The role of competition in Australian defence procurement

Henry Ergas and Flavio Menezes

While the difficulties associated with designing defence procurement policy are widely recognised, the research to date on the economics of procurement in Australia has been quite limited. This paper provides a simple framework to determine when Defence should rely on competition and when to rely on regulation.

Defence acquisition is an important public policy issue from a number of different standpoints including its: immediate economic impact; effects on R&D and innovation; regional economic significance; strategic importance; and tangible evidence of a desire to face present and future threats to our nation.
Many of the difficulties involved in designing procurement policy are well understood and documented, having been studied for several decades by researchers at institutions such as the Rand Corporation (www.rand.org). Much of the research to date has focused on the US experience with very little written on the economics of defence procurement in Australia. This article aims partly to fill the gap.

In examining the role of competition in defence procurement in Australia, this article seeks to shed some light on one of the basic choices faced by the Defence Department (‘Defence’) — whether to use competition (either in the market or for the market) or to negotiate directly (sole sourcing) with a particular supplier.

While contractual conditions (e.g. price) are determined by the market under competition, price and other conditions of supply are determined by regulation under sole sourcing. Such regulation involves Defence coming to a view about the ‘reasonableness’ of costs, prices and profit margins associated with a particular supplier’s proposal. This paper provides a simple framework to determine when Defence should rely on competition and when it should rely on regulation, with three important caveats.

First, as this paper aims to highlight the main themes in a simple framework, such a stylised approach requires that some important considerations be excluded.

Second, because this is an inherently complex area, defence industry analysts commonly view defence procurement reform as an ongoing process: there are no ‘silver bullets’ and, often, only marginal improvements are possible.

Third, the analysis below relies on two basic economic principles: (i) in the absence of market failure and other constraints, competition is the preferred mechanism for determining the contractual conditions (e.g. price, quality and delivery date) in defence acquisition; and (ii) contractual conditions set by regulation are necessarily suboptimal. This suboptimality arises from allocative and dynamic inefficiencies that stem from the direct costs and the well-known imperfections of regulation.

These studies are not uncontroversial, drawing some criticism that the net savings estimates are very sensitive to the treatment of the (duplicated) fixed costs. Nevertheless, they suggest that there might be gains in Australia from preserving more competition associated with the introduction of a second source across a range of military equipment.

Benefits and costs of competition

The benefits of competition are well established. For example, the US General Accounting Office (1999) estimated that, by using competitive sourcing, the US Department of Defense could have saved an estimated US$6 billion in the period 1997–2003.

While we are not aware of the existence of comparable Australian data, there is a considerable body of literature that measures the direct cost and price benefits of introducing competition in the context of several US defence procurement programs. Table 1, sourced from Birkler et al. (2001), illustrates the potential gains of competition that can reduce the costs associated with complex regulatory processes.
The existence of many potential suppliers for a particular good limits the ability of suppliers to increase prices (or to submit bids that are substantially higher than their costs) as the risk of displacement is high. As far as demand is concerned, the demand for military equipment does not vary generally across a broad range of price and quality. Several considerations may explain Defence’s inability to shift to alternative sources of supply: (i) national security concerns if materiel deviates from that requested by Defence; (ii) often military equipment is part of an interconnected set of platforms and weapons systems such that delay or curtailment in one of the components might compromise the integrity of the entire system; and (iii) the high cost of maintaining equipment in-service beyond its serviceable life.

As regards the structure of supply (and hence the risk each firm faces of displacement), the Australian defence industry has a relatively high degree of seller concentration due to Australia’s small size, the wide geographic dispersion of its industrial base and a tradition of industry protection from international competition. This is partially offset by an increased willingness, in recent years, to rely on (or at least give careful consideration to) imported sources, including for ‘Military Off-the-Shelf’ (MOTS) solutions.

**When is competition feasible or desirable?**

Although competition offers a number of clear advantages over regulation, there exist ‘natural’ limits to how far competition can reasonably be pursued. For example, competition in the market (or multiple sourcing) is not desirable in an industry with high fixed costs and steep learning curves. In such cases, the feasibility and/or desirability of competition for the market as a procurement strategy for Defence is a function of several factors related to the market structure, and the nature of the demand and the technology involved in the production of military equipment and services.

