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# The Effect of the Nunn-McCurdy Amendment on Unit Cost Growth of Defense Acquisition Projects

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# The Effect of the Nunn-McCurdy Amendment on Unit Cost Growth of Defense Acquisition Projects

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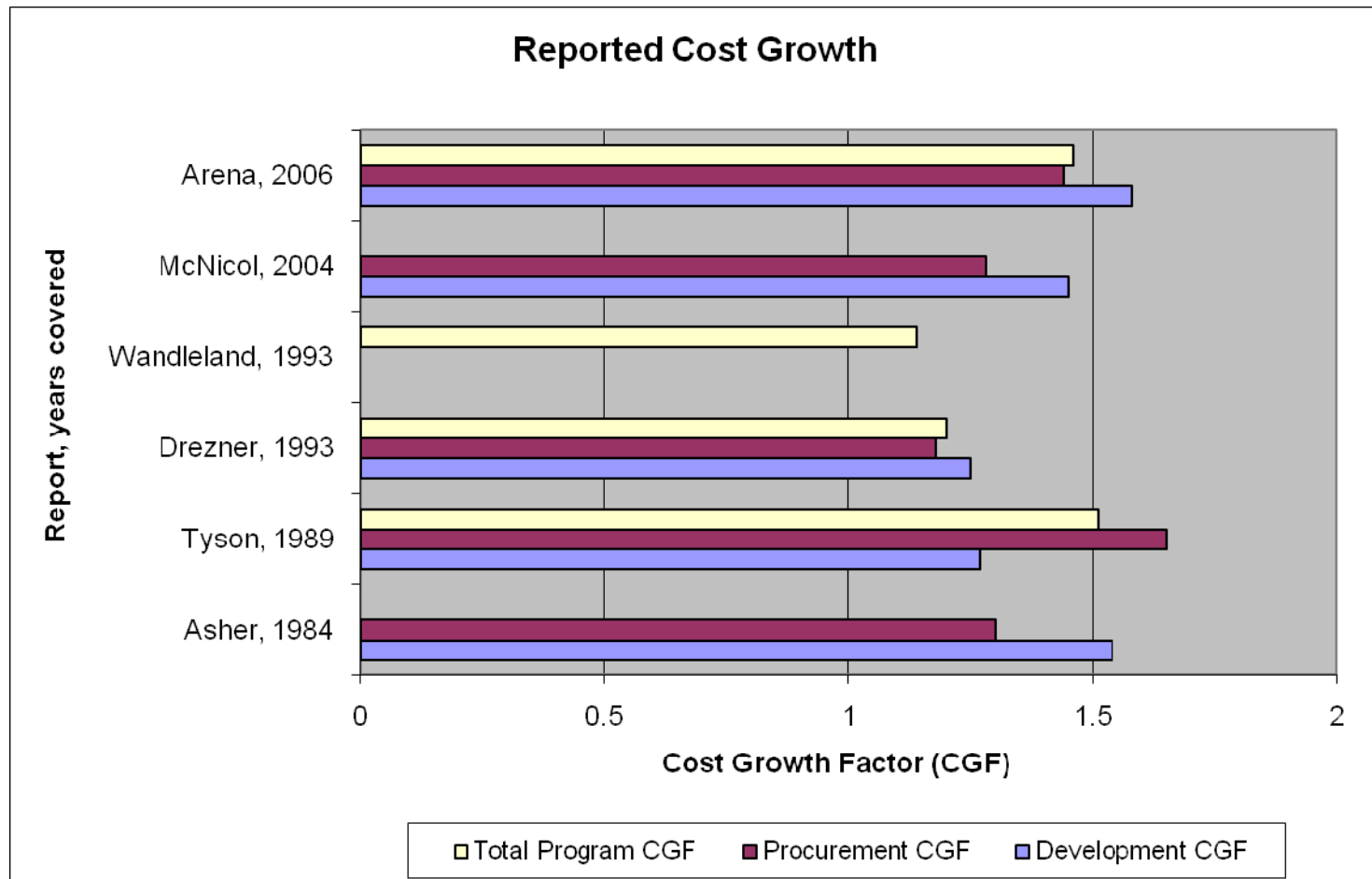**Naval Postgraduate School Acquisition Symposium**
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# DoD Acquisition "Difficulties"

