

An enterprise-level naval shipbuilding plan

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In his recent speech to the ASPI Land Forces Conference, the Prime Minister gave the strongest indication yet that a naval shipbuilding plan was imminent. And he flagged what's likely to be the key element of future Australian naval shipbuilding: rolling production of warships, as mooted in a RAND Corporation study earlier this year (and in other places before that). It's a big step, and it's a multibillion-dollar gamble that the benefits of rolling production will outweigh the costs that will inevitably accrue. Given the stakes for the taxpayer, let's hope there's a sound business case underpinning the plan.

This short paper reviews the past performance of Australian naval shipbuilding, describes the pros and cons of a rolling production model, and unpicks the issues that the government will have to take into account. We attempt to reverse-engineer a picture of the mooted plan from the information available in the public domain. It concludes that we're likely to see a bigger surface navy—potentially a much bigger one—as well as the sell-off of at least part of the currently government-owned ASC Pty Ltd. We also look at strategies to manage the risks in the likely course of action and recommend mitigation strategies.



The Air Warfare Destroyer project is currently the largest Defence procurement project in Australia. Photo courtesy of the Department of Defence.

Strategic considerations

Much of the debate about Australian naval shipbuilding has been driven by industry considerations. In particular, the ‘valley of death’ of low demand after the delivery of the amphibious Canberra-class landing helicopter docks (LHDs) and as the Air Warfare Destroyer (AWD) project winds down from its peak has attracted much attention. Predicted for years, it’s now upon us, with a shedding of jobs in the yards that fitted out the LHDs and built modules for the AWDs. The changes in the industry are highly visible and are used as effective points of leverage by state governments, the shipbuilders and the labour unions involved. There’s little wonder that this has the attention of the Australian Government.

However, it’s also a case of the tail wagging the dog. The purpose of naval shipbuilding is to provide the Navy with ships, and the government with military options for dealing with security issues, not to provide industry with work. So the first question really should be how many and what sort of ships does Australia need to meet our strategic and defence challenges? Only then should we move on to think about the best way of acquiring them.

The strategic environment certainly has elements in which naval power is extremely relevant. The maritime environment is increasingly contested due to choices China is making in the East and South China seas, not to mention the investment it’s making in both anti-access/area-denial (A2/AD) capabilities and blue water power projection assets such as aircraft carriers and nuclear submarines. China’s apparent development of military facilities in the South China Sea gives it the wherewithal to threaten freedom of navigation if it chooses—it has already attempted to warn off military platforms from airspace around disputed features. The net result is a strategic environment in the Western Pacific and abutting waters in which the force projection capabilities of the US and its allies are increasingly under challenge.

The days when Australia could free-ride on the US Navy to cover for our relatively low number of warships are increasingly behind us. Warships are expensive, and they get more expensive at a rate of about 3.5% above inflation each year. Coupled with an American defence budget that—apart from the invasion of Iraq and Afghanistan—has never re-attained Cold War levels, the effect has been downward pressure on the US Navy’s fleet size, resulting in a decline from 500 surface combatants in 1990 to around 300 today—although they are more capable vessels. But, given the increasingly contested environment, the increased capability of each modern vessel only goes so far in balancing the ledger. There’s a good case for America’s close allies, Australia and Japan (and perhaps South Korea), doing more to add to collective alliance sea power.

In terms of defence budgets, Australia should certainly be in a position to do more to help underpin the American-led order if we so choose. The Australian Government’s commitment to provide Defence with 2% of GDP by 2023–24 will result in a very sizeable amount being available for capital projects, meaning that there’ll be more money available for naval projects—unless other areas receive higher priority.

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Whether or not surface naval forces are the right capability to be investing in is a question that defence planners and the government need to be thinking hard about. The proliferation of sophisticated long-range anti-ship weapons, including ballistic missiles and high-speed cruise missiles, means that we need to consider whether surface vessels are a viable way to project power in the 21st century. The one potential saving grace for surface ships remains the difficulty of targeting them accurately at long range. By disrupting the kill chain at the targeting stage—by either taking out adversary sensors or disrupting their data

networks—it might be possible to reduce the effectiveness of A2/AD systems. But studies by influential American think tanks suggest that, at the very least, the future role of ships will be to stand off at longer distances and deploy unmanned subsystems into hotly contested spaces, rather than fight their way in and rely on onboard defensive systems if all else fails.

