AUSTRALIA AND RESOURCES IN THE ASIAN CENTURY

Ross Garnaut

Vice-Chancellor's Fellow and Professorial Fellow in Economics,

The University of Melbourne

Distinguished Professor, The Australian National University

Keynote Presentation at the Opening Plenary Session of the Australian Agricultural and Resource Economics Society's 57th Annual Conference "Economics, Agriculture, and Natural Resources in the Asian Century", Darling Harbour Convention Centre, Sydney, 6 February 2013.

Australia and Resources in the Asian Century

"Australia in the Asian Century" is the first large-scale official look in the twenty first century at economic change in Asia and how it affects Australian opportunities and challenges. At the same time, it is the first comprehensive look in the twenty first century at determinants of and constraints on Australian economic performance and at policies that can improve performance. It is ambitious in its vision for Australia in an environment shaped by continued economic success in Asia.

When the paper was released last October, I expressed the hope that it would reboot the Australian conversation about our country's future. Many Australians—maybe all who are thoughtful about our country's future—have been troubled by the raucous and ignorant shouting that has crowded out serious discussion of national policy in recent years. The White Paper provides us with an opportunity to talk differently.

So far, that opportunity hasn't been used much.

Taking up that opportunity is the spirit in which I will comment on the analysis embodied in and the objectives defined by the White Paper. I will focus especially on the challenge that making the most of Australia's Asian opportunity presents to economic management in Australia. It is a story about Australian agriculture and resources, within a story about the Australian economy more generally.

A White Paper is the Government talking. It is not an independent report on what is happening, what needs to be done, and how we are going about doing it. This White Paper is strong on aspirations and tends to see the realisation of those goals as continuing and extending current approaches and policies. For it to lead into a productive discussion of Australia's preparations to do well in an Asian Century, it is necessary to point out that some issues need new thinking and correction of past approaches.

This paper generally endorses the aspirations of the White Paper, and points out that their achievement is going to require efforts and changes beyond those that are currently contemplated. It comments briefly on six things: the wider development context of twenty first century Asian growth and structural change; growth and structural change in Asia and Australia's terms of trade; macro-economic management of an increasingly resource-intensive economy; restoring productivity growth; becoming competitive in education; and linking Australia to Asian opportunity.

Asian Economic Growth in the Twenty First Century

The White Paper's story of past and future growth and structural change in Asia is brief. This is because the Paper is mostly about Australia, rather than Asia. It happens that Australian opportunity will be shaped considerably by developments in Asia.

I will start by filling a gap in the White Paper's analysis of recent and prospective Asian economic growth: placing expected growth in Asia within a wider context of global development.

Modern economic growth involves the increase in output per person over long periods. This eventually transforms living standards and the strategic weight of a country in the international community.

Modern economic growth is a phenomenon of the last quarter of a millennium. Its initial geographic concentration amongst people in Britain and its recent overseas offshoots and adjacent areas of Western Europe encouraged ethno-centric understandings of its sources and pre-conditions.

Japan became the first non-European society to join the process of modern economic growth in the final third of the nineteenth century. It is of importance to the story of the Asian century that modern economic growth did take root so early in Japan, and did not do so in adjacent countries which shared much institutional history with it.

We now know that modern economic growth is available to all parts of humanity once certain conditions are met. That message started to be learned when the preconditions for sustained modern economic growth were established in three Northeast Asian economies—Hong Kong, Taiwan and Korea—and Singapore in the third quarter of the twentieth century. And then, critically important for Australian economic development and for the Asian century, sustained rapid growth reached into the populous countries of Asia—China, Indonesia and India—in the final decades of the twentieth century.

The most basic precondition for modern economic growth is the existence of an effective state. Economic growth requires the provision of a range of public goods and services that are essential for development.

Different institutional settings allow the boundary between state and private roles to be drawn in different places. But there is an irreducible minimum role for an effective state.

The requirement that there be an effective state immediately divides humanity into two broad parts. Most people in Eurasia and North Africa had experience with an over-arching state extending back over thousands of years. Most of the rest of humanity did not. This makes it easier to build the most basic of the preconditions for modern economic growth in Eurasia. Elsewhere the building of an effective state to sponsor and to support modern economic growth is more likely to be challenging, take longer and be subject to setbacks from time to time.

States governing large societies emerged over the past twelve thousand years on the continent of Eurasia and adjacent areas of North Africa. Ideas about government, technology and the economy moved backwards and forwards across these vast areas with conquest, migration and trade. They accumulated over time and became the foundations for the emergence of modern economic growth at the western end of Eurasia.

The second precondition for modern economic growth is that there must be broadly based support for it within the society. An elite can take decisions to start the process, but that will not keep it going. Sustained, rapid economic growth is deeply disruptive. It challenges and breaks established ideas, political and economic institutions and interests. It changes fundamentally the distribution of income and wealth. It displaces and replaces elites. All of these changes encourage resistance, around which political opposition to specific policies or general development strategies can coalesce.

Most of humanity has come to see modern economic growth as a generally beneficent process. In the end it delivers longer and healthier lives; better and more secure food and housing; greater knowledge, more extensive communications and wider life experiences. For national entities, it helps to secure sovereignty in an international community in which other states are strengthened by the product of sustained growth.

Political elites today which do not deliver modern economic growth are subject to internal challenge. But in their early stages, growth-oriented policies are controversial everywhere. Sustaining support requires the staring down of opposition which emerges around particular disruptions and disappointments.

Sustaining broadly based support for growth oriented policies requires acceptance that the benefits of all the disruption are being widely distributed. This is more easily maintained in the early stages of growth in a densely populated country, where opening up to international trade and investment raises labour incomes first and most, at first through expansion of employment and later through rising wages as labour becomes scarce and valuable. It is more difficult in an economy with initial comparative advantage in natural resource-based production, where much incomes growth takes the form of resource rents, the broad distribution of which makes special demands on strong, effective agents of the state working in the public interest.

