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**DAVIES ECONOMIC
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Managing Defence Acquisition Cost Growth

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Nothing to see here

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- A summary of literature on defence equipment cost escalation
- A case study into the impact of cost escalation: major platforms in the RN
- Tackling cost growth through procurement reform: success or failure?
- Responses to cost growth escalation

Literature Review (1)

- Norman Augustine suggested by 2054 the US would have the money for just a single combat aircraft
- In 1959 RAND found US defence projects often optimistically costed
- In 1980 Spinney found increasing technological demands and the defence-industrial complex driving increased costs.
- In the UK, both Pugh and Kirkpatrick separately and together found substantial real terms Intergenerational Cost Escalation (between 5% & 11%) stemming from need to ensure that equipment is better than opponent's
- Chalmers suggested much lower real terms growth of 2-3½%
- Arena et al (2006) found annual real terms cost escalation due to customer driven factors over 1950 to 2000 of 3% and 6% for US naval ships and 3½% between 1990 and 2004
- Norwegian FFI study found annual real terms cost escalation between 2% (MBTs)and 7 ½ % (transport aircraft)
- Davies et al found annual real terms cost escalation between 3% (Subs) and 6% (MBTs, Combat Aircraft) almost entirely attributable to enhanced performance characteristics
- tentative evidence of possible recent reduction in Intergenerational Cost Growth (Chalmers and FFI study) with the end of the Cold War.

- Defence (Specific) Inflation (DSI) - the rate of increase in price of bundle of goods and services purchased by Ministries of Defence, measured by an index - eg see UKDS.
- Differential Defence Inflation - the difference between the rate of increase in the price of a bundle of defence goods and services and economy wide inflation(measured by the GDP deflator or Consumer Price Index (CPI)).
- Intergenerational Defence Equipment Unit Cost Growth- the rate of increase in the unit cost of defence equipment between one generation and the next in annual percentage terms (usually in real terms)
- Defence Equipment Unit Cost Growth - the rate of increase in the cost of individual items of defence equipment. This may be measured in nominal or real terms. It includes both Intergenerational Defence Equipment Unit Cost Growth (see below) and shorter term consequences of growth in cost due to project cost overruns and differential defence inflation.

- All the studies of Intergenerational Cost Growth emphasise the importance of the “Tournament” nature of defence goods.
- Davies et al’s estimates lower than Pugh and Kirkpatrick but similar to Arena and Chalmers
- Changes in the characteristics of platforms- size, speed, engine power etc, can explain virtually all the observed intergenerational cost growth. This does not mean that intergenerational cost escalation is /has been discretionary
- Norwegian FFI study emphasises role of technology greater complexity pushing from the level of technology brings much greater costs and worse reliability
- Limited competition between suitable suppliers due to technology plus Defence industrial consolidation that followed end of Cold War
- Procurement of defence goods becomes politicised
- “circle of doom” - intergenerational cost escalation leads to higher unit costs which means fewer platforms can be afforded which leads to further loss of economies of scale

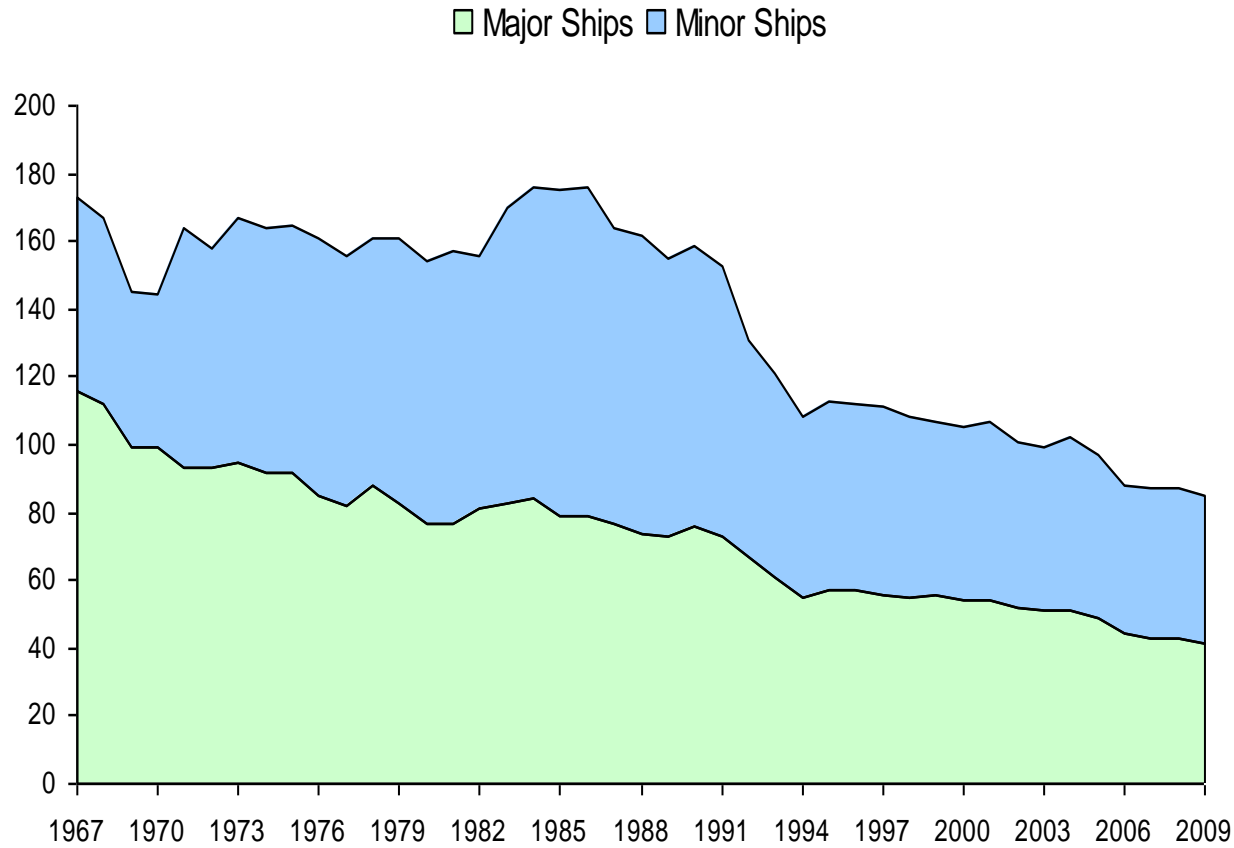
- International collaboration, particularly for military aircraft, but savings offset by additional costs of compromising on specifications, extra time delays and “Juste Retour” arrangements for work sharing.
- Cost As (an) Independent Variable (CAIV) with JSF program
- Cost Growth accompanied by delays due to affordability, budget management and because suppliers just as unable to meet demanding and unrealistic time schedules as demanding and unrealistic cost schedules.

