Never Say Never: Considerations about the Possibility of Australia Acquiring Nuclear Weapons

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Abstract: *Australia's decision to sign the Nuclear Nonproliferation Treaty and forego the acquisition of nuclear weapons was taken on medium-term strategic grounds. While similar circumstances prevail today, it is possible to identify three conditions for the acquisition of nuclear weapons by Australia to be a credible option: the existence of a major threat to Australia; a loss of confidence in US guarantees; and allied acquiescence to an Australian nuclear program. These conditions interact with Australia's relationship with Indonesia and the technological and industrial feasibility of "tactical" and "strategic" nuclear weapons postures, respectively. The only Australian nuclear posture that does not lack credibility in light of all these factors is the use of "tactical" weapons to deter major landings on the Australian mainland.*

Introduction

Shortly after coming to office in December 2007, the Rudd government created the "International Commission on Nuclear Nonproliferation and Disarmament" to reinvigorate the nuclear nonproliferation regime and continue the Australian tradition of advancing new ideas for international arms control efforts. Except for uranium mining and one research reactor, Australia has very little in the way of nuclear infrastructure or nuclear technology research programs. As a close U.S. ally, it is benefiting from extended deterrence by the foremost nuclear power. There is no public perception of a credible major military threat to the Australian homeland, and there has not been for many years – in any case, the country is far removed from global centers of power and conflict. Hence, there seems little reason to suspect that Australia might be drawn to acquiring nuclear weapons.

However, times may change, and it would be premature – and impossible – to exclude the possibility of an Australian nuclear force for all times. Support for the acquisition of nuclear weapons has never been a majority opinion in either the population or the political elite. But what Rod Lyon and Christine Leah have called the "Gortonian" approach to nuclear weapons – skeptical of the feasibility of extended deterrence, of the prospects of long-term nonproliferation success, and thereby inclined to regard a sovereign nuclear force as an essential guarantor of Australian security in deteriorating strategic circumstances – has been a persistent, if minor, strand of Australian thinking about nuclear weapons.¹

Indeed, a number of developments in recent years have arguably made considerations about the possibility of an Australian nuclear force more relevant than they would have been perceived at the end of the Cold War. The nonproliferation regime is

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far from breakdown, but the international community is nevertheless struggling to stop, let alone roll back, the nuclear programs of proven and suspected proliferators such as North Korea and Iran. A "nuclear renaissance" underway comprises a significant expansion of nuclear power generation worldwide, as well as an increase in the number of countries with access to nuclear power stations. Although no nuclear weapons capability has yet been developed on the basis of a civilian power generation program, the planned and proposed expansion of nuclear power generation to countries in Australia's region, including Indonesia, Vietnam, the Philippines, and Malaysia,² will see a significant increase in the nuclear physics expertise of these countries.

Although the nonproliferation regime has undoubtedly contributed to limiting the number of new nuclear powers since the late 1960s, more important was arguably the provision of extended deterrence to a number of critical "threshold" states in Asia, including countries such as Japan, South Korea, and Taiwan.³ However, the rise of China is leading to pressure on U.S. strategic primacy in the Western Pacific at a time when U.S. global economic primacy is also being challenged by the rise of a number of newly industrialized countries. Outside the context of a global ideological confrontation on the scale of the Cold War, it raises the question of whether, and under what circumstances, the future credibility of U.S. extended deterrence in its traditional form may be critically diminished to the point that it might stop being an effective substitute for regional sovereign nuclear capabilities. Recognizing such concerns, the U.S. and Japanese governments recently established a panel to review options for bolstering U.S. nuclear protection of Japan.⁴

In the lead-up to the 2009 Australian Defense White Paper, a small debate had already emerged in the Australian strategic community about making Asian major powers the focus of Australia's defense effort and whether such a focus would not ultimately lead to a requirement for Australian nuclear weapons.⁵ The white paper stated in this regard that

It is the government's judgment that stable nuclear deterrence will continue to be a feature of the international system for the foreseeable future, and in this context, extended deterrence will continue to be viable.⁶

However, its comment that U.S. extended deterrence

provides a stable and reliable sense of assurance and has over the years removed the need for Australia to consider more significant and expensive defense options,⁷

seems certain to raise the question among Australia's neighbors, what are these "significant and expensive defense options" that could substitute for U.S. extended nuclear deterrence?

Warranted or not, such comments may well fuel future suspicions should Australia decide to increase its civilian nuclear industry. Despite the current government's disavowal of nuclear energy for Australia, it is likely that global warming caused by carbon emissions, and the depletion of hydrocarbon energy reserves, will keep the debate alive in Australia about nuclear power generation and the possibility of enriching

Australian uranium for export. But despite the very limited nature of the Australian nuclear infrastructure – or perhaps because of it – any moves on Australia's part to increase its nuclear capabilities will also be seen by its closer and more distant neighbors through the proliferation lens,⁸ much the same way that Australian analysts would regard similar programs in Southeast Asia.⁹

Hence, whatever its political palatability, even the remote possibility of an Australian nuclear force raises some questions that are very pertinent in political as well as strategic terms – not the least because discussing them can be very informative about the broad directions that Australian strategic policy would take well short of this extreme. This article will approach the issue by analyzing those conditions in the Asian security order and Australian strategy that would have to be present for the country to seriously consider acquiring nuclear weapons. In doing so, it will define strategic events or trends that would make nuclear weapons acquisition by Australia more credible.¹⁰

However, the article does not make a detailed judgment as to how likely these trends are, nor does it advocate Australia acquiring nuclear weapons. In the current Asian geostrategic order, an Australian nuclear capability would carry significant political cost but not provide the country with any practical security benefit. Even if the trends discussed herein eventuate in the future, Australia may well deem nuclear weapons acquisition not to be desirable or viable, based on circumstances as they would prevail at the time. This article addresses credibility, it does not make predictions or specific recommendations.

Why Does Australia Not Have Nuclear Weapons?

A glance into the past is a good starting point for gauging future possibilities. Although Australia has never possessed its own nuclear weapons, they nevertheless played a significant if indirect role in the country's defense policy since the early 1950s. At that time, Australian defense planning focused on the defense of Southeast Asia alongside the forces of its major allies, the United Kingdom and the United States. As in the defense of Western Europe, allied strategy was based on using the West's quantitative and qualitative superiority in nuclear weapons to make up for the allies' quantitative disadvantage in conventional forces. Hence, Southeast Asia Treaty Organization (SEATO) defense plans involved the first and extensive use of tactical nuclear weapons as required. In that context, Australia's 1956 *Strategic Basis* paper made explicit that Australia expected its forces to be supported by nuclear weapons under US or UK control or that these may even be made available to its forces in the field.¹¹ Confident in the stability of nuclear deterrence between the major powers,¹² Australia sought to support the UK nuclear program in particular, rather than procure weapons of its own.¹³ Although the document's drafters were thus far from disavowing the use of nuclear weapons in direct support of Australian interests, they approached nuclear issues in what Lyon and Leah have dubbed a "Menzian" fashion (after Australia's prime minister of the 1950s), preferring nuclear weapons to remain in the hands of a limited number of responsible major powers.¹⁴

Although the government did not fully endorse the main tenets of the 1959 *Strategic Basis*, it was a watershed document for Australian defense policy. In its comments on nuclear weapons, the document was an early embodiment of Lyon and Leah's

"Gortonian" approach. It highlighted the need for Australia to prepare for situations in which its main allies might be unwilling or unable to come to the country's assistance. It also mirrored wider Western concerns about the credibility of the early and extensive use of nuclear weapons, as the Communist bloc was increasingly able to retaliate in kind. For Australia, this was one of a number of factors that had to qualify the expectation of allied support, and the *Strategic Basis* wrote that:

The availability of low yield nuclear weapons would be of considerable importance to the Australian Services should a situation develop which posed a direct threat to Australia, requiring defensive operations in the northwest approaches. In the worst circumstances, viz. the inability of the United States and the United Kingdom to come to our assistance, the possession of such weapons might well be essential to our national survival.¹⁵

During the 1960s, Konfrontasi and the commitment to South Vietnam led to an increase of Australian deployments to Southeast Asia, while at the same time the prospect of a Korea-style communist attack in the region, which might have required the use of nuclear weapons by SEATO, receded. The operational prominence of nuclear weapons in allied defense plans was thus reduced, mirroring a similar development in Europe. Instead, two other facets gained importance in Australian nuclear strategy: On the one hand, the country began to extend limited but crucial support to the maintenance of the U.S. global deterrent through hosting a number of "joint facilities." On the other hand, the Holt Government took care to preserve Australia's in-principle ability to produce nuclear weapons in the future, even though it did not take any active steps to that effect.¹⁶ A nuclear program was advocated by, *inter alia*, the head of the Atomic Energy Commission, Sir Philip Baxter, and the professor of nuclear physics at the Australian National University, Sir Ernest Titterton. It received prominent support from Prime Minister John Gorton in the late 1960s, a Liberal Party maverick whose wartime experience in Singapore had left him with a deep distrust of Australia's allies and who had acceded to the post after the disappearance of Harold Holt. At the time, Australia investigated plans for nuclear power production as well as uranium enrichment. Although both were conceived of as civilian commercial projects, their potential value in a military program also did not go unnoticed.¹⁷

In 1970, however, the emerging orthodox view of the role of nuclear weapons prevailed, and Australia signed the Nonproliferation Treaty (NPT) as a non-nuclear weapons state. There are a number of related reasons why Australia decided to eschew the option to develop nuclear weapons, other than a fear of being isolated amongst other Western nations.¹⁸ Foremost among these was a fundamentally changed threat perception from that which had prevailed in the first half of the 1960s. The hostile regime of Soekarno in Indonesia, which had openly toyed with the idea of acquiring nuclear weapons,¹⁹ had been replaced by Suharto's new order, and China was rapidly realigning its position between the United States and the Union of Soviet Socialist Republics (USSR). Whatever the outcome of the war in Vietnam would be, there was much greater awareness of the cultural and historical factors fueling conflict in the region and much less fear of domino effects bringing hostile Communist regimes closer to Australia.