It may not yet be time to retire the surface combatant, but technological trends suggest that the day might come when other systems—such as submarines and long-range aircraft with stand-off weapons to further increase their range or swarms of (possibly autonomous) drones—will be able to deliver the major war-fighting effects of surface vessels in a more effective and safer way. And if that does happen, defence planners will need the agility to invest in alternative technologies. Perhaps the biggest strategic risk of any rolling production naval shipbuilding model is that it will lock the ADF into a technology that might not be appropriate for future strategic circumstances.

Australian shipbuilding—a short history

The post-government-shipyard era of Australian naval construction began in 1987 when the Williamstown dockyard was sold to AMEC. The sale included a contract to complete two FFG frigates that had been progressing poorly in the government-owned yard. Both vessels were delivered early, setting the scene for the yard (which had come under the ownership of Tenix) to win the 10-vessel Anzac frigate program in the 1990s. By any measure, the Anzac program was a success: all the ships were delivered within budget and close to schedule.

In the late 1990s, a contract was let to ADI Limited (later Thales Australia) at Garden Island to upgrade the Navy's six FFG frigates. The program suffered severe technical difficulties and substantial delays. The government eventually accepted four rather than six upgraded vessels for essentially the same cost. The other two ships were retired early.

Because the Anzac frigates were built 'fitted for but not with' a complete set of sensors and weapons, an upgrade project was initiated in the early 2000s. Although initial cost estimates were soon exceeded and more time was needed than planned, BAE Systems (which took over Tenix) and SAAB Australia eventually delivered an impressive and technically challenging upgrade to the Anzac frigates—including the integration of a cutting-edge Australian-designed active phased array radar.

The Collins-class submarine project offers some lessons and cautions, although the lessons need to be interpreted carefully because the project began as a greenfield venture: it was the first Australian build of submarines. The high-level summary is that the construction of the submarines through a private-public venture (including Kockums of Sweden, the Australian Government and various other players) was at best a moderately performing program—better than the AWD program (see below) but not as efficient as the Anzac frigate program described above.

The boats were delayed in delivery by several years (which led to a frantic scramble to keep a couple of the Oberon class in service) and extensive subsequent remedial action was required. When the boats were delivered, they lacked effective combat systems and had a number of other problems that needed fixing. But perhaps the biggest lesson from the Collins-class experience is that ownership only starts with delivery, as the decade that followed was characterised by woefully inadequate and poorly coordinated support arrangements, not helped by the ineffectual role played by the Department of Finance as the owner of ASC. Another lesson was that any future build program (of ships or submarines) must be backed by a robust and efficient support arrangement. One way to achieve this would be to adopt a 'build for support' strategy that gives the builder a vested interest in the through-life maintainability of the platform.

While not strictly a shipbuilding program, the fitting out of the two Canberra-class LHDs in Australia showed an alternative model to bending steel in Australian yards. With the hulls built by Navantia in Spain and the fit-out at Williamstown by BAE, the project is set to be completed largely within schedule and budget.

The most recent naval shipbuilding project is the construction of the three Hobart-class AWDs. The hull modules are being built by a combination of private firms and ASC, and the overall consolidation and fit-out occurs in the ASC yards under the overall

management of an alliance comprising ASC, Raytheon and the government. ASPI's written a lot about this project and we won't cover the same ground here, but the performance of the project has been such that now seems a brave time to double down on Australian naval shipbuilding.

There are three take-away messages from the history of local builds for future shipbuilding. First, even a shipyard that has performed well in the past can struggle to perform after time out of the business. (A 'pro' for a rolling-build model.) Second, a great deal of care needs to be taken when setting incentives in management and contractual arrangements. Finally, as a monopsony customer, government ultimately owns the risks and costs of naval shipbuilding and needs to be closely engaged in overseeing and managing performance—a point that will become increasingly important if a monopoly shipbuilder is created.