**Number of sellers and the elasticity of demand**

The elasticity of market demand determines the extent of demand substitution available. Suppliers are less inclined to increase prices in markets where this will result in a sharp decline in their sales as consumers shift away to consuming other available goods. This logic also applies in a straightforward way in circumstances where suppliers are competing to supply a single buyer. Moreover, a single buyer might decide or threaten to postpone a purchase if bids are too high — for example, by extending the life of existing equipment — or reduce the quality or scale down the purchase. Furthermore, the existence of many potential suppliers for a particular good limits the ability of suppliers to increase prices (or to submit bids that are substantially higher than their costs) as the risk of displacement is high.

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**Barriers to entry and contestability**

As indicated above, competition in the market might not be desirable...
in industries that are characterised by high fixed costs and possible economies of scale. However, outcomes in such industries might still exhibit characteristics that are similar to those present in competitive industries such as efficient prices, quantities and qualities. This brings us to the notion of contestability and the ease of entry to and exit from the industry.

A market is perfectly contestable\(^{10}\) if:

- a potential entrant has access to all production techniques available to the incumbents (at the same price);
- there are no restrictions (regulatory or contractual) prohibiting entrants from attracting incumbents’ customers; and entry decisions can be reversed without cost (i.e. there are no sunk costs). Where these conditions hold, market incumbents are forced to charge a limit price — the price that makes entry unprofitable. This price has attractive welfare properties. In a market where there are economies of scale, price maximises total surplus subject to the constraint that incumbents break even (second-best price). In a market where economies of scale are not significant, this price is simply equal to incremental cost (first-best price).

Of course, the notion of perfect contestability is an idealised concept. In practice, there are barriers to entry into most industries. The issue is how significant these barriers to entry (and exit) are.

Substantial barriers to market entry exist in many segments of the Australian defence industry. First, there are limits on the role that international competition can play. These arise from strategic considerations that require at least some level of domestic production (or at least maintenance). Second, there are high technical risks associated with major defence projects, and often high sunk costs entailed in these projects. Third, Australia relies largely on intellectual property developed overseas by firms that are reluctant to provide access to their competitors. This can result in alliances between competing prime-contractors and their input suppliers in what amounts to a temporary form of vertical integration. Finally, many segments of the defence industry rely on access to essential infrastructure. Such access is limited by contractual arrangements between existing contractors and the owner of the infrastructure.

### The role of (managerial and technological) innovations

In technologically dynamic industries, competition has both a rivalry effect and a portfolio effect. The rivalry effect refers to the impact that the threat of being displaced or the prospect of displacing rivals has on suppliers’ incentives to perform. The portfolio effect refers to the impact the concurrent conduct of a range of independent development efforts has on the probability of identifying, in a timely and cost-effective way, the optimal approach to design, development and other aspects of production.

It follows that the benefits from introducing competition are lower in industries where the technology (including managerial practices) is stable. As expected, the importance of innovation varies quite considerably across the supply spectrum.

The next section discusses how we can apply this framework to provide a sector-by-sector approach to determining how far competition can be promoted — and how stringent regulation must be. We concentrate on three important segments: electronics, maritime and aerospace.

### The limits of competition in the Australian defence industry

The electronics sector of the Australian defence industry consists of five critical sub-sectors: systems integration including software development, electronic warfare, mobile communications, underwater acoustics and niche radar capability.

This sector can be characterised by the presence of a large number of active bidders for most major defence projects. This is partly a result of
low barriers to entry and exit. First, new entrants often do not need access to physical infrastructure and there are limited fixed costs. Second, unsuccessful bidders can still compete in commercial non-military markets. Third, the electronic capabilities embedded in many major weapons platforms are often replaced more frequently than the platforms themselves. In addition, Defence frequently has the ability to unbundle large projects in order to allow competition for each component, thereby producing many entry opportunities for new firms.