The 1968 *Strategic Basis* gives an insight into Australian thinking on nuclear issues in the lead-up to the country's accession to the NPT. It noted that, "China's caution can be expected to be reinforced with the growth of its nuclear capacity," because

as their own nuclear capacity increases, they may experience the same inhibitions as other nuclear powers, and come to understand how doubtful are the advantages conferred by a nuclear capacity inferior to that of the USSR and USA.²⁰

Proliferation of nuclear weapons was not only of concern in its own right but also because it increased tensions in the superpower relationship (and, by implication, would be opposed by those powers):

An important requirement of this [US-USSR] relationship is the nonproliferation of nuclear weapons among other states, since proliferation would not only prejudice the dominant status of the USA and USSR but, more damagingly, introduce an uncontrolled factor in tense situations that could involve both the USSR and USA with devastating speed.²¹

With the reduced threat from both Indonesia and Communism in Southeast Asia, "no threat of conventional attack on Australia or its territories is foreseen that might require the use of nuclear weapons for defense."²² Quite to the contrary, in a situation in which Australia was starting to disengage from the Cold War, possession of nuclear weapons might in fact increase the strategic risk to Australia:

In the improbable event of general war, it is unlikely that Australia would be a target of a nuclear attack, though the United States communication station at North West Cape would be under threat and might be attacked. Had Australia in the meantime developed a nuclear weapon capacity, this also might be attacked providing the enemy assessed such capability would be used against them.²³

Overall, then,

success in the promotion of an effective Nonproliferation Treaty would be likely to stabilize the nuclear situation, even including the case of China, and reduce the importance of this factor in the strategic requirements of the nonnuclear weapon states. It is therefore in our strategic interest to have an effective treaty as soon as possible.²⁴

The *Strategic Basis* concluded that

no present requirement is foreseen for Australia to develop a nuclear weapons capacity. However, should a serious breakdown in the international order appear likely to develop, Australia might wish to reconsider the possibility of a requirement for a nuclear capacity. It is important, therefore, that Australia maintain its freedom to reduce the lead time for the development of such a capacity from the

present period of seven to ten years. It appears likely that this would be possible under the Nonproliferation Treaty, but satisfaction of this score should be a factor in any consideration of Australia's becoming a party to that treaty.²⁵

The 1968 *Strategic Basis* thus left open the possibility of reversing the decision to accede to the treaty should strategic circumstances change. That said, membership in the NPT made any official consideration of acquiring nuclear weapons even more delicate than it had been in the past. For example, the only major change of substance made by the Cabinet to the draft of the 1976 *Australian Defense* white paper was to delete a passage that read,

We see no requirement in our present and prospective strategic circumstances to acquire nuclear weapons. Such a move would also cause concern among many nations of importance to us; it would impose a heavy and at present unnecessary burden on our defense effort.²⁶

Nevertheless, the *Strategic Basis* papers continued to contain references to the possibility that Australia may require nuclear weapons if strategic circumstances changed in the future. The 1976 "Australian Strategic Analysis and Defense Policy Objectives" (ASADPO) version, for example, which was considered by the Cabinet after the white paper of that year and is the last paper to be released under the Archives Act at the time of writing, remarked that, on the one hand,

No requirement is seen in Australia's present and prospective strategic circumstances for acquisition of nuclear weapons. Any steps taken in this direction would at a certain point seriously concern the US and probably cause strong opposition from other nuclear powers. It could alarm countries of major strategic concern to Australia and stimulate further nuclear proliferation.²⁷

On the other hand,

the possible requirement to keep the lead time for Australia matched with contingent developments in other relevant countries calls for keeping up to date in developments and for a review periodically of Australia's potential for development of nuclear weapons against the possibility that the country might be forced to consider turning to them for protection at some indeterminate time in the future.²⁸

In their sometimes extensive comments on the *Strategic Basis* papers, no Australian federal cabinet from 1959 to 1976 raised any specific objections to this or similar statements.

Australia's decision to sign the NPT was thus based on firm strategic, rather than on purely moral, grounds and was made in full recognition of the fact that it would not inhibit the development of a more substantial nuclear infrastructure. Today, Australia continues to abide by the NPT in the same strategic circumstances in which it acceded to the treaty: the absence of a credible major threat to Australia, with confidence in US

strategic primacy and extended deterrence, in the context of a nonproliferation regime which is successful in limiting, if not eliminating, nuclear proliferation, and which has the strong support of the United States and other major countries in the international system, and in a situation where no other country in Australia's region, south of China and east of India, possesses nuclear weapons. And yet, the question still arises as to whether future developments, domestic or external, might not one day lead Australia to reconsider its disavowal of nuclear weapons.

Driving Forces of a Possible Acquisition of Nuclear Weapons

Answering this question requires a judgment about the reasons for which it might do so. Scott Sagan has proposed three broad reasons for nuclear proliferation: security considerations, driven by external threats; domestic politics, driven by parochial interests within a state; and what he calls "norms" relating to the state's identity and international reputation.²⁹ All three factors have indeed influenced Australia's decisions on nuclear strategy in the past.³⁰ Strategic considerations were predominantly responsible for Australia being able to give up nuclear weapons as a short- and mid-term defense policy option. Bureaucratic politics were at play during the mid-1960s in particular, when individuals in influential positions pushed for the nuclear weapons option. And beliefs about norms and legitimate state behavior influenced Australia's support for great power nuclear arsenals in the 1950s and 1960s and for the nuclear nonproliferation regime in later decades.

That said, all three factors are not equally credible as the main drivers of Australian nuclear weapons acquisition. The Australian defense industry does not include major capabilities in the manufacture of ordnance or long-range delivery vehicles, so the assumption of a future "military-industrial complex" as a main driver of proliferation lacks credibility. Although the country's defense science and technology community is of respectable quality and influence within the defense portfolio, its focus also lies in different areas, especially sensors and systems integrations, not in the development of weapons systems themselves. And Australia's nuclear industry base, outside uranium mining, is limited to the point of being politically irrelevant. Any *commercially* driven expansion would be more likely to involve the purchase of overseas reactor designs or the establishment of local subsidiaries of foreign enrichment companies, such as the European URENCO consortium, than the development of a truly domestic industry. Hence, although any acquisition of nuclear weapons would have to be based on support from important and influential constituencies in the Australian military, strategic, scientific, industrial, and political spheres, bureaucratic politics as a main driver of Australian proliferation is unlikely.

In contrast, the proposition of Australia acquiring nuclear weapons for reasons of status and prestige does not seem equally far-fetched. Australia has invested significant political capital into its nonproliferation stance in recent decades, including behind-the-scenes diplomacy at numerous NPT review conferences and high-profile activities such as the Australia Group or Canberra Commission. However, Australia never followed New Zealand's much more stringent disavowal of all things nuclear.³¹ To this day, Australia's deeply ambivalent attitude toward its large Asian neighbors is underpinned by the ingrained expectation that Australia can engage on the basis of its technological

superiority, and that, in the words of the 1976 ASADPO paper, the Australian Defense Force (ADF) "should demonstrate that Australia is serious and competent in defense matters."³² In fact, it is quite remarkable that governments headed by Paul Keating, John Howard, and Kevin Rudd, with widely varying approaches in style and substance to engaging with Asia, have all based their defense postures on the explicit policy of an Australian "capability edge" – *de facto*, an open declaration of Australia's commitment to engage in, and win, a possible regional arms race and a position that would be deemed unacceptable, destabilizing, and irresponsible if it was ever adopted by another country in the region.