Costs and benefits

The economic impact and cost premium of building naval vessels in Australia are frequently discussed and used in debates by both advocates and opponents of local production. The net economic cost or benefit of spending on complex defence projects is a tricky and technical subject, and ASPI can't point to any definitive studies—one of the reasons we've argued for years that a Productivity Commission study on naval shipbuilding is needed to get objective data.

However, one of the standard fallbacks of local build proponents is economic analysis based on multipliers and input–output models (see, for example, the 2013 ACIL–Allen study *Naval shipbuilding and through-life support: economic value to Australia*, prepared for the Australian Industry Group). That approach is fine as far as it goes, but it doesn't capture the full economic impact. In particular, input–output models ignore the alternative uses of labour and other inputs employed on a project. Nor does the approach take into account the drag on economic growth due to the higher taxation required to fund the enterprise. As a result, input–output modelling overestimates economic benefits by effectively only looking at a partial picture. General equilibrium models, which take account of alternative uses of the inputs and other factors, tend to show modest or negative economic impacts. The recent RAND study into Australian naval shipbuilding equivocated on the subject, concluding that 'the economic benefits of domestic shipbuilding are unclear and largely depend on broader economic conditions'.

We can't say what sort of economic impact is likely from future shipbuilding—in fact, we can't even be sure what it was for past projects. The trouble is that we're pretty sure nobody can. Unless the government has commissioned some serious independent work on the subject, it'll be guessing too. Similarly for the vexed question of cost premium: not only is the premium sensitively dependent on assumptions about foreign exchange rates, but it also depends on uncertain estimates of shipyard productivity. That said, the AWD project unambiguously involves very substantial premiums for the work done locally.

What have we learned?

The successes and failures of domestic naval construction in Australia have led many, including apparently the government, to draw two conclusions:

- Privately owned shipyards perform better than government-owned shipyards.
- A boom-and-bust approach to naval construction undermines performance.

On the surface at least, these are not especially contentious conclusions. The superior performance of the private sector led to the sale of government-owned defence production assets across Europe and in Australia during the 1980s and 1990s. Indeed, the government's ownership of ASC was an unwelcome consequence of the turmoil at the end of the Collins program, rather than a reflection of a conscious desire to own a shipyard. As for the boom-and-bust cycle, the basics of production engineering point to substantial additional costs and risks associated with restarting production at a dormant facility—let alone commencing production at a greenfield site.

Taken together, the two conclusions listed above imply a possible way ahead for Australian naval procurement: sell the shipbuilding part (at least) of the government-owned ASC to the private sector, and commence a continuous-build program based on the forthcoming future frigate program. There are signs that this is what the government intends to do—explicitly in the case of continuous-build, about which announcements have been made, and implicitly in the case of ASC, in which a managing partner is being brought in to rescue the beleaguered AWD project.

But selling ASC and adopting a continuous-build program won't be a panacea. Indeed, it's not *a priori* apparent that we'll come out ahead on cost or performance by doing so. There are two quite separate factors to be taken into account.

First, from the narrow perspective of production engineering, the promised higher productivity of a continuous-build program has to be balanced against the cost of more frequent vessel replacement, fleet expansion, or both (in addition to any long-term questions about the viability of surface warships). This issue is particularly important, given our small navy. So, while the current boom-and-bust cycle has its problems, it may still be less costly than a continuous-build program.

Second, the proposed course of action will create a new type of entity; a privately owned monopoly shipbuilder. But what if the critical factor in the past wasn't private ownership *per se* but the need to compete for future work? The question for policymakers is whether a privately owned monopoly shipyard will perform better than a government-owned monopoly. It may be that a protected industry is a protected industry irrespective of who owns it.

This report explores those two factors below, but first examines the myriad complications of selling ASC—something that turns out to be easier said than done.

The 'sale' of ASC

Because the government is the only likely customer for ASC's services, a sale would literally be a case of the government paying someone to take the firm off its hands. Think about it: the sale price will reflect the net present value of anticipated risk-adjusted cash flows, and all the foreseeable cash flows will come from the government; hence, the government is going to pay the buyer. Even if there's an upfront payment to save face, the long-term net financial transfer will flow from the taxpayer to the private sector. The only question is how much.