The major impediments to competition are: that potential bidders have limited access to intellectual property (IP) developed by a rival firm or controlled by another country; and the skilled labour needed for its application.

The maritime sector covers the construction, modification, repair and maintenance of naval surface and sub-surface vessels. In comparison to electronics, the sector has a more complex matrix of market, demand and product characteristics. First, naval acquisition and sustainment projects rely to a greater extent on fixed physical infrastructure (e.g. dockyard, ships lifts and cranes). Second, vertical integration is more pervasive. Third, competition has an important geographic dimension, given the sometimes prohibitive time and cost involved in moving platforms from one location to another. Fourth, projects arise relatively infrequently and are often very high in value. As a result, there are very limited opportunities for new firms to enter the market.

The number of suppliers tends to be small and barriers to entry faced by new firms can be high. Innovation at the platform construction and maintenance level does not seem to be as important for the maritime sector as for electronics.

The aerospace sector consists of assembly and through-life-support for a range of fixed and rotary wing aircraft used by Army, Navy and the Air Force. Two features distinguish the aerospace sector from the maritime sector, both of which limit the scope for market competition. The first is that aircraft manufacture and assembly are, in some cases, difficult to divorce from subsequent through-life-support due to the close technical relationships involved. The second feature is that Defence manages a diverse aircraft fleet of different types. Few firms have the ability to develop and maintain the specialist skills to support more than a few aircraft types.

In addition, there are several features of the market that tend to restrict competition compared with other areas of the defence industry. First, there is high seller concentration at all stages of the supply chain. Second, there are large fluctuations in demand, with some major acquisitions being more than 30 years apart. Third, there are high levels of capital intensity including a requirement for supplier access to infrastructure such as hangars. Fourth, there are high levels of vertical integration, with many domestic firms being controlled by the Original Equipment Manufacturers (OEMs). Finally, there are often strict controls over the transfer of intellectual property from OEMs to competing Australian assembly or maintenance contractors.

In this case, competition between OEMs at the time of acquisition is essential for achieving acceptable outcomes. This is not helped, however, by the process of rationalisation that has characterised global aerospace markets over the past decade and half. As a result, aerospace is probably the sector of the Australian defence industry with the most limited competitive pressures.

Table 2 summarises the main factors affecting the desirability or feasibility of competition across the maritime, electronics and aerospace sectors.
## Table 2: The factors affecting competition across Australian defence industry segments

<table>
<thead>
<tr>
<th>Electronics</th>
<th>Ship building and repair</th>
<th>Aerospace</th>
</tr>
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<tbody>
<tr>
<td>n No need for infrastructure</td>
<td>n Large fixed costs</td>
<td>n Large fixed costs</td>
</tr>
<tr>
<td>n Lower barriers to entry</td>
<td>n Access to dockyards</td>
<td>n Access to hangars and IP</td>
</tr>
<tr>
<td>n IP issues</td>
<td>n Unbundling feasible</td>
<td>n Integrated product</td>
</tr>
<tr>
<td>n Less concentrated industry; not as reliant on Defence</td>
<td>n Lumpy demand with a geographic dimension</td>
<td>n Small number of suppliers</td>
</tr>
<tr>
<td>n Innovation is important</td>
<td>n Innovation perhaps not as important</td>
<td>n Lumpy demand</td>
</tr>
<tr>
<td></td>
<td></td>
<td>n Perhaps innovative approaches for maintenance are important</td>
</tr>
</tbody>
</table>


### Policy implications

The market for defence materiel diverges quite substantially from the idealised competitive market where buyers and sellers interact anonymously. Instead, it is characterised by a single buyer and a small number of sellers organised in different tiers and with prices that are determined to a large extent by the acquisition process itself. The defence market is a designed market and Defence can actively influence outcomes by the choices it makes. Importantly, the analysis above suggests that choices about how much competition to engineer into the market might have profound effects on procurement outcomes.

In recent years, competition has been seen through very sceptical lenses. Indeed, a significant proportion of the overall value of defence equipment purchased recently in Australia appears not to have been exposed to strong and effective market competition. In these circumstances, Defence has relied on cost and profit benchmarking to regulate equipment prices.