Hence, there are strong undercurrents in Australia's strategic identity that would be quite compatible with accession to the nuclear club. But the influence of state identity on any decision to do so would mainly be credible as a facilitating influence rather than as the ultimate cause, because a shift in the relative predominance from a nonproliferating "good international citizen" to a nuclear-armed "biggest kid on the block" would only be credible if there are new and substantial fears about Australia's strategic position in Asia. Therefore, it is to a deterioration of strategic circumstances that we must now turn as the most persuasive possible reason should Australia ever consider acquiring nuclear weapons.

"Strategic circumstances" go beyond the mere existence of a significant threat and include the attitudes of allies and other countries not directly engaged in an adversarial relationship, enduring features of the geographic and demographic situation and comparative advantages and disadvantages in military, economic, technological, and industrial capabilities. Grand strategic decisions, such as the acquisition of nuclear weapons, are taken on the basis of a whole range of explicit and implicit factors, which means that the possibility of Australia becoming a modern-day Finland, bandwagoning even with an unsavory regime, also cannot be excluded, nor can the assumption of (armed or less-armed) neutrality and isolationism. In other words, taking a policy position that would require, or be facilitated by, Australian nuclear weapons and the acquisition of these weapons themselves would be choices to which there would be alternatives – at least outside the most dire circumstances. This article will therefore define a number of conditions without which it would not be credible that Australia might consider the acquisition of nuclear weapons, without, however, arguing that even the realization of all of these conditions would make such acquisition inevitable or even desirable.

First Condition: Perception of a Major Threat

The first condition is the perception of a major, probably existential threat to Australia itself or of a major risk of such a threat developing. *Threat* is a combination of both intent and capability of (potentially) hostile powers.³³ What matters most for a decision to acquire nuclear weapons is, however, perception itself. Hence, capability does not need to be as imminent as tank divisions on NATO's Central Front or alert missiles in Siberian silos. The seemingly inexorable, long-term rise of new powers across a range of economic, diplomatic, and military dimensions can also create perceptions of risk in its own right.³⁴ In the words of Michael Howard, many seemingly innocuous and unrelated events

will be subjected to the kind of anxious examination and calculation that was devoted a hundred years ago to the news of comparable events in the Balkans: an insurrection in Philippopolis, a *coup d'état* in Constantinople, an assassination in Belgrade. To whose advantage will this ultimately redound, ask the worried diplomats, ours or *theirs*? Little enough in itself, perhaps, but will it not precipitate or strengthen a trend, set in motion a tide whose melancholy withdrawing roar will strip us of our friends and influence and leave us isolated in a world dominated by adversaries deeply hostile to us and all that we stand for?³⁵

In Australia's case,³⁶ the twentieth century saw concerns of this type about Germany and Japan in the 1930s that were pertinent as well as prescient,³⁷ and concerns about China and Soekarno's Indonesia in the 1960s that ultimately proved to be more of the former than the latter.³⁸

In general, two different types of existential threat need to be distinguished: first, the development by a hostile power of such preponderance as to enable it to, at best, coerce Australia on questions of vital interests or, at worst, to invade, occupy, and subjugate. To make it credible that a power would be able to overwhelm Australia's conventional defense effort, even after long-term warning and in a mobilized state, a certain gravitas in economic and demographic terms is required. Of Australia's immediate neighbors, only Indonesia could ever fit that score. Any power geographically further removed would, in addition, have to overcome the resistance of its more immediate neighbors. Although countries such as Vietnam could thus credibly pose an existential threat to countries in their immediate region, only Japan, China, India, and the United States have the necessary latent potential to pose a credible threat of such magnitude to Australia.

Capability does not, however, equal intent. For a major threat to be perceived, there must be reason to believe it credible that the power in question might harbor, or might develop in the future, goals that would threaten vital Australian interests. Revisionism³⁹ itself would only be a necessary, not sufficient, condition, as it would have to either involve goals specific to Australia's own immediate neighborhood, or be "open ended" in a way that Japanese aspirations were during the 1930s but Chinese aspirations to Taiwan are not. And whatever the theoretical weaknesses of the idea of the democratic peace,⁴⁰ there do not seem credible issues of contention for such a perception to arise in the relationship between two countries with established and stable democratic systems – even between countries as different in cultural and historical terms as Australia and Indonesia.⁴¹

The development in Australia of a perception of major threat would be evident from clear indicators. To meet a growing threat to the country, Australian defense planning would be progressively focused on capabilities for high-intensity conventional warfare in Australia's wider region and less on those for low-intensity stabilization operations, including beyond the Asia-Pacific.⁴² Defense expenditure would likely grow beyond the post-1945 3 percent per annum long-term trend and increase significantly as a share of gross domestic product from below 2 percent beyond the 4 percent attained during the Vietnam War.⁴³ Alternatively, there would be strong and vocal domestic support for a rapid and significant increase in defense outlays to the point of

being a central feature of the opposition's political program. In this context, "going nuclear" could well be an explicit election promise. In either case, it could not go unnoticed that the country was under the apprehension of a growing threat.

A second type of existential threat is based not on geographically proximate preponderance but on the combination of nuclear warheads and ballistic missiles. Both types of threat are, of course, complementary, in which case the considerations previously discussed apply. But nuclear weapons have made it possible to destroy a society without defeating its military forces, and – unlike the major threat discussed above – acquiring a capability to do so is, in principle, within the technological and economic capability of a large number of countries in the Asia-Pacific region. Despite the large size of the continent, Australia is inherently vulnerable to missile attack, because its population is among the most highly urbanized worldwide and concentrated in a handful of capital cities, which could be severely damaged by a limited number of fission weapons, and would be virtually obliterated by thermonuclear attack.⁴⁴

However, conceiving of a motive that would make a threat by a minor power of nuclear annihilation of Australia credible is more difficult. *A priori*, there are three possibilities: First, it could arise from the implementation of containment or roll-back strategies by the United States and its allies, with or without Australian participation. It is conceivable that in that situation, Australia might become a target of choice in "triangular deterrence"⁴⁵ if the United States and other U.S. allies are beyond the reach of a hostile power – for example, because they, but not Australia, are covered by missile defense systems. However, this assumes that major powers, in particular the United States, are still actively resisting a hostile regime and willing to bear the costs of their alliance commitments, which for reasons discussed below makes the acquisition of nuclear weapons by Australia far less credible. Second, in theory, a threat could arise from a regime driven by a generally Manichaeic and apocalyptic world view. However, it would be a stretch to assume that such a regime would in any way be focused on Australia, and as the very real possibility of nuclear annihilation did not become a dominant Australian policy determinant during the Cold War, this scenario is also lacking credibility as a driver of Australian proliferation in the future. Third, such a threat could arise from a general breakdown of the nonproliferation regime. Nuclear weapon acquisition would not necessarily have to become a new "norm," but proliferation could go beyond North Korea and Iran to include other "second-tier" unsavory regimes like Libya, Syria, Sudan, Venezuela, Cuba, and Myanmar. The danger of nuclear attack would then arise less from conflict between Australia and any specific country than because the notion of high-intensity, interstate conflict itself could become synonymous with nuclear warfare. The way in which this danger would interact with Australia's relationship with Indonesia would be of critical importance to any Australian decision on nuclear weapons acquisition and will be addressed in more detail below.

The first indicator for a raised credibility of Australian nuclear weapons acquisition due to a threat from nuclear weapons would be the breakdown in the nonproliferation regime that would most credibly lead to it. Second, technology has advanced to a stage where interceptors capable of destroying intercontinental missiles are already fielded in Alaska and California. In cooperation with the United States, it would be well

within Australia's national means to establish such a system for the defense of its continent, and a decision to do so would signal the perception of significant threat.⁴⁶ Should the system prove ineffective, a decision by Australia to acquire a nuclear weapon capability of its own would become more credible. The reason, however, would lie not only in the resulting effect on Australia's defense capabilities, but also on US policy to which it is now necessary to turn.

Second Condition: Loss of Confidence in US Extended Deterrence

Any decision to acquire nuclear weapons in response to a perception of severe threat would not be taken in a strategic vacuum. Even after the 1969 Guam doctrine demanded that US allies in Asia take more responsibility for their own security, Australia has remained confident that the United States would come to its aid in the case of an existential threat, including through the extension of nuclear deterrence. As long as Australia believes that these commitments remain credible, there would not be a compelling case for Australia to acquire nuclear weapons.⁴⁷

There are, however, a number of reasons why Australian confidence in US guarantees might be reduced in the future, which largely arise from the interplay of US interests at stake, the relative size of US military capabilities, and possible consequences of a conflict for the US homeland. In general, any credible guarantee requires a basis in a common strategic interest that would make it worthwhile for the deterrer to bear the cost of the proposed assistance.⁴⁸ But if the realization of the guarantee would expose the deterrer's homeland itself to the threat of nuclear attack, a deterree's trust in the credibility of extended deterrence will become an act of faith, rather than a logical and reasoned conclusion.⁴⁹

What credible developments may make Australia lose faith in US guarantees if it was faced with a major threat? In the case of increased nuclear weapons proliferation to various smaller hostile regimes, it is not credible that serious doubts could arise with regard to the US military capability to extend deterrence to Australia. Even if the number of nuclear countries multiplies, the United States could maintain a nuclear arsenal far beyond that of new nuclear powers in quantitative as well as qualitative terms, supported by a global antiballistic missile system against limited strikes that could, as previously discussed, be extended to Australia as it today already is for Japan, Israel, and as planned, US allies in Europe.