But it still makes sense to sell ASC provided that the cost to the government of securing ASC's services is less under private ownership than under government ownership. Or, to put it another way, what matters is that the firm can efficiently complete its present workload and potentially play a role in the government's promised 'naval shipbuilding enterprise'. Most observers agree that these goals would be more readily achieved with ASC in private hands. There's a lot at stake: ASC is already critical to the delivery of more than \$10 billion worth of defence acquisition and sustainment contracts, and there's as much as five times that amount on the horizon. Whatever pittance is or isn't paid up front to symbolise the deal is irrelevant.

Several interacting factors need to be taken into account. The first question is how to package the sale. There are three components to ASC: shipbuilding, submarine maintenance and a latent submarine construction component. The most natural packaging for the sale would be to sell the firm intact or to hive off the shipbuilding component. Something like a three-way split would also be possible by lodging a new submarine builder at ASC's Osborne yard in South Australia with access to the existing ship-lift.

Selling the firm intact would allow the buyer to exploit economies of scale and scope between the submarine and shipbuilding components. Overheads could be kept to a smaller proportion of turnover, personnel could be moved from one area to another as demand ebbs and flows, and lessons learned in one area could be applied in others. On the other hand, splitting the firm between submarines and ships would allow more highly specialised buyers (as opposed to diverse conglomerates) to enter the contest. As shown below, dividing the firm may also make it easier to manage the resulting monopoly.

Other practical factors will no doubt influence whether the sale is done in one or two parts. The remediation of submarine maintenance following the Coles Review is showing encouraging signs of progress, so it probably makes sense to leave that part of the business alone for the moment. In contrast, many would argue that the beleaguered AWD project needs to be put into private-sector hands sooner rather than later. Then there's the future frigate program, which will have to be the centrepiece of the government's shipbuilding enterprise plan. Whatever process is undertaken to select a design and shipbuilder for the frigates could include the sale of ASC's shipbuilding business.

There's also the question of a complete or partial build of the future submarine at or adjacent to ASC's Osborne yard. While this doesn't seem to be the government's preferred option, there's no telling how things will evolve in the months ahead. Between a falling euro and the brittle politics of South Australia, pressure could mount for a local submarine build. Even if that weren't the case, there would be clear advantages to selling the submarine maintenance component of ASC to the successful bidder for the future submarine project—not the least of which would be continuity of submarine maintenance through the long transition from Collins to its successor and the ability to harness incentives for 'build for support'.

The way in which ASC is sold will have a strong influence on the structure of the firms that will build and upgrade the Navy's vessels. On past experience, projects have tended to be more successful when there was a single prime contractor in charge, as opposed to an alliance or joint venture, and that should be borne in mind during the sale process.

Stepping back from the details, it's clear that the sale of ASC will be but one part of a larger puzzle involving a number of current and future multibillion-dollar defence projects. The challenge for the government is to bring the pieces together to achieve the most cost-effective supply and support of assets for the RAN. Given the large number of moving parts and possible sequences of events, it's impractical to outline all the possibilities. We'll just have to wait and see what the government comes up with. Even then, it's unreasonable to expect a precise sequence of events to be laid out in advance. The reality is that the best course of action will evolve as decisions are made and information (including on the intentions of industry) comes to light. Nonetheless, if we're to have an enterprise-level naval shipbuilding plan, we need a road map from the government that outlines the key steps, contingencies and an indicative schedule.

Rolling builds

Several recent ASPI publications have looked at the possible costs and benefits of rolling-build models for future shipbuilding (see, for example, Chapter 7 in the 2015 *ASPI Defence budget brief*). This paper presents just the pertinent conclusions:

- Learning effects in shipyards reduce the cost of labour (but not of systems and materials) for successive builds of the same ship type and reduce the set-up costs for building new designs.
- The tempo of production is an important consideration in rolling builds. Because of the need for different skills at different stages in production engineering and building, there's a minimum tempo required to obtain efficiencies. RAND work suggests that this might be 24 months between completions. The additional cost relative to a more usual 12-month interval is not known.
- Because of the size of the Navy's fleet and the age of its vessels, there's no credible rolling-build program that can replace the current fleet of Anzac frigates on the right timescale *and* keep the yards gainfully employed in perpetuity.
- Given where we are now, a 'valley of death' in shipbuilding work is almost inevitable in the short term. RAND suggests an interim project of building offshore patrol vessels, but that would have to essentially start now, and would deliver ships for which there's no obvious need. More importantly, the cost of the make-work vessels would comfortably exceed the downstream savings.