The loss of confidence in distributional equity and disputes over income shares can truncate the growth process at any time. Such disputes cause some countries that have embarked upon rapid growth to be caught in a “middle income trap”.

But once modern economic growth is established with distributional outcomes that are widely seen as being reasonable, it delivers benefits and builds interests that help to sustain support for growth-oriented policies.

Other preconditions of sustained, rapid economic growth have revealed themselves through experience.

It requires high rates of investment. While foreign capital can help to get rapid growth going and can supplement domestic savings through the growth process, excessive dependence on overseas savings leaves a country vulnerable to instability with changes in international conditions or perceptions of the recipient country. So high domestic savings rates are important. Some societies at some points in time have higher propensities to save than others.

We now know that high savings are partly endogenous to growth, with people saving a high proportion of incremental income when income is rising strongly over a long period.

High and broadly based investment in education is especially important for modern economic growth. The requirements for education become more demanding in later stages, as productivity and incomes move towards the global frontiers.

Modern economic growth in its early stages involves the absorption of ideas and technologies from the international economy. Foreign trade, investment and educational and research exchanges are important vehicles for transmission of ideas and technologies. Direct foreign investment is especially powerful, although where it is highly restricted, as in Japan and Korea over long periods, the purchase of technology and international education can fill part of the void.

Conventional gains from trade can make immense contributions to early income gains, especially in densely populated countries with highly skewed relative resource endowments. Trade can remove what would otherwise be tight natural resource and capital constraints on incomes growth. The realisation of potential gains from trade is most complete under close approximation to free trade conditions, as in Hong Kong and Singapore and less completely in China after entry into the World Trade Organisation. The conditions of free trade can be imperfectly simulated by ensuring that there are similar incentives for export and import-competing production.

Sustained rapid economic growth requires acceptance of structural change. Established interests will resist such change. To the extent that they persuade governments to intervene in response to resistance, growth falls below its potential. Smooth and far-reaching structural change requires extensive use of markets in allocation of resources and exchange of goods and services. The demands made on effective markets increase as modern economic growth proceeds; weaknesses that are tolerated early in the growth process become major bottlenecks later on.

Sustained growth also requires reasonable standards of macro-economic management. Beyond some point, high inflation, external imbalances and fluctuations in economic activity damage short-term economic growth and can undermine support for growth-oriented policies for long periods.

The commitment to growth, the selection of appropriate growth-oriented policies, the gains from trade and the transfer of institutions and technologies from abroad are all assisted if other countries in a region are experiencing successful growth. The international transmission of the impetus to growth amongst neighbours assists newcomers to the process. This is now a support for modern economic growth in all of Asia.

For all but the developed countries, modern economic growth is a matter of catching up with the economic ideas, institutions, policies, technology and availability of capital per person of countries at the frontier of global productivity and incomes. It proceeds more rapidly the

greater the gap between the productivity levels and capital per worker of the most advanced and the rapidly growing countries.

The experience of declining growth rates as the global productivity frontiers are approached varies widely across countries. In the early Asian participants in modern economic growth, rapid growth continued without apparent abatement for a considerable period, then eased at some point well before the productivity levels of the advanced economies had been reached.

For Japan, the easing of growth occurred in two stages, each marked by macro-economic recession: one in the nineteen seventies when per capita productivity and incomes were around two thirds of the United States level; and one in the early nineteen nineties when per capita output was approaching ninety percent of the United States. The latter, in the context of severe macro-economic contraction, ended the catching up for the time being. Japan's average output per worker declined relative to the United States in the 1990s, and since then has settled in at a bit below 80 percent.

Korea and Taiwan began to slow at an earlier proportionate level of income but less sharply. Singapore kept growing at reasonably high rates after United States average incomes had been reached.

Labour market dynamics interact with economic growth in important ways. Here there is one important difference among Asian counties and one important similarity.

The difference arises out of different population density. Island and peninsula Northeast Asia and coastal China are exceptional in their high ratio of population to other economic resources at the beginning of modern economic growth. This generates the conditions for Lewis-style growth in a labour surplus economy, supporting mutually supporting rapid growth and capital accumulation with low real wages until the absorption of surplus labour begins to generate rapid increases in wages. From that point, growth depends heavily on successful investment in education and structural flexibility. These economies are especially suited to rapid catching up with the global frontiers.

The similarity, shared with people everywhere but present in Northeast Asia in exceptional degree, is that fertility drops sharply with rising incomes and the financial security, confidence in the survival of children and improved education of women that goes with it. Fertility falls below population replacement levels well before the frontiers of global incomes and productivity are in sight. The changes in fertility produce a "demographic dividend" for several decades after the commencement of modern economic growth. Lower fertility, however, eventually leads to large increases in the ratio of work-age to total population and to ageing of the population. The Northeast Asian countries with low fertility have so far resisted large-scale immigration, which has eased the "demographic tax" of advanced development in the United States, Canada and Australia in particular.

Japan is the most mature of the Asian economies, after a century and a half of participation of modern economic growth. It is worth more attention than it is given in the White Paper. It remains a large economy and Australia's second largest export market after two decades of

slow growth. And it tells us something about the eventual destination of the growth experience in other Asian and especially Northeast Asian economies.

Some observers see Japan's economic stagnation as a failure of the Japanese economy and polity. Many Japanese do not feel that their country is in crisis. Unemployment is low. Income is more equitably distributed than in the United States, although some Japanese are disturbed by increasing disparities. Health services are excellent by global standards and longevity incomparably high. Japanese enjoy high and subtle literacy and good education, and a rich cultural life. There is a high degree of private financial and personal security and incomparable public security — natural disasters aside.

To be sure, the ageing of the population slows national economic growth and reduces national strategic weight, and a more dynamic polity would remove some longstanding imperfections. But if Japan is the end point of modern economic growth, then modern economic growth is no bad thing.