At first glance, it is more plausible that Australia might consider acquiring nuclear weapons in response to proliferation to unsavory minor powers because of concerns about US intentions and commitment. But even if Washington radically altered its policies toward the rest of the world, construed or real historical grievances will still make the United States a prime target of rogue regime propaganda, creating a strong commonality of strategic interest with Australia in opposing new hostile nuclear powers. Moreover, although there is little doubt that wars in Iraq and Afghanistan will have satisfied any US appetite to engage in protracted counterinsurgency operations for many years, the containment of regional nuclear powers will play much more to traditional strengths in US alliance management⁵⁰ and would be quite congruent with a generally more cautious post-Afghanistan security policy.

However, Australian faith in US extended deterrence could be shaken should it visibly fail. A first kind of failure would be the open disregard of US threats, followed by US retaliation for an attack against one of its allies. In such a situation, any previous doubts about US resolve to act on its extended deterrence commitments would be significantly diminished. Deterrence would have failed but for reasons of miscalculation that affect the concept of deterrence in general. A demonstrated US commitment to implementing extended deterrence would thus be unlikely to strengthen the case for an Australian nuclear weapon program. However, if the United States did not act on its previous commitments to retaliate or if a US ally under pressure visibly lost confidence in US guarantees, the case for sovereign rather than extended deterrence would instantly become much stronger and increase the credibility of Australian nuclear weapons acquisition.

Confidence in US guarantees against a major threat to Australia from a regional great power will be more difficult to sustain than against smaller nuclear adversaries. First, such a threat would be closer in geographic proximity to Australia or could credibly develop into one, which would raise into starker relief the differences between US and Australian vital interests in Southeast Asia – a point discussed below in reference to Indonesia. This difference does not necessarily imply a lack of US willingness to assist but would simply acknowledge that the geographical circumstances of both countries, combined with the existence of parallel US commitments in other regions, would lead to a different priority placed on the Southeast Asian theatre in a conflict of global scope – a situation that was a very real and prominent concern to Australian defense planners during the 1950s.⁵¹

Second, great powers are defined by the fact that they have a significant economic and demographic potential that could be converted into military might. This makes countering their influence a much more demanding proposition than the case of hostile regional or small powers. Doubts about the willingness and ability of the United States to meet the challenge of a peer competitor would be more credible, especially if its power and influence are only growing with time and are not framed in obviously global ideological terms.⁵² Against a great power, it would be more difficult for the United States to gain the military supremacy that would give confidence in the safety of the US homeland from nuclear attack. Somewhat paradoxically, such concerns could be reinforced by US attempts to stabilize the (global) balance through arms control measures with the rising power, which would lead to questions about US resolve, and could enshrine US vulnerabilities – one reason for European ambivalence toward strategic arms control and nuclear parity during the Cold War.⁵³ Such concerns would only be accentuated if the US nuclear stockpile was fixed at numbers as low as have been considered desirable by many in recent years.

Overall then, any US moves that would signal a reduced willingness to make the efforts required for global balancing of potentially hostile major powers would tend to raise the credibility of the possible acquisition of nuclear weapons by Australia, especially if advocates of isolationism and the active abrogation of alliance commitments became a vocal force in US politics. As most US allies would be faced with similar concerns, nuclear proliferation by any country currently under the US extended deterrence umbrella would be a strong indicator of strategic pressures pushing for Australian

nuclear acquisition. However, Australia's strategic dependence (and the value of the US alliance in its current form) extends far beyond the provision of extended deterrence, which leads to the third condition that is necessary for an Australian acquisition of nuclear weapons to be credible.

Third Condition: Allied Acquiescence to Australian Nuclear Weapons

Australia heavily relies on the use of advanced technology to meet the particular challenges involved in defending a large island continent with relatively small forces that are operating far from their sustainment base. Australia's strategic posture does not rely on allied combat forces for the defense of the country, but self-reliance in that sense is not equivalent to self-sufficiency. Instead, Australia heavily depends on close access to overseas technology, weapons systems, logistics resupply, factory-level maintenance, satellite communications and navigation, and intelligence. Maintaining Australia's "capability edge" in more challenging regional circumstances, as well as the inexorable growth in the complexity of military equipment, will even further increase the importance to Australia of access to allied assistance. On the basis of the US alliance and in the context of the technological leadership of the United States, close links between the ADF and US Pacific Command, global defense industry structure, and self-imposed Japanese defense export restraint, that Australian dependence is very much concentrated on the United States.⁵⁴ Australian equipment sourced from European countries, such as helicopters and mine countermeasures ships, or indigenously developed could not make up for the majority of force structure elements and enablers that directly depend on US support.

This very practical military dependence of Australia on the US alliance is of direct relevance here, because it gives the United States a direct lever that it could use to constrain Australia's ability to defy US demands. This would even more be the case in strategically challenging circumstances, where Australia could ill afford to risk the operational effectiveness of its defence force, but the United States could impose crippling restrictions.⁵⁵ Therefore, the attitudes and views held by the US administration and Congress toward the development of nuclear weapons by Australia become of critical importance.

Similar considerations would, of course, face any U.S. ally considering the acquisition of nuclear weapons. However, a country such as Japan has the technological, industrial, and economic potential to mitigate the financial and capability cost of U.S. sanctions even in the military sphere,⁵⁶ while Australia does not. Moreover, Australia is located in a relatively marginal position in strategic terms and of very limited importance at the global level, so it is unlikely that the United States would significantly depend on the alliance with Australia for its own security. If Australia continues to rely, to the extent that it does today, on the practical benefits of the US alliance for its military capability, it might find itself in a situation in which it would prefer to have a sovereign nuclear capability but where the prospect of active US opposition would preclude achieving that goal without incurring crippling and unacceptable military weakness in the meantime.

Therefore, any noticeable weakening of US resistance to nuclear proliferation by its allies, in the administration as well as Congress, would increase the credibility of Australian nuclear weapons acquisition. Alternatively, Australia might actively mitigate

the political risk of interrupted supply and assistance by broadening the number of countries from which it sources technology, weapons systems, essential supplies, intelligence information, and satellite services, and by accepting the financial, political, and operational penalties that would accompany such a move. One possible source of such assistance would be Europe, where Australia could exploit existing if limited areas of cooperation and benefit from a developed defense export culture. However, European countries face strategic circumstances quite different from those in Asia. They could not be assumed to be reliable sources of supply that would openly acquiesce in Australia breaking its nonproliferation commitments – even if, and perhaps exactly because, the status of these commitments as a general norm may have weakened. Japan, however, would be a different case, as it would be more likely that it would be faced with similar threats as Australia and could hence be considered more sympathetic toward its strategic predicament. Assuming Japan relaxes its current strict defense export policies, it has the technological potential to substitute for a substantial part of the assistance currently provided by the United States. Any Australian move to cooperate with Japan to the extent that its dependence on the United States would be materially reduced would thus be another important indicator increasing the credibility of an Australian nuclear weapons acquisition.

The Importance of Indonesia for Australian Nuclear Weapons Acquisition

Many of the considerations outlined above about necessary conditions and indicators need qualification in respect to, or are qualified by, the future of Australia's relationship with Indonesia.⁵⁷ In the words of the 1976 ASADPO paper, Indonesia "possesses in relation to Australia attributes of both an ally and an adversary,"⁵⁸ because any major threat to Australia would have to originate in, or pass through, the Indonesian archipelago. The strategic relationship between the two countries is thus inherently ambivalent, and as ASADPO went on to explain, Australia's

strategic posture vis-à-vis Indonesia thus has two basic elements: the one, implicit, the maintenance by defence measures of a generalised deterrence against Indonesian use of military force against Australian interests; the other, explicit, the fostering by various measures, including defence measures, of a co-operative relationship with Indonesia, based on the common strategic concerns and interdependence of the two countries.⁵⁹

The way in which this ambivalence might resolve itself, in the context of a major threat to Australia, has profound implications for the credibility of Australian acquisition of nuclear weapons.

First, as previously noted, Indonesia is the only country among Australia's neighbors that could one day credibly pose a major threat to Australia in its own right. ASADPO noted that in a hypothetical situation of that kind,

The extent and manner of the US intervention . . . would depend upon a variety of circumstances at the time, for example US interests in Indonesia, the nature of Indonesia's disputes with Australia, the kind of external support that Indonesia

might be receiving, and Congressional willingness to intervene, particularly militarily, if the USSR was not supporting Indonesia – or if there was an expectation that US action would attract Soviet involvement. The threshold of US military intervention in support of Australia could be quite high.