Those conclusions are sufficiently robust for us to say that one or more of the following conclusions must be true if we are to rationally adopt a rolling production strategy:

1. The size of the surface combatant force will be increased: 14 or 15 vessels (up from the current 11 Anzacs and AWDs) would allow for the production of a ship with an operational life of 28–30 years every 24 months in perpetuity.
2. The Navy will keep its vessels for a shorter time in future, so that a two-year production interval can replace a fleet of the existing size.
3. The government expects Australian shipyards to export vessels to cover any domestic demand shortfall for locally built vessels.

There are pros and cons to each of those possibilities. Expanding the size of the fleet would add to the capacity of the RAN, allowing for more concurrency in operations, and would add additional weight to our alliance contribution (although contributions in other areas might be valued more highly). The downside risk, as discussed above under ‘Strategic considerations’, is that we’d be deciding to bet that surface combatants will continue to have military utility commensurate with their cost, and that the defensive battle against modern anti-surface weapons will be winnable.

Keeping ships for a shorter time has the advantage of not having to do major mid-life upgrades (which have been expensive and troublesome in the past), but is also likely to substantially increase the total cost of ownership as the high acquisition cost is amortised over a shorter time. And even a 20-year-life ship will require progressive technology refreshes at intervals to keep it competitive.

The possibility of exporting vessels to cover for limited local demand shouldn’t be discounted. That’s how France and Germany keep their ship and submarine yards busy. And, while nothing about the AWD project would suggest export orders for Australian shipyards any time soon, the falling value of the dollar at least makes local shipbuilding more competitive if (substantial) efficiencies can be found. However, the timing of any such ‘fill-in’ export orders would have to be remarkably fortuitous to match the gaps in our schedule. Note that New Zealand isn’t currently in the market for the sorts of frigates sought by our navy.



Consolidation of final keel block for first Air Warfare Destroyer. Photo courtesy of the Department of Defence.

It's clear from this discussion that the business case for a continuous-build program is far from obvious. Given the strong political pressure associated with the potential offshore build of the future submarines, there's a risk that the government will be railroaded into promising the future frigate program to South Australia as a sop. And, while the granting of largesse to geographical regions is part and parcel of Australian representative democracy, some level of transparency is needed. For those reasons, any decision to establish a rolling shipbuilding program should be accompanied by the release of an independent cost-benefit analysis. If billions of taxpayer dollars are to be spent, the business case should be on the table for all to see.

If a rolling-build model is established, it's not going to support more than a single major shipbuilder (and perhaps a couple of smaller players building modules). In any case, the Australian Government is likely to find itself as the sole customer of a sole shipbuilder. How it manages that arrangement will be crucial.

Playing monopoly

Successive governments have striven to maintain competition in the broader Australian economy, and for good reason. Competitive markets drive efficiency, promote innovation and contain costs. Where it isn't feasible to maintain competition—for example, in the provision of some utilities—the government regulates the industry to protect the consumer.

Monopoly supply arrangements arise frequently in the defence sector, usually because there's only one supplier of a unique piece of equipment. The F-35 Joint Strike Fighter, P-8 Maritime Patrol Aircraft and Aegis air warfare combat system are examples in which competition was forgone in order to source a unique asset. In practice, however, things aren't as bad as they might appear. The US Government tightly regulates its defence industry to encourage innovation and efficiency and, just as importantly, to ensure that profits are not excessive. We piggyback not only on America's massive investment in research and development, but also on its self-interested oversight of its defence firms. As the F-35 saga demonstrates, that doesn't insulate us from spiralling costs and extended delays (but at least we have someone else to blame).