➡ "DoD's major weapon system programs continue to take longer, cost more, and deliver fewer quantities and (less) capabilities than originally planned" GAO

➡ The DoD's Major Defense Acquisition Projects (MDAPs) for 2007 experienced

–   An average delay of 21 months

–   An average program cost growth of 26%, representing approximately $295 billion dollars in additional costs (while still reducing quantities)

➡ Cost growth is a primary concern as DoD plans to spend approximately $935 billion dollars on acquisition between fiscal years 2009 and 2013 (but other [non-discretionary] pressures are likely to reduce the acquisition dollars available).

# Past cost growth studies



**Reported Cost Growth**

Arena, 2006
McNicol, 2004
Wandleland, 1993
Drezner, 1993
Tyson, 1989
Asher, 1984

Report, years covered

Cost Growth Factor (CGF)

☐ Total Program CGF   ■ Procurement CGF   ☐ Development CGF

*Center for Public Policy and Private Enterprise*

# Nunn-McCurdy Amendment

➡ Congress tried to directly address the issue of unit cost growth with passage of the Nunn-McCurdy Amendment (NM)

- – Passed in 1982, made permanent in 1983

➡ NM requires DoD to report when unit cost growth of any major defense acquisition program is "known, expected, or anticipated" by a program manager to exceed certain cost growth thresholds

# NM Breach levels

**Two levels of unit cost breach:**

➡ A **significant** unit cost breach occurred if a program experienced cost growth over 15% of the *current* baseline estimate

➡ A **critical** unit cost breach occurred if a program experiences cost growth of 25% over the *current* baseline estimate.

➡ A unit cost breach occurs if a program experiences unit cost growth above specified thresholds as measured by **either** program acquisition unit cost (PAUC) or average procurement unit cost (APUC).

# Reporting requirements by NM breach level

➡ For a **significant** unit cost breach, the Service Secretary must
- notify Congress within 45 days after the report and
- submit a Selected Acquisition Report (SAR) with required additional unit cost breach information

➡ For a **critical** unit cost breach, the Under Secretary of Defense for Acquisition, Technology and Logistics must fulfill all 'significant' breach requirements and must <u>additionally</u> certify to Congress within 60 days of the SAR that the program meets four criteria:
1. the system is essential to national security;
2. there are no alternatives to such system which will provide equal or greater military capability at less cost;
3. the new estimates of the unit cost are reasonable; and
4. the management structure for such major defense system is adequate to manage and control unit cost.

# Impact of Original NM

➡ Limited data restricts ability to determine impact of NM exclusively

  – Overall, program acquisition outcomes have not improved significantly since implementation of NM

➡ Criticism of NM as not effective due to rebaselining

  – Practice of establishing a new "current" baseline to avoid a NM unit cost breach

  – Rebaselining does not require congressional notification

➡ As a result, few programs incurred a NM breach between 1982-2004.

  – Congress has recertified the majority of breached programs

# 2006 revision of Nunn-McCurdy

➡ The NM statute was amended in 2006 to close the rebaselining loophole.

➡ New provision: unit cost growth over the *original* baseline estimate.

- A **significant** unit cost breach occurs when cost growth exceeds 30% of the *original* baseline

- A **critical** unit cost breach occurs when cost growth exceeds 50% of the *original* baseline estimate.

- The revision did not change the reporting requirements for either the significant or critical unit cost breach.

Doubled the thresholds and included "current" as well as "original" baseline

# Impact of 2006 revision

➡ DoD reported 40 of the 85 current MDAP programs were experiencing unit cost growth high enough to warrant a NM breach.

   – However, 25 programs did not breach because the National Defense Authorization Act permitted the "original baseline estimate to be revised to the current baseline estimate as of January 6, 2006" (Office of the Under Secretary of Defense (Acquisition Resources and Analysis) 2006).