These considerations suggest that the general proposition about Australia's security from major military threat, and the assurance of US combat support, need qualification in respect of Indonesia.⁶⁰

As long as there is another country higher on the list of US strategic priorities than Indonesia, the same logic still applies. The same factors that make Indonesia potentially threatening to Australia – its size, military potential, and geographic location – could make the United States loath to risk an irreconcilable break with the country. Therefore, the confidence that Australia could place in US extended deterrence in a conflict with Indonesia would generally be lower than in other cases, and the relative importance to the United States of avoiding a confrontation with Indonesia, in light of its other global commitments, would be an important consideration for Australia as it considered the need for alternative measures.⁶¹

Second, the strategic ambiguity in the relationship between Australia and Indonesia may persist even while a major threat develops from a third country. In practice, it would not be possible for a hostile great power north of Indonesia to establish advance bases in East Timor, Papua New Guinea, or other countries in Melanesia without Indonesian support or acquiescence. The geographical distances would make forces in that area very vulnerable to Australian interdiction, and the location of Indonesia would make them hostage to that country's intervention.⁶² Hence, Indonesia's relationship with a hostile great power to the north would be an important consideration in Australia's strategic outlook, and any indication that it might cooperate with it would significantly increase the perception of major threat.

Should the main threat be perceived in the proliferation of nuclear weapons to a large number of countries, Indonesia's reaction would again be a critical influence on Australia's response. Should Indonesia acquire nuclear weapons as well, be it for reasons of prestige or of perceived threat, the strategic case for Australia to follow suit, as well as public opinion pressures, would become much stronger and be consistent with its traditional posture toward Indonesia as outlined in the quote from ASADPO above.⁶³ Should Indonesia refrain from acquiring nuclear weapons, however, the case for Australia to acquire them would be much weaker. The ambiguous nature of the relationship between the two countries works in both ways, and given Australia's inherent vulnerability to nuclear attack, its net strategic position would deteriorate rather than improve, should Indonesia reciprocate and acquire nuclear weapons as well.

Third, however, an Indonesia that resisted a hostile great power's encroachment on the region would be Australia's greatest strategic asset, leading to a commonality of interests that could also resolve the inherent ambiguity of the relationship in a positive way. Indonesia would have an interest in a safe southern flank to enable it to focus on a major threat from the north, as well as in access to defense technological and industrial resources that Australia could provide. The two countries' force structures – one

heavily emphasizing land forces and able to draw on a very large demographic base, and the other specializing in air and maritime forces and surveillance capabilities suited to denying access to an archipelagic region – complement each other well. Their respective international statures and relations also complement each other: one ethnically Southeast Asian and a natural first among equals in the Association of Southeast Asian Nations, the other (still) mostly ethnically European, and able to use historical and cultural affinity to tap into political and strategic support by the United States and European countries.

How the dynamics of the relationship between Australia and Indonesia in such a situation would play out with regards to the possible acquisition of nuclear weapons by either country is impossible to predict. On the one hand, it is quite conceivable that Indonesia might welcome the implicit protection that a nuclear-armed Australia could extend, if that allowed Indonesia to maintain a position of moral leadership in the region and left its own relationship with a potentially hostile major power ambiguous. On the other hand, Australia might well be satisfied that nuclear weapons strengthened Indonesia's status as the regional leader and gave it the necessary confidence to resist hostile intrusions into the region – especially if a decision to acquire nuclear weapons remained less acceptable internationally for countries that could not legitimately claim a regional leadership role and an Australian nuclear capability was opposed by Australia's traditional allies. Much in this situation would, however, depend on Australian public opinion concerns over Indonesia in general and on whether any public support, or even demand, for an Australian nuclear program would then also become part of the policy platform of at least one of the major parties.

Operational Doctrine and Force Structure Options

Even if strategic circumstances led Australia to see possession of nuclear weapons as desirable in principle, it would still be confronted with technological, industrial, and doctrinal problems that would need solving on the way to an operational capability. The ability to overcome technological and industrial obstacles, and to develop a nuclear doctrine that would be appropriate for the strategic circumstances at the time, are therefore also important considerations for the credibility of Australian nuclear acquisition. Because operational concepts and doctrine underpin capability requirements, while Australia's technological and industrial resources determine what could feasibly be achieved, each needs to be considered in relation to the other.

A nuclear weapons capability consists of nuclear warheads, delivery vehicles, and command and control infrastructure. But the quantity in which these three elements are fielded, and their sophistication and specialization, can vary widely – with the now defunct South African program at one end of the spectrum and the Cold War superpower forces at the other. There is an important difference between pure or boosted fission warheads, and two-stage thermonuclear designs: The former are easier to design and build, and simple warheads can be fielded without the need for nuclear testing. The technological difficulties involved in developing the latter, however, are much greater, and could not be solved with any confidence without access to nuclear testing data and real-life tests, which is one reason why only the five recognized nuclear weapons states have successfully tested and fielded thermonuclear warheads to date.

Indigenous development of thermonuclear weapons would thus not be a feasible short-term or midterm option for an Australian nuclear weapons program, which would have to provide tangible benefits on the basis of fission designs alone. Because the fissile material requirements of pure or boosted fission weapons are much greater than those of thermonuclear warheads of similar yields, an indigenous Australian nuclear program could only lead to a relatively small arsenal in the first instance, with warheads numbered in the low tens, and would be unlikely to grow far beyond a few dozen in number. Moreover, although boosting allows increasing the yield of fission weapons into the low 100-kt range, such higher-yield warheads would still be of significant size and weight, effectively restricting deployment to ballistic missiles with sufficient throw weight.⁶⁴ Therefore, Australia would in all likelihood be limited to warheads in the range of one to two dozen kilotons, similar in yield to the weapons used on Hiroshima and Nagasaki, with boosting in later designs being primarily used to reduce fissile material requirements and increase deployment options.

There are two distinct operational nuclear postures that Australia could assume, each with strategic as well as technological advantages and disadvantages, and both embodying slightly different approaches to deterrence. First, Australia could develop nuclear forces for the direct support of military operations, often referred to as the "tactical" use of nuclear weapons, in a strategy of deterrence by denial. Its geographic situation would make such a posture more attractive than it would be for many other countries, as Australia could credibly pledge to use nuclear weapons only on its own territory and without running the risk of significant civilian collateral damage. Importantly, Australian nuclear weapons use would significantly complicate the planning and execution of amphibious landings across the air-sea gap, and by the mere fact of their existence, have very practical benefits even for the conventional defense of the continent. Enemy forces that are dispersed during transit and landing, to reduce the damage from possible nuclear attack, would be more vulnerable to interdiction by conventional forces.⁶⁵ Once ashore, air and sea ports required to sustain a landing force could also be targeted with nuclear weapons.

Simple warheads in the low kiloton range would be suitable for counter-landing operations. They could be delivered in ways that impose relatively few constraints in terms of warhead size, weight, and ruggedness, including nuclear land and sea mines in likely landing areas, heavyweight torpedoes, and aircraft-delivered gravity bombs. The main operational constraint would thus be to ensure the survivability of the Australian arsenal against a disarming first strike or in the face of a prolonged enemy counterforce campaign. However, Australia has significant experience in long-range small-unit operations in the rugged north of the continent that would be very valuable in reducing the vulnerability of a dispersed nuclear force.

Even if a hostile great power threatened nuclear retaliation against Australian civilian centers, any landing of significant size and the occupation of territory on the Australian mainland would remain a significant gamble. The direct operational benefit that would flow from the use of nuclear weapons by Australia would make using them inherently credible. Although Australian opposition could ultimately be overcome, especially if the enemy was willing to make liberal use of nuclear weapons to soften Australian defenses, it would be difficult to conceive of any motivation that would warrant the

risk and cost of major combat operations against the mainland of a nuclear-armed Australia. Hence, "tactical" nuclear weapons would be a credible way for Australia to significantly raise the cost and risk involved in the physical occupation of the country – an objective that would still leave room for other types of pressures to be brought against the country but that is nevertheless an achievement beyond the ability of most other countries of Australia's size.