An Australian continuous shipbuilding program will create a monopoly that we alone will have to regulate. That wouldn't be an entirely new situation; submarine maintenance has largely been a monopoly arrangement—albeit one involving a government-owned supplier. Until recently, the results were increasing costs and diminishing vessel availability. It wasn't until the government (acting in its triple role of owner, regulator and customer) commissioned the 2012 Coles Review that performance and efficiency started to turn around. Despite favourable progress to date, the final outcome remains to be seen.

Although there were many institutional and technical reasons behind the poor performance of the Collins fleet, the core problem was that successive governments failed to take action. If the current government goes through with establishing a continuous-build ship program, it will create a monopoly for which it is both customer and regulator. Given the sorry record of Collins sustainment, there's a strong case for facing up to the challenge of regulating a monopoly supplier from the start.

Regulating a monopoly supplier is much more than ensuring that profit margins are kept in check. (It's entirely possible for a firm to be inefficient and make modest profits.) Moreover, in the absence of countervailing pressures, a monopoly will tend to be less efficient than a firm that's subject to market competition.

Consider the incentives faced by a monopoly supplier. The baseline profits that it receives will be largely calculated as a percentage (typically 10% to 12%) of its turnover. Because higher costs lead to higher profits, the incentive to contain costs is turned upside down. As a result, monopoly firms have an incentive (beyond individual self-interest) to provide their workers and management with better conditions and pay than do firms that compete on the basis of cost. Similarly, because costs are automatically passed on to the customer, a monopoly supplier will retire risk beyond the point of what's cost-effective. By doing so, it increases its profits while decreasing the possibility of sanctions for schedule slippage or technical noncompliance.

A role for exports?

Some countries, such as France and the UK, encourage and support their domestic arms companies to win export contracts. This has two benefits. First, costs are shared with foreign customers. Second, the firms are driven to be competitive in the international market. In this way, arms exports subject firms to market pressures that would be non-existent within their domestic domain. It's doubtful that such an approach would be feasible for a country with as small a home market as Australia and coming late to the game, although Sweden provides a challenging counterexample. At present, only one local firm—the Western Australian shipbuilder Austal—has achieved significant success in finding international markets for its naval shipbuilding products.

In any case, the willingness and ability of a firm to export should not be ignored when decisions are made about the ownership of ASC and the establishment of a continuous-build program. Equally, the likelihood that a foreign subsidiary operating in Australia would be prevented from exporting by its parent company (to protect its own exports) should also be taken into account.

A range of strategies can be used to regulate a monopoly supplier.

Open book accounting allows profits to be kept to baseline profit (*sans* incentives) within designated bounds. Although this provides no assurance of efficiency, it's a minimum check that needs to be put in place.

To some extent, **second-tier competitive subcontracting** can mitigate the cost premium by exposing a component of the work—for example, module construction—to competition. This approach was adopted by the AWD project, which distributed ship module fabrication between two local and two foreign shipyards. Where effective competition can be found, this approach makes sense. The risk is that the government will intervene to distribute work among local yards to 'share the love' in response to lobbying. When this occurs—as appears to have been the case with the AWD—the benefits of competition are lost but the cost of multiple corporate overheads remains, along with substantial transaction and transportation costs.

Financial incentives can be used to boost productivity (that is, reduce costs) relative to past performance, an agreed target price, or both. While this is undoubtedly worthwhile, it has two inherent limitations:

- The information asymmetry between customer and supplier means that the latter is in a better position to set a target price (or initial productivity level) and then reap the benefits downstream.
- By its nature, any incentive scheme splits the benefits of productivity improvements between the customer and the supplier. In a competitive market, productivity gains ultimately flow down to the customer. As a result, a customer employing incentives in a monopoly arrangement ends up paying a premium compared with what would be the case under competition—in economic terms, a 'monopoly rent' is imposed on the customer.

Financial sanctions can be used to encourage suppliers to meet cost and schedule targets. But, just as with incentives, the inherent information asymmetry favours the supplier when it comes to setting targets. More importantly, the practical reality of multibillion-dollar projects (such as the AWD project) is that the supplier will rarely have sufficient balance sheet depth to absorb more than a modest sanction. This is especially the case in joint undertakings that (quite deliberately) quarantine the assets of participants. As is so often the case with major defence projects, sanctions only work up to a limited point, beyond which the residual risk is entirely borne by the government.