And Japanese growth has not been quite as low as popular perception would have it. Since the turn of the century, output per worker has increased at about the same rate in Japan as in the (admittedly low) United States. Japan's real income per work-age person actually rose a little (7 percent) over the first 11 years of the century, a little more than United States income per work-age person (6 percent). The difference reflects the ageing of the Japanese population. The proportion of the population in the 15-64 years age group that is usually considered to cover the working ages fell from 68.2 percent in 2000 to 63.3 percent in 2011. The United States ratio of people aged 15 to 64 to total population remained fairly steady. The United States and Japanese economies performed similarly in output and income per work-age person.

Part of the low Japanese growth in the past two decades may be attributable to macro-economic adjustments and policy responses that are currently in the process of experimental adjustment. The outcome of current experiments will be important for our understanding of the past two decades of slow growth.

The different countries of Asia are at various stages in their commitment to modern economic growth, at different stages in the path towards the frontiers of world productivity and incomes, and possess the conditions for growth in varying degree.

We have learned that the structural conditions of Northeast Asian economies are especially conducive to rapid growth. The prudent speed limits of growth in other Asian economies are lower, as was revealed in the 1997-8 financial crisis in Southeast Asia and more recently with growing pains in India.

Myanmar is a recent addition to the Asian countries showing interest in modern economic growth. Pakistan and North Korea have not yet allocated high priority to economic growth.

The White Paper sees the United States as continuing to define the frontiers of global productivity. It sees Japanese average productivity remaining at a bit below 80 percent of

United States levels and Korea's as reaching a maximum at that level. It is not obvious why this presumption should prevail.

To be sure the United States has some important advantages for continuing economic growth: favourable demographic features supported by immigration; structural flexibility; a business culture that provides strong support for innovation; a high proportion of the world's best institutions for higher education and research. I would once have included an innovative financial sector in the list of advantages, but the Great Crash of 2008 has shown this to be at best ambiguous in its implications for long term growth.

The high quality of the best American institutions for higher education is no longer a special advantage of the United States: lower standards of American school education mean that competitive entry is claiming a high proportion of places at the best institutions for students from Asia, especially China and India. And the United States today carries some important disadvantages for broadly based economic growth, including the exclusion of people of lower socio-economic status from good education, and the political challenges of implementing sound policies in the national interest. Political challenges to the intellectual authority of science are reducing the advantages of the United States as a location for scientific innovation, especially in the biological sciences.

Japan, Korea and China are all seeking to deal with their own impediments to sustaining high growth at advanced stages of the growth process. It is wise to keep an open mind about which countries will contribute most to defining the frontiers of global productivity through the twenty first century.

The White Paper's story of Asian growth is brief, but it does enough to set the scene. The growth projections seem about right for the region as a whole. Differences from my own perspectives on the growth outlook for China, Japan and Korea are little more than quibbles.

The White Paper says little about Japan. Japan is Australia's second largest export market after China, and the second source of pressure on Australian terms of trade, and will remain so for the foreseeable future. More importantly, Japan was and is the pioneer in modern economic growth in Asia. Many of the structural pressures on the contemporary Japanese economy will be felt sooner rather than later elsewhere in Northeast Asia and elsewhere where modern economic growth has established deep and strong roots.

I would put the likely growth rates in China at a percentage point higher to 2025: a couple of percentage points lower than so far in the reform era from slower growth in labour supply, a touch smaller contribution from growth in the capital stock, a touch higher from total factor productivity growth. That brings the average down from about 10 percent 1978-2011 to about 8 percent for the next fourteen years. The convergence slowing is likely to come a few years after the 2025 end point for the White Paper's quantitative analysis.

The projections might be slightly underdone for the countries that have been on a slower trajectory of economic growth and fertility decline, including India, Indonesia, the Philippines and Thailand. More could have been said about some other large countries which may

contribute considerably to expansion of Asian output to 2025, notably Vietnam and Bangladesh.

The Paper doesn't say much at all about the large structural changes that are now taking place in Northeast Asia in particular: the demographic change that accompanies continuing low fertility; the reorientation of policy towards meeting domestic demand including consumer requirements; and the higher priority that is now being given to environmental amenity, local and global, and more generally to the accompaniments of secure and prosperous human civilisation.

The Paper correctly draws the most important implication for Australia from the structural change in Asia: the increase in importance of goods and services demanded in much larger volumes by a rapidly expanding "middle class" in the high-income emerging economies of Asia. Less is said about the other side of the coin to this structural change: the decline in the rate of expansion of opportunity for increased exports at high prices of the staples of the resources boom of the early twenty first century--iron ore, thermal coal and metallurgical coal.

The White Paper mentions a couple of risks to growth in the large Asian developing countries, including the impact of climate change, but doesn't say much about them. My list of risks includes increasing costs of adapting to the inevitable climate change which would accompany even successful global mitigation in pursuit of the international community's two degrees objective. It includes the possibility of irruptions of military activity. It includes policy paralysis as a result of political tensions over policies that are necessary to sustain growth.

We see manifestations of each of these risks now in Asia. The costs of adapting to climate change are already emerging but, if the mainstream science is broadly right, the consequences of substantial failure of global mitigation would be much greater later in the Asian century than in the period to 2025 that is the main focus of the White Paper.

I can see good reasons for the White Paper's generally moderate balance of judgements about all of the risks except climate change. The White Paper acknowledges the climate change risks clearly enough, including noting the likelihood of severe disruption if global temperatures increase by more than two degrees above pre-industrial levels. There should also be acknowledgement that there are risks before two degrees, and that it would take a major change in the global mitigation effort for a limit of two degrees of warming to be anything better than a possibility.