Moreover, such a posture would also be a good fit with Australia's industrial and technological capabilities. The country does not have experience in fuel reprocessing or access to plutonium production reactors, while the use of any future power production reactors for that purpose would pose its own technological problems of converting them to fissile material production.⁶⁶ Australia does, however, have an established production infrastructure for uranium yellow cake, and the design information and test documentation of its developmental centrifuge enrichment program, operated by the Atomic Energy Commission in the 1970s and early 1980s, is still kept at Australian Nuclear Science and Technology Organization's Lucas Heights facility.⁶⁷ Australia's universities, Commonwealth Scientific and Industrial Research Organization, and industry contain other resources required for the design and production of centrifuges, physics package, and warhead assemblies, such as nuclear physicists, metallurgists, precise machining equipment, high-speed X-ray photography and advanced conventional explosives, and precisely timed detonators. Given this technological and industrial base and the relatively simple delivery vehicles that would be required, it is credible that Australia could field a number of operational "tactical" nuclear warheads within five years of a decision to do so.⁶⁸ Any commercial program of uranium enrichment that was established before such a decision and that involved the transfer of technology to Australia would further reduce this lead time.⁶⁹

By forcing enemy ships to disperse or defeating major landings, an Australian nuclear force of "tactical" weapons could provide very similar benefits for the defense of archipelagic Southeast Asia as it could for the defense of Australia itself. However, maintaining such a posture in the face of nuclear threats against the Australian homeland would be most difficult. There would be little credibility in a swap of "Sydney for Borneo," given that Australia would not be immediately threatened by the lodgment of enemy forces in Indonesia and could still retreat to the mainland – much the same way it did in the face of the Japanese advance in 1942. A missile defense system would be able to intercept limited strikes, but even if it was nuclear armed, there would be little reason to expect that any such system could not ultimately be overcome by a major power's arsenal. Hence, if Australia is to maintain an independent strategic role of any kind beyond the defense of the continent, after it has lost confidence in U.S. extended deterrence, it would require a "strategic" arsenal of its own, with long-range delivery vehicles and relatively large warheads that could establish a posture of deterrence by punishment through the credible threat of nuclear retaliation against enemy urban areas.

However, developing such an arsenal is a very different proposition from one focused on small, short-range "tactical" weapons. Australia has very little experience in the construction of large missile engines, guidance systems, or staging of missiles. Without assistance, the time that would be required to build intercontinental-range ballistic missiles would therefore be measured not in years but in decades.⁷⁰ In theory,

Australian submarines equipped with Tomahawk cruise missiles, which the government has decided to acquire in the 2009 defense white paper, could be converted into nuclear launch platforms. However, the size of the missile imposes strict space constraints, while the need to maintain its balance in flight (and to avoid the need for range-reducing counterweights) imposes equally strict weight limits.⁷¹ A fission warhead fitted in a cruise missile would therefore necessarily be very small and have a correspondingly small yield. Given that only a few such missiles could be deployed at any one time within a 1,000-mile radius of enemy urban centers, a credible "strategic" force based on Australian submarine-launched cruise missiles would ultimately require the development of small thermonuclear warheads. Overall, the technological difficulties and cost involved in such a program significantly reduce the credibility of Australia deciding to acquire weapons of this kind, and Australia would be much more likely to retreat to the continent, avoiding exposure of its own cities by seeking political accommodation behind a (nuclear) force defending the country itself.⁷²

Many of the technological and industrial difficulties of an indigenous nuclear program could be much more easily overcome if Australia received assistance from allied nuclear powers – especially if such a power was willing to supply nuclear warheads directly. During the Cold War, tactical nuclear weapons were an essential intermediate step in the US-extended deterrence posture against the threat of major Soviet attack on Western Europe. To this day, the North Atlantic Treaty Organization maintains a multinational capability for targeting and delivery of US tactical nuclear weapons as "a visible nuclear bond" between the allies.⁷³ The political symbolism of allied participation in the nuclear mission would make the extension of similar schemes to Australia a credible possibility, should a direct threat to the country develop.⁷⁴ The supply of complete warheads would, of course, still be a significantly different proposition in practical and political terms. However, the supply of US warheads to Australia would leave the United States with some measure of strategic leverage over its ally even if Australia was determined to acquire nuclear weapons of its own.⁷⁵ In a situation of allied acquiescence to an Australian nuclear program, identified above as a necessary condition for nuclear weapons acquisition to be credible in the first place, this possibility cannot be fully discounted. A US policy of strengthening and extending arrangements for nuclear participation would raise the credibility of a possible transfer of nuclear weapons – with the important caveat, however, that there would probably be no U.S. inclination to support Australia acquiring warheads and systems beyond those required for the direct defense of the continent. Whatever the advantages to Australia from its own version of the *force de frappe*, from a US perspective, it would only serve to significantly complicate the management of nuclear crises.

Conclusion

This article has argued that Australia's decision to renounce nuclear weapons and sign the NPT was ultimately taken on strategic grounds, and that, while similar strategic circumstances continue to this day, they might not do so in the indefinite future. The article then identified three conditions that would have to be fulfilled for the possibility of an Australian decision to acquire nuclear weapons to be credible: a perception of major threat to Australia; a loss of confidence in US security guarantees; and acquiescence

to Australia's nuclear program by its main allies to maintain access to allied industrial, technological, logistics, and intelligence support for Australia's conventional defense effort. These three conditions further interact with considerations about Australia's relationship with Indonesia, and the feasibility of acquiring different force structures for "tactical" or "strategic" use.

Two broad conclusions emerge from the analysis: On the one hand, it is conceivable that strategic circumstances could evolve to a situation in which the acquisition of nuclear weapons becomes a credible option for Australia to defend the continent against major direct attack. Operationally, nuclear weapons would be suited for counter-landing operations, while building a nuclear arsenal focused on that task would be well within Australia's technological and industrial capabilities. If the threat emerged from Indonesia, the relativities of strategic priorities between Australia and the United States would increase the attractiveness of such an option, and it could not be excluded that warheads might, in the end, even be supplied by Australia's ally itself.

On the other hand, the situations in which Australian acquisition of nuclear weapons would be credible are also very limited. In particular, a widespread breakdown of the NPT is neither a necessary nor a sufficient condition.⁷⁶ Unless it already felt threatened by a major power, Australia's reaction to proliferation would always be conditioned by the response of Indonesia. Furthermore, the difficulty in developing a long-range, "strategic" nuclear force structure would be formidable. The most convincing scenario where such a force structure might be required, in the extension by Australia of nuclear deterrence to Indonesia to keep a hostile major power from encroaching on the region, lacks credibility, because it would be within a growing Indonesia's abilities to provide a deterrent of its own. If Australia and a growing Indonesia in the future entered a close alliance against a major threat, Indonesia will do so as Australia's equal.

Any nuclear force that would be credible for Australia to develop will consist of "tactical" weapons, for use in the direct defense of the continent, and with little use for coercion of other countries. Any Australian government can make it harder but never impossible for one of its successors to decide to acquire such a nuclear arsenal. Although reasonable people may reasonably differ over whether that fact is to be welcomed or to be deplored, the possibility itself, with all its political and strategic consequences, will never go away.

NOTES

1. Rod Lyon and Christine Leah, "Three Visions of the Bomb: Australian Thinking about Nuclear Weapons and Strategy," *International Affairs*, forthcoming.
2. Michael S. Malley and Tanya Ogilvie-White, "Nuclear Capabilities in Southeast Asia: Building a Preventive Proliferation Firewall," *Nonproliferation Review* Vol. 16, No. 1 (March 2009), pp. 25–45.
3. Muthia Alagappa, "Nuclear Weapons and National Security: Far-Reaching Influence and Deterrence Dominance," in Muthia Alagappa, ed., *The Long Shadow: Nuclear Weapons and Security in Twenty-First Century Asia* (Stanford: Stanford University Press, 2008), pp. 479–507; and David Yost, "Assurance and U.S. Extended Deterrence in NATO," *International Affairs* Vol. 85, No. 4 (2009), pp. 755–780, esp. pp. 763–744.
4. "Japan, U.S. to Launch Talks on 'Nuclear Umbrella,'" *NTI Global Security Newswire*, July 20, 2009. Available at <http://gsn.nti.org>
5. See Ross Babbage, "Learning to Walk amongst Giants: The New Defense White Paper," *Security Challenges* Vol. 4, No. 1 (Autumn 2008), pp. 13–20; and the replies by Rory Medcalf and Robert Ayson, "On 'Ripping an Arm Off,'" *Security Challenges* Vol. 4, No. 2 (Winter 2008), pp. 147–164.

