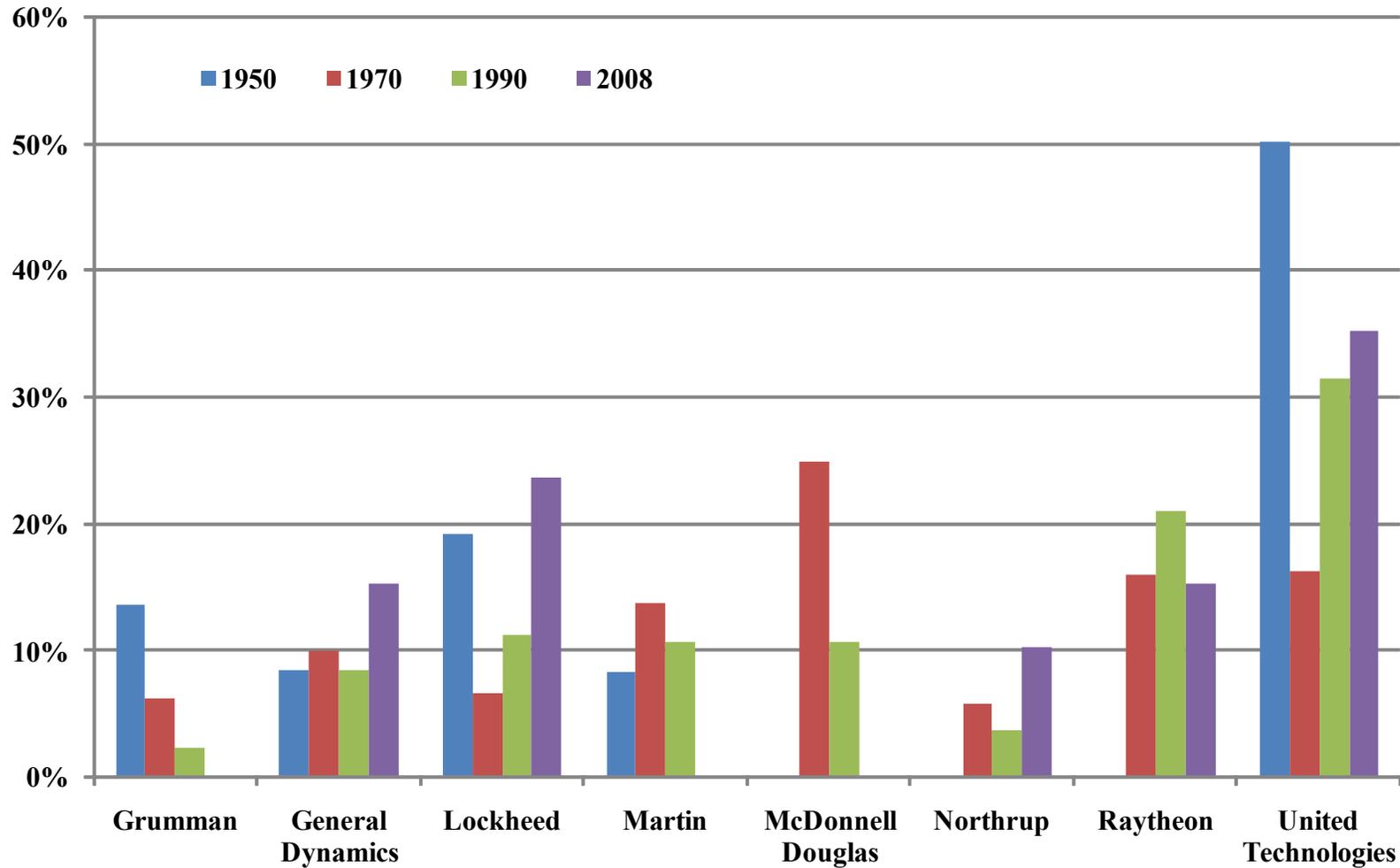
<u><i>Company</i></u>	<u><i>Mkt. Share</i></u>	<u><i>Excess Return</i></u>
<i>General Dynamics</i>	18	61
<i>Lockheed Martin</i>	15	48
<i>Northrup Grumman</i>	7	37
<i>Raytheon</i>	14	75
<i>United Technologies</i>	46	45
<i>All Five Firms</i>	100	49

## What Happened in 2000H2?

“In an effort to **help U.S. defense companies become more profitable**, a special Pentagon panel is set to recommend the government adopt several measures....Defense companies such as **Lockheed Martin**, **Raytheon**, and Boeing would benefit from the changes....The panel group is recommending expanded use of multiyear contracts and establishment of a venture-capital fund to nurture new technologies. Another recommendation would **allow companies to keep cost savings on government programs for three years rather than immediately passing them along to the government.**”