Growth, Structural Change and the Australian Terms of Trade

The Asian economies are more closely complementary to Australia in their resource endowments and patterns of trade than any other parts of the world economy. This is especially true of the Northeast Asian economies: elsewhere in Asia, there are larger endowments per person in resources for energy, metals and agricultural production. India has large iron ore and substantial coal resources and more agricultural land per capita than Northeast Asia. Southeast Asia has per capita resources of metallic minerals, energy (including

coal and natural gas as well as renewables) and agriculture that are much closer to world averages than are Northeast and South Asia.

Rapid growth in international purchasing power in complementary economies tends to increase a country's terms of trade.

It is therefore highly relevant that developing Asia's and especially developing Northeast Asia's international purchasing power has increased much more rapidly than the rest of the world's in the early twenty first century.

Over the first 11 years of the century, the real international value of output per person (current output converted into United States dollars and deflated by the United States Consumer Price Index) rose a little in the United States (plus 6 percent). In the major European States, real international value of output per person grew moderately (France 49 percent, Germany 46 percent, the United Kingdom 18 percent).

The decline in real international purchasing power in Japan in the first eleven years of the twentieth century (minus 6 percent) was a negative for Australia's terms of trade. However, it was swamped by changes in developing Northeast Asia.

The international value of output per person increased over the first 11 years of the century by 339 percent in China, 246 percent in Indonesia and 153 percent in India. The high-income developing countries of Asia fell into the range of the large European economies: Singapore 36 percent and Korea 51 percent.

The White Paper notes that the increase in Asian demand for resources has generated the highest terms of trade since comparable data has been available (140 years), and a real exchange rate 40 percent higher than the average of the first three decades of the floating currency—an average that includes the high levels of the past 7 years and the high as well as low years before that.

The White Paper notes that the terms of trade are not quite as high as they were and will ease further in the years ahead.

My own assessment is that the easing is likely to be considerably larger than is contemplated in the White Paper and more generally by the authorities, and may encompass periods when they fall to levels that are low by historical standards. Asian demand will continue to grow, although less strongly than in the early twenty first century. A bigger change is that high prices over the past decade have prompted a huge expansion of productive capacity. The White Paper tends to assume that announced proposals for investment will proceed and that installed capacity will produce at full capacity. In reality, a likely excess of announced capacity over demand will lead to postponement or abandonment of some investment in Australia and elsewhere, some closure of existing capacity, and prices at levels too low to cover investment costs while the market adjustments are being made. The reluctance of market participants to accept the losses involved in closure of capacity can even lead to periods in which prices barely cover recurrent costs.

For at least some commodities of importance to Australia, the market adjustment that lies ahead could generate periods of historically low prices despite the continuation of reasonably strong aggregate demand.

The level of Chinese economic growth has been the focus of Australian anxiety about export prices. This has been overdone: the Chinese economy has already executed the change in gear from around 10 percent to around 8 percent annual growth required by the demographic transition.

There is good reason for focussing on China. International purchasing power has grown much more rapidly in China so far this century, and the Chinese economy is far more complementary to the Australian than are Southeast or South Asian economies. The resources boom was overwhelmingly a China boom, with most of the global increase in resources demand coming from China before the Great Crash (2004-8), and almost all of it since. When the Chinese contribution to the resources boom eases, the boom itself will lose momentum: Southeast and South Asian economies will not grow as fast and are much less complementary to Australia.

Structural change in China is more important than the deceleration of growth to Australian terms of trade. Structural change is being driven by Chinese growth having reached the turning point of economic development, at which wages rise more rapidly than other incomes, the consumption share of expenditure rises and the investment share falls.

The changes being driven by economic forces are being reinforced by Government policy. Since 2011, policy has emphasised greater equity in income distribution including through increased provision of rural services, faster growth in domestic demand in general and household consumption in particular, greater efficiency in energy use, and lower greenhouse gas emissions and other environmental impacts.

It happens that the structural change has its most severe effect on the three commodities which have been at the centre of the Australian resources boom of the early twenty first century: especially thermal coal, but also iron ore and metallurgical coal. The White Paper correctly observes that some major Australian resource exports will benefit exceptionally from rising Asian prosperity, gold amongst them. (Gold is again among major Australian exports, but its likely price prospects are not easily divined: Asian demand will tend to lift prices, but an easing of international financial anxieties may push in the opposite direction). It is on solid ground in noting that rare earths, natural and unconventional gas and some other minerals in which Australia is well-endowed with resources will benefit from expansion of renewable energy and electrification of transport within an effective global climate change mitigation effort.

The White Paper could usefully have drawn a stronger distinction between minerals and energy resources that will be negatively affected by structural change in Asia in the period ahead, and those that will not, or which may benefit from the change. Uranium will benefit from Chinese and Indian expansion of low-emissions nuclear energy generation. Natural gas will for a time be the largest beneficiary of Asian intentions to change the relationship

between greenhouse gas emissions and economic growth. But efforts to reduce greenhouse gas emissions will have large negative effects on thermal coal exports from Australia.

Gas exports are so important that it is worth saying more about them. Australia and the United States have experienced a huge increase in gas reserves and resources in recent years through the application of new technology to extraction of material from shale and coal seams. In the United States, restrictions on exports have caused this to bring down the price of gas dramatically. In Australia, the emergence of an export industry on the east coast has had the opposite effect. There is debate about the export restrictions in the United States. The most likely outcome is substantial exports from the United States, but retention of restrictions to the extent that United States prices remain well below east Asian levels. There is febrile activity in China to utilise unconventional technologies to allow gas production from shale and coal deposits; it is likely that these will bear fruit, maybe in abundance.

It is possible that an easing of United States export restrictions together with an increase in export supply capacity in Australia and elsewhere and the application of the new technologies in Asia itself could bring Asian gas prices down a long way towards United States levels. Possible, but expansions in supply will be fighting with strong growth in Asian demand in the determination of prices. This all points to significant reductions in east Asian prices from current levels, but to well above current United States levels.