- What is the *impact* of defence equipment cost escalation?
- To look at this we undertook a case study to look at the acquisition of major platforms in the Royal Navy from 1960 to the present
- The headline figures are telling:
 - 11 out of 19 platform entered service later
 - 9 out of 18 platform were more expensive than planned
 - 6 out of 19 platforms had less units acquired than envisaged
- Further, there is a tendency for more modern platforms to exhibit longer delays, higher costs and fewer units purchased-

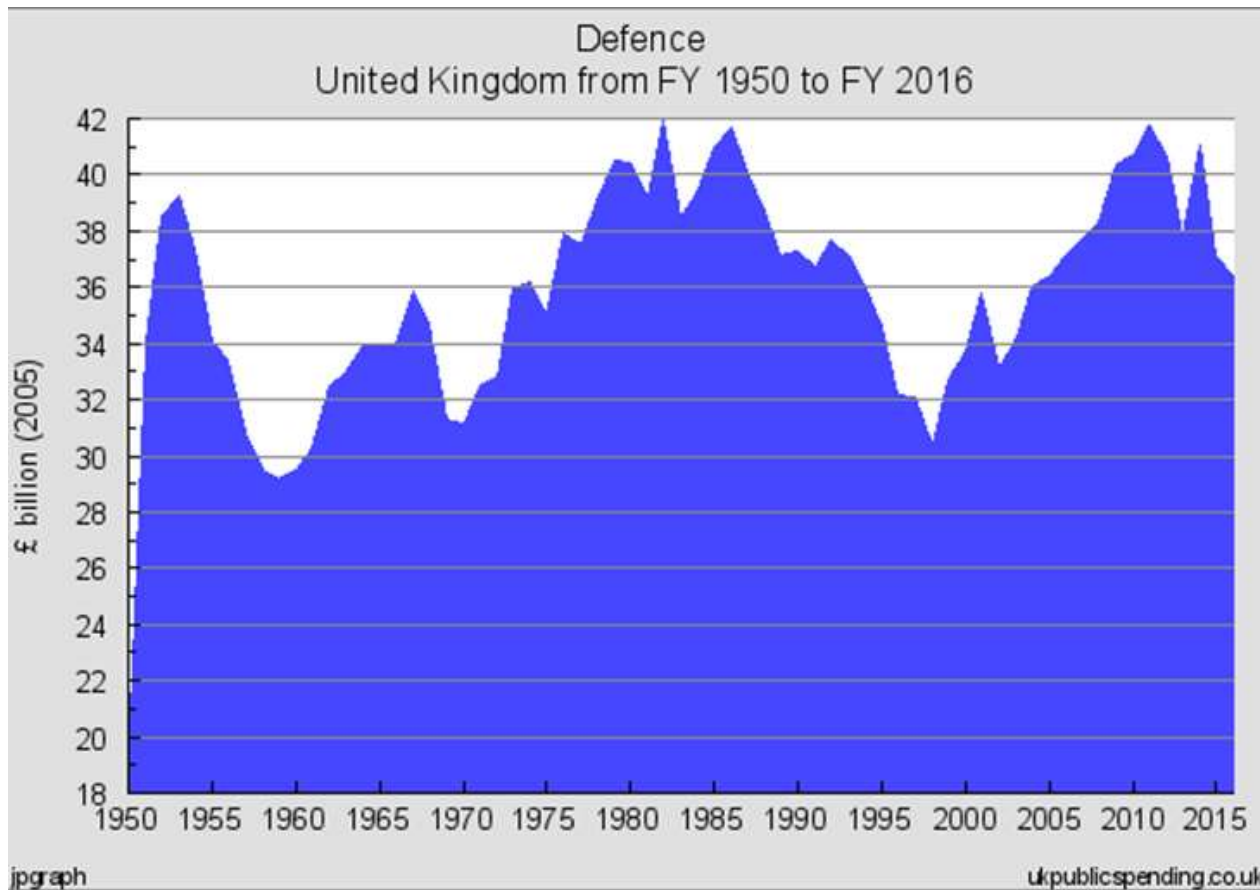
The Impact of Cost Growth (2)