The **threat of cancellation** would in theory provide a strong incentive for a monopoly supplier to meet the expectations of its customer. However, threats are only effective if they are credible. Given that the creation of jobs in South Australia seems to be the key driver of the whole scheme—a threat to cease shipbuilding in South Australia would be difficult to take seriously. If the threat

were serious, the Australian Government wouldn't be doubling down on local construction while the AWD project spirals into the abyss. The powerful coalition of shipbuilders, unions, the state government and their paid lobbyists would fight tooth and nail to preserve domestic shipbuilding irrespective of its cost and performance.

In contrast, the **threat of replacing management** is credible. This could be achieved by retaining government ownership of the firm but contracting a private sector firm to manage the enterprise under a government-owned contractor-operated ('GOCO') model. Such an approach has been used in the UK and US defence sectors. Because a management switch-out affects only one of many stakeholders, the political impediments to action are less. Even so, a management switch-out wouldn't prevent unions from extracting above market wages and conditions for the workforce.

The underlying economics of monopoly supply mean that the customer will pay a premium compared to prices in a competitive market.

The underlying economics of monopoly supply mean that the customer will pay a premium compared to prices in a competitive market. That premium will comprise reduced productivity and abnormal gains by the firm, its workers and perhaps also its suppliers. The effectiveness of the various strategies in driving down the premium (it will never be zero) ultimately depends on reducing the information asymmetry between the customer and the firm. The more that's known about the 'cost of efficient production', the better that contractual incentives and sanctions can be structured to the customer's advantage.

The cost of efficient production is the cost to the supplier of building the vessels in Australia by the most efficient means possible. In general, this will *not* be equal to the cost of acquiring vessels on the international market. Foreign shipyards will be either advantaged or disadvantaged by their relative economies of scale and scope, their relative input costs (especially labour costs) and prevailing foreign exchange rates. The distinction is important. While it makes sense to look at the cost of acquiring a vessel from overseas when deciding whether to build locally or not, once the decision is made to build locally it's only the cost of efficient production that the supplier can reasonably be expected to deliver.

Attempts to reduce information asymmetry can take a number of forms:

- The Defence organisation can try to purchase the information from the supplier through funded studies and joint project development.
- Defence can try to develop an independent ability to understand the cost of efficient production.
- An independent arm's-length third party can be asked to do so.

The first option is fraught because Defence can never know whether the true cost of efficient production has been disclosed or not; and, if it were, disclosure would come at a cost (as with incentives). The second option suffers from the drawback that Defence, as an effective partner in the project, will have an incentive to underestimate the cost of efficient production so as to ensure that the project is a success. Remember, the ultimate customer is the government. Defence merely acts as the government's agent in the purchase and, as such, is subject to moral hazard—especially if it's easy to pass costs on to the government. Conversely, if Defence finds itself operating under hard budget constraints (that is, it can't go back and ask for more), there's a risk that it will use its monopsony purchasing power to deal unfairly with its captive supplier. One way or another, Defence has a dog in the fight.

By elimination, we're left with the third-party option. But neither Defence nor the supplier is likely to sign up to a contract where the price is set by an outside entity with no skin in the game—certainly not from the start. Some combination of funded studies and internal Defence estimates (augmented by external above-the-line industry analysis) will inevitably form the basis of any initial

contract. Nonetheless, there might be a viable role for an independent third-party to oversee the performance of the resulting enterprise and put pressure on Defence and its supplier to improve productivity and contain costs. The beginning and end of the case for such an entity is the sorry performance of ASC in submarine maintenance and the AWD program.

Independent oversight of monopoly supply arrangements is neither an original nor radical idea. In the broader economy, independent regulators oversee the conduct of monopoly suppliers in a range of areas, acting to set prices and determine profit margins. In the United Kingdom, the government has established the Single Source Regulations Office to ‘ensure that good value for money is obtained for the UK taxpayer in Ministry of Defence expenditure on qualifying defence contracts, and that single source suppliers are paid a fair and reasonable price under those contracts.’