I drew attention in my Colin Clark lecture at the University of Queensland last September to the reality that parts of corporate Australia had dissipated shareholders' funds by underestimating the seriousness of Chinese commitments to reduce the emissions intensity of economic growth. There had been wasteful overinvestment in thermal coal mining and exporting capacity. Investment decisions had been based on the premise that the extraordinarily rapid growth in Chinese thermal coal use and imports of the immediately preceding years would continue—expectations that are reflected in the White Paper.

The awful reality has been recognised in write-downs of coal asset prices in the recent Australian corporate profit reporting period.

Recent data have confirmed the perspective that I presented last September.

Reductions in Chinese energy use per unit of output and reductions in the emissions intensity of Chinese electricity generation in 2012 have exceeded the ambitious targets of the twelfth five year plan 2011-15. Thermal power generation increased by only 0.6 percent in 2012 (Garnaut, 2013). The proportion of gas increased modestly from a low base at the expense of coal within that total. All low-emissions sources of power have grown rapidly, with hydro-electric, wind and nuclear in that order contributing the largest increases in volumes of power production. Coal-fired generation is producing more power per unit of coal: from 2007 to 2012, the replacement of small and inefficient by large and efficient plants increased output per unit of coal by 2.5 percent per annum (Mai, 2013). The continuation of the large for small replacement programme as currently defined will lead to further increases in electricity output

per unit of coal by 1.7 percent per annum over the next four years even if there is no increase in productivity of the large-scale plants from current levels.

The change in the trajectory of opportunity is not quite as fundamental for Australian steel-making raw materials. For iron ore, however, we have to take account of huge expansion of supply capacity around the world. The expansion has been led by established exporting countries, especially Australia but also Brazil. Some investment in Africa has been encouraged by misguided Australian restriction of Chinese direct investment in this country.

India had been the third largest supplier of iron ore to China after Australia and Brazil. However, restrictions on exports to retain ore for domestic steel-making has led to declines in Indian exports in recent years, followed by the virtual cessation of exports with the tightening of restrictions in late 2012. The Indian retreat from the export market has provided major support for iron ore prices in late 2012 and early 2013.

The optimists of the early twenty first century resources boom have been and are likely to be disappointed by volume and price. Of course, price and volume interact with each other: price will have to remain sufficiently low to discourage enough production to equilibrate supply with constrained demand.

The White Paper provides medium, high and low projections of export volumes out to 2025 for iron ore, thermal and coking coal, and liquefied natural gas (LNG), drawn from the Bureau of Resource and Energy Economics. The expectation is for large increases even in the low cases, and for much larger increases in the medium and high. Iron ore goes from around 400 million tonnes in 2010 to about 900-1080 mt in 2025; metallurgical coal from around 150 in 2010 to 250-300 in 2025; thermal coal from around 140 to 260-380; and LNG from 20 to 80-150.

With structural change in China, where will the growth in markets come from? The gas numbers involve the largest increases but do not seem out of the question. Gas demand will be enhanced up to 2025 by replacement of higher-emissions fuels, although how much of the increase is drawn from Australia depends on supply from domestic and other external markets.

The iron ore numbers seem to be drawn from an assumption that current expressions of hopes for Australian investment projects will be realised, and that once supply capacity is installed it will be utilised. Chinese demand growth, down from double digit numbers to a few percent per annum, will contribute only a modest proportion of the anticipated expansion in total demand. Import demand could increase more than total demand if high-cost domestic capacity closed disproportionately; this outcome may emerge, but requires exceptional incapacity of Chinese producers to reduce costs under competitive pressure, and unusual Chinese official acceptance of rapid decline of a major industry. (M□uch smaller proportionate contractions are being resisted in the Australian aluminium industry, for example in relation to proposed closures at Bell Bay and Gove). There will be some increases in iron ore exports to other Asian markets, but these will remain small compared with China.

Metallurgical coal export expansion depends on similar factors to iron ore.

The thermal coal projections are not likely at the lower end and implausible at the top. Chinese demand for thermal coal is likely to be negligible from now on, before entering a period of absolute decline. Indian demand growth will be stronger, but Australian exports will be subject eventually to increased competition from domestic and Indonesian suppliers.

The White Paper correctly draws attention to expanding markets for high value agricultural produce. Here the renewed emphasis on multilateral trade liberalisation is appropriate. Australian agriculture has been damaged by the proliferation of discriminatory arrangements for agricultural trade in Asia in the early twenty first century, after the breaching of the earlier Asian commitment to non-discriminatory multilateral trade. The White Paper appropriately supports open approaches to foreign investment in the sector.

There is a contradiction between the White Paper's projections to 2025 on thermal coal and agricultural exports, which raises doubts about whether increased agricultural prices would increase Australian terms of trade in the longer term.

Human-induced warming at the current level of less than one degree Celsius above pre-industrial levels has already been associated with reduction of rainfall in the main grain growing season April-October in southern Australia, with reduced proportions of rainfall contributing to stream flows in Australia's southern irrigation areas, and with higher proportions of precipitation arriving in events of high rainfall that are more difficult to capture for agriculture. The two degrees of warming that now seems the likely lower bound of temperature increases would greatly exacerbate these effects. While export markets in Asia for agricultural products are likely to expand strongly and prices to be well above historical levels on average, it is by no means certain that Australia will have the productive capacity to remain a substantial exporter of grain, dairy and other temperate products. The focus in the White Paper on expansion possibilities in the Northern Territory and Tasmania is a hedge against climate change in the southern mainland, but the extent of the possibilities is as yet poorly defined.

Australia could export more than 260 million tonnes of thermal coal in 2025 only in a world that had failed to reduce carbon emissions enough to avoid much higher levels of temperature increase. This suggests two contradictions in the White Paper.