In contrast with industries like gas, electricity, telecommunication and transport infrastructure, defence markets exhibit few of the characteristics which facilitate the ready benchmarking of firm prices, costs, output quality and productivity. Clearly, benchmarking is more easily achieved where the number of entities whose costs and profits need to be controlled is small, each entity delivers a similar type of good or service, the technologies used in production and incorporated into finished products are readily defined and mature, and demand for output is stable and predictable. These factors limit not only the number and complexity of variables in the ‘regulatory equation’ but the range and depth of data needed for their estimation.

This does not mean benchmarking should not be used in defence procurement — in fact, the opposite is true — but it does mean that the costs of regulation (to Defence and the defence industry) can be high. International experience suggests the importance of maintaining a pool of skilled regulatory practitioners familiar with the idiosyncrasies of defence markets, carefully targeting areas of industry in which regulation is likely to prove most cost effective, and maintaining relevant benchmarking data.

Essentially, the benefits of competition (wherever it is feasible) should not be overlooked as a procurement strategy. When competition is neither desirable nor feasible, care should be exercised in devising workable (and cost-effective) regulatory approaches.

There are important limits to competition. These arise not only from inherent technological
characteristics but also from the increased importance of ensuring real-time inter-operability both within the asset portfolio of the ADF and between that portfolio and the assets operated by our major allies, most notably the United States. This can narrow the range of supply choices.

This makes it all the more important to ensure we structure the procurement process to obtain the benefits of competition when available. Interestingly, the new proposed approach to defence procurement seems to be more pro-competition, suggesting that competition should be used as a procurement strategy when it is feasible and taking alternative regulatory approaches in other circumstances. How this discussion plays out over the next few months will be important in determining the new directions for defence procurement in Australia.

Essentially, the benefits of competition (wherever it is feasible) should not be overlooked as a procurement strategy. When competition is neither desirable nor feasible, care should be exercised in devising workable (and cost-effective) regulatory approaches.

At the same time, the world supply of defence equipment is becoming more concentrated. In the 1980s, when the Collins submarines were being planned, seven shipbuilders were approached to meet the Collins program’s requirements; of those, only two remain active. A similar trend towards concentration has occurred in most of the complex systems areas, with the result that, worldwide, procurement has tended to involve ever fewer players. Even in the United States — the world’s largest market by far for defence equipment — the five largest suppliers of arms now account for over one-third of all defence purchases of goods and services, up from some 20 per cent during the later years of the Cold War. Moreover, a high proportion of the sales made by these firms are now ‘sole sourced’, i.e. non-competitively, with sole-sourcing contracts rising from about 45 per cent of the total in the mid-1990s to around 65 per cent today. A less competitive arms market internationally will make it more difficult to ensure ‘value for money’ in defence outlays.

ENDNOTES:

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3 For example, the yearly defence authorisation in the United States

Allocative inefficiency refers to the loss of welfare that follows from the under- (over-) consumption that results from above- (below-) cost prices. Productive inefficiency arises from the distortions in the incentives to invest in creating new products or in finding out new (cheaper) ways to produce existing products.


Note that these are net benefits that derive from the introduction of a second source after production by the original source has started and, therefore, include duplication of some fixed costs. In this sense, these figures might underestimate the potential benefits of competition when there are multiple sources from the beginning of the project and potentially less scope for duplication of all fixed costs.


In practice, both competition and regulation are required if Defence is to secure the kinds of market outcomes it desires. Neither instrument is a panacea to achieving value for money in defence procurement, so recognising the advantages and disadvantages of each becomes important in deciding on an optimal mix.

The winner-takes-it-all nature of competition for the market might make these effects — i.e. the threat of displacement by a competing supplier — even stronger. However, the efficiency of competition ‘for the market’ depends to a substantial extent on the efficiency of the contractual arrangements that will govern the relation between buyer and seller once the competition closes (in the case of a single source) and the competitive dynamics that emerge (in the case of multiple sources). There are no silver bullets!


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