6. Department of Defense, *Defending Australia in the Asia-Pacific Century: Force 2030* (Canberra: Commonwealth of Australia, 2009), para. 4.59.
7. Department of Defense, *Defending Australia*, para. 6.34.
8. Paul Malone, "Australia a Nuclear 'Concern,'" *Canberra Times*, May 2, 2007; Andrew Davies, *Australian Uranium Exports and Security: Preventing Proliferation* (Canberra: Australian Strategic Policy Institute, 2006).
9. Malley and Ogilvie-White, "Nuclear Capabilities in Southeast Asia," pp. 25–45. For a critique of analyzing regional nuclear programs through the proliferation lens, see Richard Tanter, "Australia's Treaty Links to Nuclear Weapons and Nuclear Disarmament" Austral Policy Forum, 09-8A, March 26, 2009. Available at <http://www.globalcollab.org>
10. In the years prior to any decision to acquire nuclear weapons, Australia may well decide to reduce the lead time for doing so by developing (civilian) fissile material production capabilities under sovereign Australian control. But because the development of such a "latent arsenal" would be a reaction to the same trends that would ultimately lead Australia to acquire nuclear warheads themselves, it is not an independent variable in an Australian decision to do so and will hence not be specifically considered here. That said, the development of a "latent arsenal" would, of course, provide an important indication that Australian policymakers see a need to facilitate the acquisition of nuclear weapons in the future, which would be a significant departure from the current situation.
11. Defense Committee, "Strategic Basis of Australian Defense Policy, 1956, Strategic Review," in Stephan Frühling, ed., *A History of Australian Defense Policy since 1945* (Canberra: Department of Defense, 2009), p. 208; Wayne Reynolds, "The Wars That Were Planned: Australia's Forward Defense Posture in Asia and the Role of Tactical Nuclear Weapons, 1945–1967," *Australian Journal of International Affairs* Vol. 53, No. 3 (1999), pp. 295–309.
12. Defense Committee, "Strategic Basis of Australian Defense Policy," 1956, par. 3–5, pp. 219–220.
13. Jacques E. C. Hymans, "Isotopes and Identity: Australia and the Nuclear Weapons Option, 1949–1999," *The Nonproliferation Review* Vol. 7, No. 1 (Spring 2000), pp. 1–23.
14. Lyon and Leah, "Three Visions of the Bomb."
15. Defense Committee, "Strategic Basis of Australian Defense Policy," 1959, par. 54, p. 246.
16. Hymans, "Isotopes and Identity," pp. 1–23.
17. Jim Walsh, "Surprise Down Under: The Secret History of Australia's Nuclear Ambitions," *Nonproliferation Review* Vol. 5, No. 1 (Fall 1997), pp. 1–20; Hymans, "Isotopes and Identity," pp. 1–23; Tom Hyland, "When Australia Had a Bombshell for U.S.," *The Age*, July 6, 2008.
18. Walsh, "Surprise Down Under," pp. 1–18.
19. Robert M. Cornejo, "When Sukarno Sought the Bomb: Indonesian Nuclear Aspirations in the Mid-1960s," *Nonproliferation Review* Vol. 7, No. 2 (2000), pp. 31–43.
20. Defense Committee, "Strategic Basis of Australian Defense Policy," 1968, para. 55, p. 351.
21. Defense Committee, "Strategic Basis of Australian Defense Policy," 1968, para. 29, p. 347.
22. Defense Committee, "Strategic Basis of Australian Defense Policy," 1968, para. 228, p. 387.
23. Defense Committee, "Strategic Basis of Australian Defense Policy," 1968, para. 159, p. 370.
24. Defense Committee, "Strategic Basis of Australian Defense Policy," 1968, para. 228, p. 387.
25. Defense Committee, "Strategic Basis of Australian Defense Policy," 1968, para. 228, p. 387.
26. Cabinet Decision No. 1656 (FAD), October 18, 1976, NAA: A12909, 703.
27. Defense Committee, "Australian Strategic Analysis and Defense Policy Objectives," 1976, para. 962, in Frühling, *A History of Australian Defence Policy*, p. 566.
28. Defense Committee, "Australian Strategic Analysis and Defense Policy Objectives," 1976, para. 382, p. 615.
29. Scott D. Sagan, "Why Do States Build Nuclear Weapons?" *International Security* Vol. 21, No. 3 (Winter 1996–97), pp. 54–86. For a quantitative analysis of nuclear proliferation drivers, see Dong-Joon Jo and Erik Gartzke, "Determinants of Nuclear Weapons Proliferation," *Journal of Conflict Resolution* Vol. 51, No. 1 (February 2007), pp. 167–194.
30. For a good discussion on the factors influencing Australia's approach(es) to nuclear strategy, see Rod Lyon, "Australia: Back to the Future?" in Muthia Alagappa, ed., *The Long Shadow: Nuclear Weapons and Security in Twenty-First Century Asia*, pp. 429–450.
31. Wade Huntley, "The Kiwi That Roared: Nuclear-Free New Zealand in a Nuclear-Armed World," *Nonproliferation Review* Vol. 4, No. 1 (Fall 1996), pp. 1–16.
32. Defense Committee, "Australian Strategic Analysis and Defense Policy Objectives," 1976, para. 388, p. 616.
33. A now-classic formula first proposed in David J. Singer, "Threat Perception and the Armament-Tension Dilemma," *Journal of Conflict Resolution* Vol. 2, No. 1 (1958), p. 94.
34. For a perspective on which the power-cycle theory is based, see C. F. Doran and W. Parsons, "War and the Cycle of Relative Power," *American Political Science Review* Vol. 74, No. 4 (December 1980), pp. 947–965.
35. Michael Howard, *The Causes of War* (Cambridge, MA: Harvard University Press, 1983), pp. 14–15.
36. See Alan Dupont, *Australia's Threat Perceptions: A Search for Security*, Canberra Paper, No. 82 (Canberra: Strategic and Defense Studies Center, Australian National University, 1991); and Anthony Burke, *Fear of Security: Australia's Invasion Anxiety* (Cambridge: Cambridge University Press, 2008).
37. See for example, W. M. Hughes, *Australia and War Today* (Sydney: Angus & Robertson, 1935); and the documents from the relevant time in Neville Meaney, ed., *Australia and the World: A Documentary History from the 1870s to the 1970s* (Melbourne: Longman Cheshire, 1985).

38. See, for example, T.B. Millar, *Australia's Defence* (Melbourne: Melbourne University Press, 1965), as well as *Strategic Basis* documents reproduced in Frühling, *A History of Australian Defence Policy since 1945*.
39. "Revisionism" is being used here to denote those states seeking to alter the existing international order by force. Alternative names used in this context are imperialistic versus status quo (Morgenthau), unsatiated versus satiated (Schuman), revolutionary versus status quo (Kissinger), dissatisfied versus satisfied (Carr), have-nots versus haves (Mattern), and revisionist versus status quo (Wolfers). Randall L. Schweller, "Bandwagoning for Profit," *International Security* Vol. 19, No. 1 (1994), p. 85.
40. Christopher Layne, "Kant or Cant: The Myth of the Democratic Peace," *International Security* Vol. 19, No. 2 (1994), pp. 5–49.
41. For a discussion of democratic peace and nuclear proliferation, see Etel Solingen, "The Political Economy of Nuclear Restraint," *International Security* Vol. 19, No. 2 (1994), pp. 126–169.
42. Hugh White, *Beyond the Defence of Australia* (Sydney: Lowy Institute, 2006).
43. For long-term trends in Australian defense spending, see Mark Thomson and Andrew Davies, *Strategic Choices: Defending Australia in the Twenty-First Century* (Canberra: Australian Strategic Policy Institute, 2008), pp. 7–8; and Mark Thomson, *The Cost of Defense: ASPI Defense Budget Brief 2007–2008* (Canberra: Australian Strategic Policy Institute, 2007), p. 126. The examples of Israel and Pakistan demonstrate that economies significantly smaller than Australia can "afford" nuclear weapons programs as well as substantial conventional forces. However, experience also suggests that nuclear weapons are a qualitative advance that will add to the overall defense expenditure, rather than substitute for conventional systems. Hence, although economic considerations alone would not preclude Australia from acquiring nuclear weapons, their cost will no doubt be an important consideration that may ultimately lead the country to prefer political accommodation over a nuclear weapons-based deterrence posture.
44. As discussed below, that technology is, however, also far more complex than simple fission designs.
45. Robert E. Hakarvy, "Triangular or Indirect Deterrence/Compellence: Something New in Deterrence Theory?" *Comparative Strategy* Vol. 17, No. 1 (1998), pp. 63–81.
46. For technological issues involved in such a system, see Stephan Frühling, *Ballistic Missile Defence for Australia: Policies, Requirements, and Options* (Canberra: Strategic and Defence Studies Centre, Australian National University, 2003).
47. On Australia's reliance on US extended deterrence, see Raoul Heinrichs, "Australia's Nuclear Dilemma: Dependence, Deterrence, or Denial?" *Security Challenges* Vol. 4, No. 1 (2008), pp. 55–67.
48. Vesna Danilovic, "The Sources of Threat Credibility in Extended Deterrence," *Journal of Conflict Resolution* Vol. 45, No. 3 (2001), pp. 341–369.
49. For a case against that act of faith, see Pierre M. Gallois, "The raison d'être of French defense policy," *International Affairs* Vol. 39, No. 4 (1963), pp. 497–510.
50. David Ochmanek and Lowell H. Schwartz, *The Challenge of Nuclear-Armed Regional Adversaries* (Santa Monica, CA: RAND, 2008).
51. See the 1953, 1956, and 1959 *Strategic Basis* documents in Frühling, *A History of Australian Defence Policy since 1945*.
52. Thomas S. Szayna, Daniel Byman, Steven C. Bankes, Derek Eaton, Seth G. Jones, Robert Mullins, Ian O. Lesser, and William Rosenau, *The Emergence of Peer Competitors: A Framework for Analysis* (Santa Monica, CA: RAND, 2001).
53. See Lawrence Freedman, *The Evolution of Nuclear Strategy* (New York: Palgrave Macmillan, 2003).
54. Paul Dibb, "Is the US Alliance of Declining Importance to Australia?" *Security Challenges* Vol. 5, No. 2 (Winter 2009), pp. 38–39. For a discussion of the dependence on U.S. assistance even in Australia's most prominent indigenous project, the Collins class submarine, see Peter Yule and Derek Woolner, *The Collins Class Submarine Story* (Cambridge: Cambridge University Press, 2008).
55. It should be noted that although the United States was opposed in principle to the British and French nuclear programs, it was not willing to risk alliance relationships over the issue. Israel received significant nuclear assistance from its main pre-1967 ally France, while South Africa and China were much less dependent on allied support when they developed their weapons compared with the case of Australia today.
56. Michael J. Green, *Arming Japan: Defense Production, Alliance Politics, and Postwar Search for Autonomy* (New York: Columbia University Press, 1995); Sugio Takahashi, "Transformation of Japan's Defence Industry? Assessing the Impact of the Revolution in Military Affairs," *Security Challenges* Vol. 4, No. 4 (2008), pp. 101–115.
57. For background on that relationship in defense planning terms, see Paul Dibb and Richard Brabin-Smith, "Indonesia in Australian Defence Planning," *Security Challenges* Vol. 3, No. 4 (2007), pp. 67–93.
58. Defense Committee, "Australian Strategic Analysis and Defense Policy Objectives," 1976, para. 201, p. 585.
59. Defense Committee, "Australian Strategic Analysis and Defense Policy Objectives," 1976, para. 223, p. 588.
60. Defense Committee, "Australian Strategic Analysis and Defense Policy Objectives," 1976, para. 85–86, pp. 564–565.
61. Moreover, Australia officially only relies on US nuclear deterrence against nuclear, not conventional, threats – unlike NATO, for example, which does condition the use of nuclear weapons in that way. See Department of Defence, *Our Future Defence Force: Defence 2000* (Canberra: Commonwealth of Australia, 2000), par. 5.15; Department of Defence, *Defending Australia*, par. 6.34; NATO, *The Alliance's Strategic Concept*, April 24, 1999, par. 46. Available at <http://www.nato.int>