One contradiction is between rapid expansion of thermal coal exports and hopes for Australia to increase agricultural exports to take advantage of growing Asian demand. While Asian demand growth is likely to be a major contributor to rising global food prices through the twenty first century, it is unlikely in a world of weak climate change mitigation that Australia would be a net exporter of agricultural products on a consistent basis. And to the extent that Australia is an importer of agricultural commodities, higher global prices represent a deterioration of Australian terms of trade.

The other contradiction is between rapid expansion of thermal coal exports and hopes of continuing high prosperity in Asia through the twenty first century. It is possible that geological or biological carbon sequestration technologies will eventually reconcile high levels of global

coal combustion with the avoidance of dangerous climate change, but unlikely that this will be practically relevant before 2025. The high levels of thermal coal exports anticipated in the White Paper would emerge only in a world of failure of global mitigation. That, in term, would be a world that was problematic for political and economic stability and for modern economic growth.

My overall assessment is that the White Paper's moderate declines in the terms of trade from current levels will be greatly exceeded from time to time, starting in the not-so-distant future, and will also prove to be optimistic on average.

Australian Macro-Economic Stability

The China resources boom has underpinned the most recent third of the longest episode of unbroken economic growth in the economic history of Australia, or in any country at least over recent decades. It followed the reform and productivity growth boom of the 1990s, and the housing and consumption boom of the early twenty first century. Since 2004, the China boom has given us prodigious increases in average incomes.

I am afraid it is building a difficult legacy. We are likely now to face major adjustments in incomes and living standards. If we do not manage the adjustments well, we will face a long period of economic stagnation and uncomfortably high unemployment.

The White Paper, following the official monetary fiscal and monetary authorities, has been complacent about the challenge of managing fluctuations in the terms of trade. It praises our success in macro-economic management during the boom. It fails to acknowledge that the hard part lies ahead of us.

Let me hasten to say that I endorse the White Paper's endorsement of the "three pillars" of contemporary macro-economic management: the floating exchange rate; the independent Reserve Bank of Australia; and the setting of fiscal policy to avoid increases in public debt on average over the business cycle.

I am uncomfortable about the assertion that the three pillars have avoided the problematic aftermath of previous resources booms: the wool boom of the early fifties; the global inflationary boom of the early seventies; and the energy price boom of the late 1970s and early 1980s. (The boom of the late eighties was different, deriving from domestic demand expansion—like the housing and consumption expansion of the first few years of this century which preceded the China boom).

We certainly avoided the high inflation that accompanied all of the earlier resources booms. The inflationary episode was brief in the early 1950s boom; fiscal tightening was the main instrument in bringing it quickly to heal, without lingering unemployment. By contrast, the inflationary aftermaths of the later resources booms were prolonged and debilitating. We can be glad of the contribution that the three pillars made to avoid having to go through that again.

Where the White Paper falls short is in the absence of recognition that we have not avoided other consequences of a large increase in the terms of trade.

The White Paper laments that in earlier booms, the increase in the terms of trade "was spread through the economy through a centralised wage system, leading to inflation and to a considerable loss of competitiveness in industries not linked to the boom" (White Paper, Box 3.5).

Yes for inflation. No for the avoidance of corrosion of competitiveness in those sectors not linked to the boom.

I included a section on managing the macro-economic consequences of fluctuations in the terms of trade in my 1989 report to the Prime Minister on relations with Northeast Asia:

> "...Australia would remain exceptionally vulnerable to changes in the terms of trade. If the associated variations in incomes were allowed to flow into domestic expenditure, they would inevitably cause fluctuations in the real exchange rate: high terms of trade would inevitably cause domestic inflation or a stronger exchange rate...We should...seek to absorb as much as possible of the domestic income effects of terms of trade variations in counter-cyclical variations in official foreign debt and foreign exchange reserves...Effective patterns of counter-cyclical management need to be developed gradually, with adjustment of the details of the approach in the light of experience" (Garnaut, 1989, pp219-9).

In the China boom, far from doing what we can to minimise the lift in the real exchange rate, we have embraced it. I am afraid that having sown the wind, we will reap the whirlwind.

We have to come down from a hump in domestic expenditure, incomes and costs that is extreme in every dimension.

We can get a feel for one dimension of the hump by adding Australia to the countries for which data was introduced on increases in real international purchasing power of incomes.

Australia looks nothing like other high-income countries: real international value of output per person increased by 113 percent in the first eleven years of the century. By 2011, international value of output per person in Australia stood one quarter above the United States, one third above Japan, and almost one half above the large Europeans. Only small countries with exceptional endowments had higher per capita international value of output per person than Australia: Luxembourg, Kuwait, Norway, Qatar, Switzerland and Macao.

The general story of divergence between developed country and both Asian developing country and Australian experience survives refocussing on national income (the preferred measure for comparative performance in the White Paper), rather than domestic product. The increase in Australian real international value of national income per person was a little lower, at 108 percent between 2000 and 2011. The fall in Japan's was smaller (minus 1 percent). The differences reflect incomes paid abroad from Australia and from abroad to Japan.

This high international value of output per person is reflected in similarly high incomes relative to other countries. The doubling of our average incomes relative to the United States through the early twenty first century—culminating in absolutely higher incomes—occurred through a period when total factor productivity growth fell behind the United States. Australian average international purchasing power of incomes one quarter higher than American average incomes sits uncomfortably alongside substantially lower average productivity.

These high Australian incomes relative to the rest of the world reduce competitiveness in all industries that are not experiencing exceptionally high prices. They are the cause of low investment and exports across most of the trade-exposed industries outside the resources sector.

The hump is revealed in another form in increases of traded prices for traded and non-traded goods and services. We can see this point in Box 3.6 of the White Paper. Imported capital goods and information technology prices have fallen and imported consumer goods prices have increased hardly at all over the past seventeen years. Total consumer goods and services prices, with their large non-traded components, have increased greatly.