If the Australian Government establishes rolling production of naval vessels, independent oversight would help minimise the premium inherent in a monopoly supply arrangement and guard against unreasonable behaviour on the part of both the monopoly supplier and its monopsony customer. In what follows, we’ll refer to such an entity as the ‘Naval Shipbuilding Office’. Its roles would include:

- setting baseline profit margins for the monopoly shipbuilder
- developing and adjusting the ‘cost of efficient production’ throughout the life of a project by monitoring productivity and benchmarking it against international best practice
- using the resulting ‘cost of efficient production’ to set annual (or per-vessel) productivity improvement targets to be used in any incentive or sanction scheme
- estimating and reporting publicly
 - the *monopoly premium* due to variation from best-practice production in a domestic context
 - the *absolute premium* paid for vessels relative to the prevailing competitive international market
- monitoring the health and sustainability of the monopoly supplier
- monitoring Defence’s performance as a monopsony customer, including its use of resources to manage its side of the contract.

Although a Naval Shipbuilding Office could be established as a stand-alone entity, it could also be established with, or assigned as a role to, the Australian National Audit Office.

Do we really need to decide now?

The government will be taking a massive step if it establishes a continuous-build program now. Normally, governments avoid making long-term commitments when the costs and benefits are uncertain—and that’s certainly the situation with domestic naval shipbuilding. But a continuous-build program requires a high degree of pre-commitment by definition. Fortunately, there’s a way out of the apparent trap.

The benefits sought from a continuous-build program are predicated on the shipyard improving its productivity by avoiding gaps in activity. If all goes well, the second vessel will be cheaper than the first, and so on. Proponents of a continuous-build program argue that Australian industry is capable of reaching international standards of productivity and the recent RAND report said that the premium could be halved by the fourth vessel in the Anzac replacement program. Fair enough, let’s put it to the test.

We need eight vessels to replace the current Anzac frigates (or more if the fleet is to be expanded). Rather than commit upfront to a continuous-build program, why not commit only to building eight replacement frigates in the first instance, on a schedule consistent with transitioning to a continuous-build program. Then, if the promised performance materialises, the program can

be continued. If not, we've retained the option to do something else for later vessel classes. Such an approach would have the following benefits:

- the shipbuilder and its workforce would have a strong incentive to achieve world-class productivity because future work would be clearly contingent on performance
- we could defer expanding our commitment to surface combatants (at an opportunity cost to the remainder of the force) until a time when their future utility is clearer.

There's absolutely no advantage in committing to a rolling-build program now. We have the freedom to conduct an eight (or more) vessel experiment over 16+ years, and don't need to make a decision until we're well down the production run.

Recommendations

1. An expansion of Australian military power will help support the forces of the US and its other allies at a crucial time, as American pre-eminence comes under serious challenge. However, locking into a naval shipbuilding program in perpetuity is betting heavily on surface vessels, which are increasingly vulnerable to new technologies.
2. Given the very high costs and strategic importance of the RAN's surface fleet, any plan to establish a continuous naval shipbuilding program should be accompanied by a comprehensive analysis of the costs, benefits and risks of the program compared to alternative procurement options.
3. The sale of ASC is inextricably linked to a number of elements of the broader naval shipbuilding industry landscape, including the future submarines and frigates and the ongoing maintenance of the Collins-class submarines. Any credible enterprise-level naval shipbuilding plan will need to include a sequenced road map showing how the various elements will be brought into harmony.
4. If a monopoly rolling production program is established, the government needs to explain how it will monitor performance and ensure value for money through incentives and sanctions. One option would be to establish a Naval Shipbuilding Office to oversee the performance of Defence and the monopoly supplier.
5. Rather than commit to a rolling-build program today, the government could initiate an Anzac replacement program with a production run on a schedule consistent with transitioning to a continuous-build program later, with any further work contingent on achieving value-for-money levels of productivity.

Acronyms and abbreviations

A2/AD	anti-access/area-denial
ADF	Australian Defence Force
AWD	air warfare destroyer
GDP	gross domestic product
LHD	landing helicopter dock
RAN	Royal Australian Navy

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