   – Between 2006-2007, 16 additional programs experienced a NM breach.

➡ Despite increase in the number of program NM breaches, it is too soon to determine the long-term impact of the legislation on current acquisition performance

   – Immediate short-term impact has been to provide greater visibility, as well as a great deal more emphasis on the unit cost growth, relative to the <u>original</u> program baseline.

# The Major Weapons Systems Acquisition Reform Act of 2009

➡️ Congress again amended NM with the Major Weapons Systems Acquisition Reform Act of 2009. This law added two requirements to the process of recertifying programs that incur a NM breach.

➡️ A program with a NM unit cost breach now must

– (a) rescind the most recent Milestone approval and

– (b) receive a new Milestone approval before any actions regarding the contract may continue. The new Milestone approval requires a certification that the costs of the program are reasonable, and the certification must be supported by an independent cost estimate that includes a confidence level for the estimate.

➡️ This statute was implemented too recently to evaluate its impact upon the defense acquisition process.

# Data Analysis

➡️ The authors conducted a data analysis using the information provided by the Selected Acquisition Report Summary Table for December 2007 (the most recent full year set of data available as of the start of research).

- Analysis of one SAR summary table represents a snapshot in time.

➡️ The data analysis computed several tests of independence using Fisher's "exact test".

- Fisher's "exact test" determines the "probability of getting [an outcome] as strong as the observed or stronger simply due to the chance of sampling" (G. David Garson 2008).
- The interpretation of the Fisher's "exact test" p-value 0.0x is that there is an x% chance that, given the information provided in the contingency table, one would randomly draw an outcome as strong or stronger than the sample provided.

# Data Analysis explanation

➡ Only programs in development 3 years or longer as of the December 2007 SAR were included in the analysis, so as to avoid including programs too new to have developed significant development difficulties.

 – The data set contains 71 programs that meet this criteria

➡ Prior SAR summary tables were consulted to determine if a program has incurred a NM breach or high unit cost growth.

➡ Two sets of programs analyzed

1. Programs that experienced a NM breach (18 programs)
2. Programs that experienced a NM breach, as well as programs that would have experienced a NM breach if not rebaselined to avoid the new NM provisions (31 programs)

# Data Analysis example

## NM Breach by Quantity Change for FY 2007

➡ We are testing to see if NM breach is independent of quantity change.

➡ Although the SAR adjusts the cost of the program for changes in quantity, those that decrease quantity appear much more likely to breach.

➡ Interpretation: Programs that experience a NM breach are either more likely to reduce quantity in order to stay within total program cost thresholds or to reduce quantity after incurring a breach.

|  | NM Breach percentage |
|---|---|
| No Quantity Increase | 8% |
| Quantity Increase | 19% |
| Quantity Decrease | 48% |
| Fisher's "exact test" estimates there is a 0.0% chance that, if quantity change is independent of breach, that this outcome is a result of random chance | |

# Sample Chart of SAR Cost Growth "Causes"

| Problem Areas | Specific Problems |
|---|---|
| Requirements Definition | Poor initial requirements definition<br>Poor performance/cost trade-offs during development;<br>Changes in quantity requirements |
| Cost Estimating | Errors due to limitations of cost estimating procedures<br>Failure to understand and account for technical risks<br>Poor inflation estimates<br>Top down pressure to reduce estimates<br>Lack of valid independent cost estimates |
| Program Management | Lack of program management expertise<br>Mismanagement/human error<br>Over optimism<br>Schedule concurrency<br>Program stretch outs to keep production lines open |
| Technical | Use of immature technologies<br>Adherence to strict performance requirements<br>Reliance on proprietary information |