None of this would matter if the high terms of trade and investment in the resource sector were here to stay. Unfortunately, they will be substantially modified, and possibly changed radically for a while. We will have to adjust to much lower incomes. We will have to adjust to rapidly rising rather than falling prices for tradeable goods and services. We will have to adjust to much lower relative costs.

The immediate agent of adjustment will be the exchange rate. A lower exchange rate will raise inflation as measured by the general indices and compress real incomes.

Downward adjustments on the scale that we will face sooner rather than later are immensely difficult. This is the unhappy other face of the resources boom.

Productivity Growth

Less downward adjustment in real Australian incomes will be required in the period ahead the higher the increase in productivity. If one were confident of a return to the high productivity growth of the 1990s, it may even be possible to make the required adjustments through a long period of steady real income without divisive and painful downward adjustments. May, because the reduction in the terms of trade and resources investment could turn out to be so large that reductions in many real incomes are still required. But even in the latter circumstances, a marked lift in living standards will reduce the adjustment that is required.

The White Paper sets challenging goals for productivity growth—much the most challenging that an Australian Government has ever set. Here I will focus on the central macro-economic goal: to raise per capita real incomes from $62,000 now to $73,000 by 2025. The Paper says that this would place us in the top 10 countries in output per person in purchasing parity terms.

To reach this goal even with the moderate decline in the terms of trade anticipated by the White Paper would require lifting Australian productivity growth to the rates of the 1990s—then at the top of a world in which productivity was growing strongly by the standards of the preceding and following decades. This would follow a dozen years in which total factor productivity has been virtually stagnant. It would require strong performance through an era of generally low productivity growth in the developed countries.

There are recent signs of recovery of productivity growth after the dismal outcomes of the new century's first decade. The foundations for the task ahead will be more secure if these turn out to be of continuing importance.

Increasing average real incomes by 17 or 18 percent over 13 years may not sound that much. After all, we have seen mean Australian real incomes rise by 108 percent from 2000 to 2011—through the tech-wreck recession in the United States and then the Great Crash of 2008 and its recessionary aftermath in the North Atlantic. What's the big deal?

The high incomes and expenditure after two contiguous booms of historic proportions, the housing and consumption and then the China resources boom, establish a high starting point for the proposed objective to increase real incomes per person by 18 percent.

The White Paper notes that Australia's terms of trade will fall somewhat by 2025 (and remember that I expect them to fall further than the paper anticipates) and that ageing will slow growth in economic output. It notes that this increases the challenge of meeting the target. That adds up to a strong headwind.

I would add to the headwind the early costs of adaptation to a growing reality of climate change, and the unavoidable costs of climate change mitigation.

Before we reject these goals as unattainable, let us consider what would be necessary to attain them, and whether their attainment would be worth the necessary disruption of temporary contemporary comforts. They are worth a serious national conversation. If we agree that their attainment would be worth the effort, we might be ready to sign on to that effort, and to invite Governments to put us to the test. We might be ready to hold governments to account for what they do not ask of us.

The White Paper gives us some big headings of productivity-raising reform. I have no quarrel with its suggestions so far as they go. The heavy emphasis on transport, communications, energy and other infrastructure is warranted by problems and opportunity. But the White Paper doesn't go far with prescription. Let's take it as our job to provide the content for a reform programme.

There are a few things close to the heart of Australian resource economics.

The Henry tax review made a good deal of the inefficiency of most established resource royalty regimes, and proposed replacing them by a profit-based resource rent tax. It was right to see this as an area in which substantial productivity gains could be made. These gains are going to

be especially important in the period ahead, when costs at the economic margins of production determine which plans for mines will proceed and which will be shelved; which established mines will work at full capacity and which will be run below capacity or closed.

The extension of the Petroleum Resource Rent Tax from offshore to all areas without addition of sales- or volume-based royalties puts the expanding LNG industry into a highly competitive position. On the other hand, the net effect of the 2011 changes in the rest of the mining sector, including the increase in royalties in the main mining states, was to increase costs on marginal output. This was mainly through the states raising royalty rates, ostensibly to pre-empt payments of Mineral Resource Rent Tax to the Commonwealth.

This could be important in determining how much Australian potential output becomes part of the global contraction of production to reconcile output with demand. For example in iron ore, some Australian mines have amongst the lowest costs in the world, while others are highly vulnerable at the low prices that prevailed in the second half of 2012. An efficient rent taxation system would not deter production at high cost mines that would be commercially attractive in the absence of royalties and other charges for utilisation of the resource.

In a weak spot, the White Paper asserts that “Australia’s Energy Sector is one of the most reliable and low cost suppliers in the world”. Once but not now for electricity, with rising transmission and distribution costs moving overall prices to users from the lowest to the highest ranks of the developed world between the early 2000s and 2012. Nor now for gas, with downward wholesale prices deriving from increased supplies in the United States and some other countries coinciding with upward price pressures from the establishment of a gas export industry in eastern Australia.

The higher gas prices reflect economic policy choices in line with standard economic analysis. The higher electricity prices reflect fundamental flaws in price regulation in privatised and corporatized monopolies.

The flaws in electricity price regulation have been a large and growing drag on national productivity over the past seven years. They are reflective of a general weakness in Australian sales of publicly owned infrastructure assets into the private sector: the failure to introduce efficient regulatory regimes prior to privatisation of publicly owned monopolies. Correction of flaws in regulatory regimes is difficult in the political and business culture that has developed in the early twenty first century, when benefits from flaws in established policies and regulatory regimes are treated as private assets.

There are similar problems across many areas of transport and other infrastructure. Productivity-raising reform of established regulatory regimes for private transport and other infrastructure will have important places in any serious effort to reach the productivity goals articulated in the White Paper.