62. Either directly or by allowing Australian forces to operate from its territory.
63. A similar point is made in Robyn Lim, *Australia and the Future of Nuclear Deterrence* (St. Leonards, Australia: Centre for Independent Studies, 2007).
64. Estimates for an Iranian first-generation implosion design with a yield in the tens of kilotons, without boosting, place the overall warhead weight at more than 1,000 kg. *Iran's Nuclear and Missile Potential: A Joint Threat Assessment by U.S. and Russian Technical Experts* (New York: East West Institute, 2009), p. 5. US and Russian warheads of the late 1950s incorporated many features that made significant miniaturization possible, but these were based on the experience from hundreds of actual weapons tests and would not all be possible for Australia to replicate. See Chuck Hansen, *U.S. Nuclear Weapons: The Secret History* (Arlington, TX: AeroFax, 1988), for a good overview on the development of US nuclear warhead designs.
65. This complementary nature of nuclear and conventional defenses means that it is not possible to discount the value of nuclear weapons on the basis of direct cost-benefit comparisons between the two – an approach that was, for example, used in Desmond Ball, "Australia and Nuclear Policy," in Desmond Ball, ed., *Strategy & Defence: Australian Essays* (Sydney: Allen & Unwin, 1982), p. 326.
66. William Van Cleave, "Nuclear Technology and Weapons," in Robert M. Lawrence and Joel Larus, eds., *Nuclear Proliferation Phase II* (Lawrence, KA: University Press of Kansas, 1974), pp. 30–68.
67. M. D. Laughter, *Profile of World Uranium Enrichment Programs – 2007* (Oak Ridge, TN: Oak Ridge National Laboratory, 2007), p. 15. The Australian company Silex has also developed an experimental laser enrichment technology that is now under exclusive licence of General Electric, and which, depending on the extent to which Australian nationals remain involved and the yet-to-be-proven feasibility of scaling up the process, could be an alternative way of producing highly enriched uranium. See <http://www.silex.com.au>. The technological assumptions of earlier studies from the 1960s and 1970s, which identified plutonium as the most likely basis for an Australian nuclear weapons program, were overcome by the significant advances in commercial centrifuge technology during the 1970s and 1980s. See, for example, Ian Bellamy, *An Australian Nuclear Force: Some Economic Considerations* (Canberra: Strategic and Defense Studies Center, Australian National University, 1969); and Robert O'Neill, *Internal Problems Associated with Any Acquisition of Nuclear Weapons by Australia* (Canberra: Strategic and Defense Studies Center, Australian National University, 1974).
68. Robert Harney, Gerald Brown, Matthew Carlyle, Eric Skroch, and Kevin Wood, "Anatomy of a Project to Produce a First Nuclear Weapon," *Science and Global Security* Vol. 14, No. 2–3 (2006), pp. 163–182. The article assumes five years for a covert program based on a gun-type design. This may be a conservative estimate in Australia's case because arguably the development of a simple implosion design is well within Australia's scientific and technological expertise, which would reduce the amount of fissile material per warhead that would have to be produced.
69. Philip Baxter, head of the Atomic Energy Commission, reportedly stated in 1975 that on the basis of the then-operating centrifuge program, the first weapons could be available with 12 months – an estimate that seems optimistic given the challenges of warhead design but nevertheless indicates the value of existing fissile material production facilities. Ball, "Australia and Nuclear Policy," p. 323.
70. For a general discussion of the difficulties of nuclear and missile programs, see US Congress Office of Technology Assessment, *Technologies Underlying Weapons of Mass Destruction* (Washington, DC: Government Printing Office, 1993). For a good discussion of the technological difficulties in missile development in the particular context of Iran and North Korea, which highlights many of the difficulties that would also face Australia with regards to engine design, staging, and guidance, see Theodore Postol, *A Technical Assessment of Iran's Ballistic Missile Program* (New York: East West Institute, 2009).
71. Both would be of particular concern to Australia, because its program would most likely be based on the use of highly enriched uranium, which requires much bulkier and heavier critical masses and hence conventional explosives than comparable plutonium designs. Using a gun-type design might ease weight and space restrictions of the warhead but would come at the cost of significantly lower yields. For estimates of fissile material requirements, see Henry D. Sokolski, "Assessing the IAEA's Ability to Verify the NPT," in Henry D. Sokolski, ed., *Falling Behind: International Scrutiny of the Peaceful Atom* (Carlisle, PA: Strategic Studies Institute, US Army War College, 2008), p. 25.
72. One argument that has been made against a (purely) tactical nuclear posture is that it does not address a threat of nuclear attack against Australian urban areas following Australian nuclear use and that therefore Australia would require a long-range nuclear force to establish the prospect of nuclear retaliation. See O'Neill, *Internal Problems*, pp. 2–3. However, Australian retaliation for nuclear use against Australia ultimately suffers from the same fundamental weakness of any strategy based on pure retaliation: There would not be any practical benefit other than pure revenge to an Australian retaliatory strike, making such a posture inherently incredible. Both deterrence by denial and deterrence by punishment ultimately rely on creating uncertainty and the risk of significant cost in the enemy's mind; threatening cities as opposed to military objectives is no panacea to eliminate the inherent fallibility of deterrence. Moreover, the natural technical progression of any indigenous Australian nuclear program would first result in small and heavy warheads that would be inherently suitable for tactical but not strategic use, blurring the distinction in practice between the two postures.
73. For the case for maintaining such arrangements, see Michael Rühle, "NATO and Extended Deterrence in a Multinuclear World," *Comparative Strategy* Vol. 28, No. 1 (2009), pp. 10–16; and Yost, "Assurance and U.S. Extended Deterrence in NATO," pp. 755–780.

74. Hedley Bull argued in 1968 for creating a mechanism allowing Australia to influence US nuclear strategy similar to that available to the US allies in Europe. See Hedley Bull, "The Political and Strategic Background to Australian Defence," in R. H. Scott, ed., *The Economics of Defence* (Sydney: Economics Society of Australia and New Zealand, 1968), p. 13. I am grateful to Robert Ayson for bringing this piece to my attention.
75. For a discussion of similar factors in the Anglo-US nuclear cooperation during the late 1950s and early 1960s, see Michael Middeke, "Anglo-American Nuclear Weapons Cooperation after the Nassau Conference: The British Policy of Interdependence," *Journal of Cold War Studies* Vol. 2, No. 2 (2000), pp. 69–96; and Donette Murray, *Kennedy, Macmillan, and Nuclear Weapons* (Basingstoke, England: Macmillan, 2000).
76. In that sense, the message of this article is more positive than that in Lyon, "Australia: Back to the Future?" pp. 446–447, or in Martine Letts, "Nonproliferation and Arms Control: Creative and Uncomfortable Policy Choices Ahead," in Alan Gynge, ed., *Australian Voter's Guide to International Policy* (Sydney: Lowy Institute for International Policy, 2006), p. 15.

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