*(Wall Street Journal, 4/17/2000, p.C20)*

# The Evolving Share of Market Capitalization for Major Defense Firms



## Measuring Firm Shares Based on Market Capitalization vs. Defense Contracts

	GD	GQ	LMT	MD	ML	NOC	RTN	UTX
<b>1960</b>								
<i>Mkt. Cap</i>	21	2	11	3	41	2	8	12
<i>Defense</i>	30	6	23	5	14	3	8	12
<b>1981</b>								
<i>Mkt. Cap</i>	16	2	3	13	12	6	31	18
<i>Defense</i>	17	9	13	22	7	3	9	19
<b>2000</b>								
<i>Mkt. Cap</i>	17	---	14	---	---	6	10	52
<i>Defense</i>	14	---	49	---	---	10	21	7

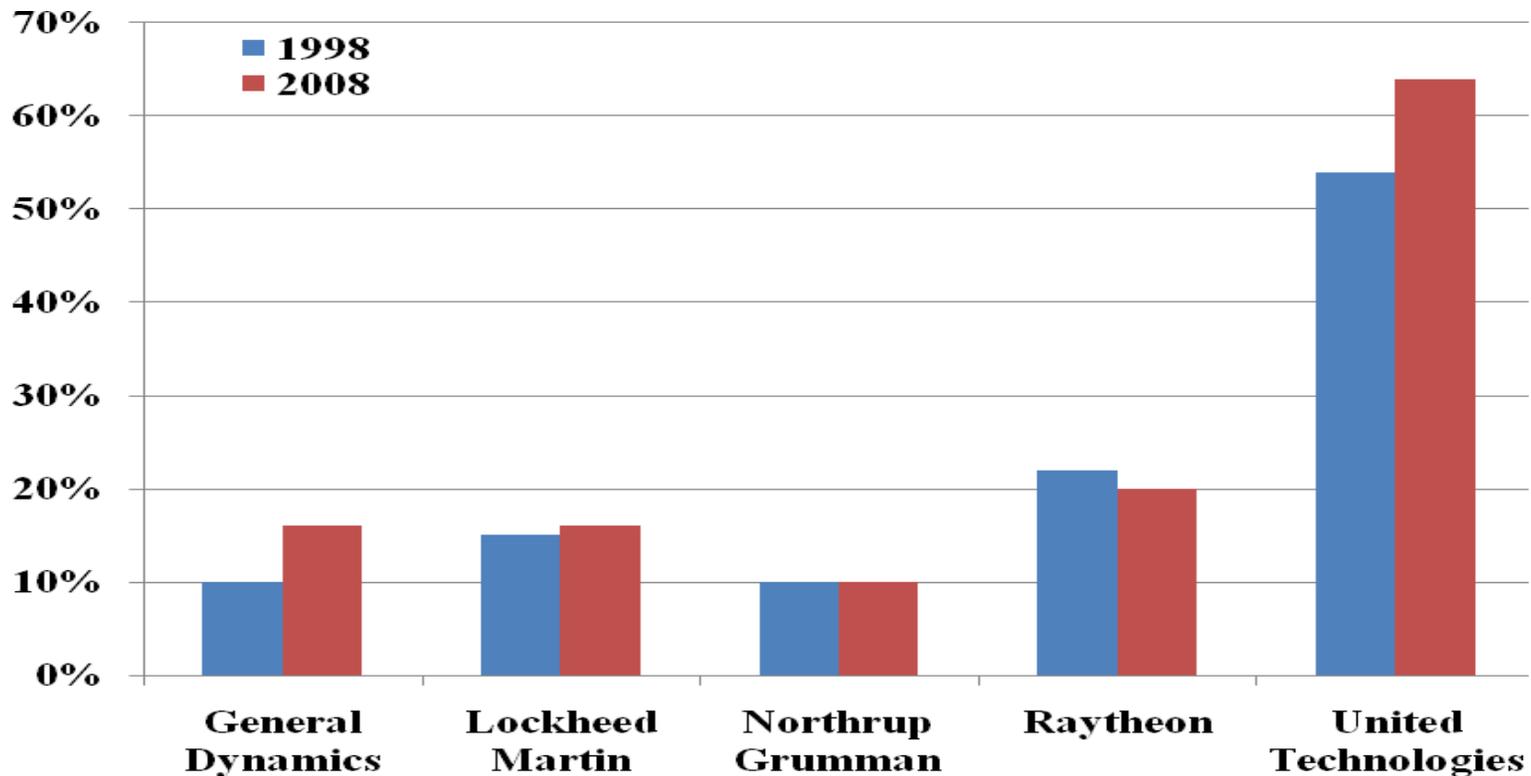
*Source: "100 Companies Receiving the Largest Dollar Volume of Prime Contract Awards"*

## **The Impact of Foreign Sales Revenue on the Earnings of Major Defense Firms**

Lockheed Martin has been awarded a £130 million five-year contract by the **Royal Mail** for its Address Interpretation (AI) project....The AI system represents Lockheed Martin's next generation in recognition and automation technology, building on its experience and performance as one of the largest providers of technology and services for the **U.S. Postal Service**....Lockheed Martin Postal System....is an operating unit of Lockheed Martin Electronics Sector, which **designs, develops and produces advanced components and systems for military, civil government and commercial customers around the world.**

*Lockheed Martin press release, June 23rd, 1999*

## The Evolving Share of Foreign Sales Revenue for Major Defense Firms



*Source: annual reports and 10-K forms posted on company websites*