# Sample Chart of SAR Cost Growth "Causes"

| Contracting | Lack of competition; Contractor buy-in (to win competition) |
|---|---|
| | Use of wrong type of contract |
| | Inconsistent contract management/administrative procedures |
| | Too much contractor oversight and reporting requirements |
| | Waste |
| | Excess profits |
| | Contractors over staffed |
| | Contractor indirect costs unreasonable |
| | Taking too long to resolve undefinitized contracts |
| Budgetary | Funding instabilities within DoD caused by trying to fund too many programs |
| | Funding instabilities caused by congressional decisions |
| | Inefficient production rates due to stretching out programs |
| | Defense Acquisition Board (DAB)--formerly DSARC--out of synchronization with the services' Program Objective Memorandum (POM) cycle |
| | Failure to fund for management reserve |
| | Failure to fund programs at most likely cost |

# Data analysis conclusions

This data analysis produced two conclusions:

➡ First, DoD's current SAR metrics are **not useful** for determining the root cause of unit cost growth in acquisition programs.

➡ Second, despite data limitations, it appears that programs that experience high, unit-cost growth are **not** randomly distributed. The two most important factors were (1) the dollar size of the project and (2) the "optimistic estimating" cost category.

➡ Although quantity decrease is highly correlated with NM breach, quantity decrease is more likely to be the *result* of cost growth (decreasing units to stay within top line budgets) as opposed to the *cause* of cost growth (decreasing quantity because the mission changes) – particularly as the SAR unit cost growth calculation adjusts for quantity.

# Case Study #1

➡ SBIRS-High:

- 1996 contract for $4.5B (FY2010 $) with launch by 2004 (covering four missions "missile warning, missile defense, technical intelligence, and battlespace characterization" CRS)

- NM breach in 2001 (immature technologies), resulting in the program being restructured and rebaselined.

- <u>Rebaselined</u> in 2005, to avoid second NM breach

- Now at $13.5B (FY2010 $) with launch schedule for 2011

**Conclusion: NM did not achieve its objective**

# Case Study #2

➡ SSN 774

- 1993 contract for next generation of attack sub (with the objectives of lower cost and greater versatility)

- 1998 contract awarded to 2 yard "partnership" for $4.2B (4 ships)

- By 2003 program cost growth 24%, <u>so Navy initialed cost reductions</u>

- By 2008, the first Block II ship was "delivered eight months ahead of schedule and $54 million under budget" (Associated Press 2008)

**Conclusion: Good cost management <u>by DoD</u> can be effective**

# Findings

1. Unit cost growth has remained high;

2. Few programs incurred a NM breach until the recent 2006 revision of the law that requires programs to consider unit cost growth above a program's *original* baseline (instead of the *current* authorized baseline);

3. DoD's data collection has been inconsistent (regarding: definitions; moving baselines; quantities; etc.);

4. DoD often has not conducted systematic analysis of root-cause problems;

5. Limited and inconsistent data undermines an effective analysis;

6. NM may identify acquisition problems too late in the development process to allow program reforms to be effective;

7. NM's effectiveness may be limited by its focus on the development and procurement of assets, as opposed to the entire life-cycle of the program; and

8. Recent legislation has not been implemented long enough to evaluate its impact on DoD acquisition processes.

# Recommendations

➡ In order to control cost growth, DoD should

1. Make "unit cost" a military "requirement"

2. Implement a more complete acquisition data information system

3. Consider life-cycle costs when rendering acquisition decisions

4. Directly address the lack of incentives (government and budgetary) that allow current underlying problems to persist

5. Work with Congress to increase funding flexibility (e.g. being able to use production and/or O&M money to increase development costs so as to save far more significant unit production and support costs)

6. Provide programs with greater requirements flexibility (e.g. allowing cost/performance trade-offs, especially for "block I" of the deployed system, so that the last 5 to 10% of performance "requirements" doesn't double the unit costs)

# Recommendations (continued)

➡ Regarding NM, DoD should:

1. Develop a system to determine and distribute lessons-learned from a NM breach, throughout the DoD and
2. Develop leading indicators.

➡ On <u>all programs</u>, focus on using internal DoD management, acquisition strategy, incentives, and oversight (by P.M., service acquisition executives, USD (AT&L), etc.) to control unit costs (and, in order to achieve the required performance, quantity, cost and schedule)

## This can, and must, be done!