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The Impact of Cost Growth (3)



- Adjusted for inflation, UK defence spending has remained remarkably constant in terms of actual spend

- The reduction in the number of platforms is a direct consequence of defence equipment cost escalation
- The delays, cost overruns and reduction in platform numbers are a consequence of the 'circle of doom'
- This must be caveated:
 - The RN of today is far more capable than that of 1960; tonnage and numbers do not equate to capability
 - The relative economic power of the UK has fallen globally since 1960, making power projection more difficult
 - The same issues can be seen in other European nations
- Nonetheless, the consequences are severe

- Augustine's Law (that the US would have one combat aircraft in 2054) is seen as an incisive yet unrealistic outcome, yet:
 - There has been no UK carrier strike capability since 2012
 - The original air group of 36 Lightning II on each carrier will not be carried
 - SDSR 2010 suggested mothballing the *Prince of Wales*
 - Only 6 Type 45's (and not 12) exist to protect the carriers
- This is not to say that the carriers are not capable, but to point out that compared to the original vision, the capability provided has been intermittent and compromised
- And the capability is being delivered 20-25 years after conception

- The NAO have concluded that there have been successes in the MOD managing costs over the past decade, reporting in 2011 that:
 - the increase in costs before 2001 had been 16.8%
 - the increase in costs after 2011 had only been 2.8%
- Nonetheless, technical issues on projects had led to:
 - cost growth
 - reduction in the number of platforms
 - Projects being slowed down to remain affordable
- Leading to relatively poor Value for Money

- These issues reflect the underlying realities of defence equipment cost escalation
- The NAO also noted, in 2012, that the MOD expected to achieve about 99% of its equipment capability specifications, but that:
 - project costs had risen by 12%, and
 - Had encountered time delays of nearly 30%
- This reflects the 'tournament goods' nature of defence acquisition, and a reluctance to trade performance against time and/or cost
- While this can and does deliver highly capable platforms such as the type 45 destroyer, it can lead to compromises on the types and number of operations conducted

- The Gray Review highlighted cost overruns and delays and concluded that the following were factors:
 - The increasing cost of equipment over inflation
 - Lack of incentives to veto programmes
 - Failure to account for long term cost increases
 - Poor estimation of complex systems
- The Review also compared the UK to other nations:
 - France have a simpler approach to acquisition
 - Australia specify the inclusion of at least one COTS solution in an acquisition
 - Canada operates a simpler system with customer/supplier separation

Possible Responses (1)- Understanding the Problem

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- A number of semi-independent factors contribute to cost escalation:
 - the differential between defence inflation and CPI/ GDP deflator inflation;
 - inter-generational unit cost escalation;
 - the deleterious financial impact of buying fewer platforms within a given class or type;
 - the various behavioural issues causing project price estimates to be initially understated;
 - the reduction of the competitive market for many defence platforms;
 - and the way in which budgetary difficulties are tackled by delaying projects.
- These are linked into a vicious circle

Possible Responses (2)- A possible solution?

- Address the perverse incentives encouraging project optimism bias and lack of responsibility for managing costs
- Recognise the reality of cost escalation and plan for it, or at least conduct 'what if' testing on its impacts
- Be willing to trade some performance for cost and time
- Specialise roles on a national basis (the Danes removed their submarine capability in the 2000s to avoid compromise)
- Consider different ways of delivering capability (such as UCAVs)
- Reduce timescales for acquisition by building simpler platforms (such as HMS Ocean)
- Be willing to buy COTS
- Aim to cut the timescales for platform development and build in adaptability into platforms to enable roles to be changed

- The literature and the evidence is emphatic: defence equipment cost escalation is real
- It stems from the ‘tournament goods’ nature of defence equipment, leading to defence inflation greater than CPI and intergenerational cost escalation
- Once in train, it then reduces the number of platforms in a class, introduces delays to manage affordability, and shrinks the market, leading to a vicious circle of further cost increases
- Its effects result in compromised or intermittent capability, often delivered decades after the requirement for the platforms was established
- Ignoring the problem will not make it go away: the policy, strategic direction and approach of the MOD needs to change
- None of the potential solutions would be easy to implement, but must be to deliver better VfM and more durable and effective capability