Given the importance of road and rail infrastructure to national productivity—an importance appropriately emphasised in the White Paper—I should put one other big issue onto the reform agenda. It has become common for agencies evaluating transformational infrastructure

investments in Australia to apply discount rates derived from those thought to be relevant to investments in equity markets. Rates of around 8 percent in real terms are often applied, when the real costs of borrowing to the Commonwealth are closer to zero than to the long-term average of about 2.1 percent. We need a serious discussion on the appropriate discount rate to apply to Government investment in transformational infrastructure. Where there are large advantages in private management of infrastructure assets, we need to find mechanisms for allowing at least part of the investments managed by private entities to be funded off the public balance sheet.

The largest productivity problems and opportunities for improvement are now in the supply of non-traded goods and services. Reform in the most important of these areas requires close cooperation between Commonwealth and State Governments—transport infrastructure; electricity; education; health. Regrettably, reform of Commonwealth-State fiscal relations is a pre-condition for good outcomes in most of these areas. Commonwealth-State financial relations have so far resisted to productivity-raising reform. We simply have to find a way to do better if anything like the White Paper's ambitions on productivity growth are to be achieved.

Education

The White Paper rightly places high priority on the quality of Australian education in preparation for making the most of the Asian Century. It sets two astoundingly ambitious targets: by 2015 we should have one of the world's top 5 school systems in reading, mathematics and science; and 10 of the world's top one hundred universities.

Nowhere is the aspiration of the White Paper more important than in relation to education, and nowhere does the aspiration jar more heavily with contemporary reality.

The setting of these objectives for school education is an example of the positive demonstration effect of our being located in the Asian region. If our comparators were the large old economies of the North Atlantic, we might feel comfortable about the standards of our schools. The United States, for example, is the only country amongst the OECD's members plus 29 partners in which education levels are lower amongst 55-64 year olds than 25-34 year olds.

On reading, we rank 9th amongst the OECD's members plus 29 partner economies (OECD, 2012). Neither the United States nor any of the major European economies sit above us. But Shanghai (the Chinese member of the group), Korea, Hong Kong, Singapore and Japan all do.

In mathematics, we sit equal 15th with Germany and Estonia, and way behind the top 5, which are all East Asian.

In science we are 10th, again with big gaps to the top 5, amongst which Finland alone is not East Asian (all data from OECD 2012). The gap between the top performers and Australia has been increasing in recent years. To reverse that tendency and to enter the top 5 in the three specified areas would require fundamental change. The changes would involve much more

than increases in resources (where the needs are in the poorer schools). Such change may look impossible.

At least the White Paper is making the right comparisons. Let us at assess what would be required to reach the White Paper's objective. I, for one, would like us to take up the challenge.

For the Universities, the objective raises more questions. The tops of the established rankings are dominated by United States and British Universities in both of the best known lists. Nine Asian and six Australian Universities make it into the Times top 100; four Asian and five Australian into Shanghai Jiatong. This rate of exclusion of leading Asian universities is unlikely to last long. Chinese, Indian and other Asian Universities with some of the most brilliant student enrolments in the world universities don't make it yet to either list. How long will Delhi, Fudan and Nanjing remain outside?

It takes a long time for a university to make a world mark, and rankings are strongly influenced by financial resources which come with higher incomes. More top Chinese, Indian and Southeast Asian universities will be pushing into higher world rankings in the decades ahead. I would think it a highly satisfactory outcome if Australian universities held their current numbers in the top 100, and a couple of them pushed higher in the lists.

Whatever our goals, the quality of our universities will depend critically on their attractiveness to top students from Asia and on intense interaction in research with the best Asian universities.

Linking to Asian Opportunity

The White Paper says that the growth of Asia replaces the tyranny of distance by the power of proximity. Blainey has pointed out that many major cities in Europe are closer than Sydney and Melbourne to Beijing (Blainey 2012).

That is true, but this truth does not remove the content from the White Paper's statement.

Many parts of Australia are closer than Sydney and Melbourne to Asia. Many parts of Asia are closer than Beijing to Australia. Besides, time zones matter for business and the services trade. Proximity has been a major factor in the commodities trade.

In addition, relative as well as absolute distance matters for the intensity of trade, and Australia is relatively close to Asia (Armstrong, 2013).

Proximity matters, and it is important that Australia reduces the economic distance from Asia as much as possible.

We could make ourselves economically closer by unilaterally removing remaining tariffs and other restrictions on trade on a non-discriminatory asks. This would have resource allocation as well as proximity advantages. It would allow us to participate more intimately in the fine specialization in parts of a production process that has contributed the most rapidly growing elements of Asian trade over the past two decades.

Inefficient international telecommunications and civil aviation infrastructure needlessly increase economic distance. These too provide Australian cases of privatisation of public infrastructure assets without appropriate regulation of monopolies leading to increased costs--in this case increased costs and inconvenience of international human interaction. Compare the speed and ease of moving from a flight landing in Singapore into a city office or hotel with the equivalent experience in Sydney or Melbourne!

Unnecessary economic as well as natural distance affect Australia's capacity to utilise opportunities in the Asian century. This argues for reform of regulatory arrangements affecting the quality and cost of international movement of people, goods and services occupying a central place in Australian efforts to build a prosperous place in the Asian century.

The White Paper has its own big and important agenda of means of reducing cultural difference. The exposure to knowledge of Asia including and in addition to language at school and university is important to building the confident familiarity which will allow individual Australians to make the most of their Asian opportunity.

The White Paper reminded us of the importance of the intense interaction with Asia that has come from our large non-discriminatory immigration programme and the presence of so many international students in our education institutions.

The economic success of China in particular and Asia in general and the Australian community's links into that success have supported our distinctive economic performance in the early twenty first century and especially since the Great Crash of 2008. Our incomes have risen exceptionally when incomes have stagnated elsewhere in the developed world.

The deep interaction with Asia has also exposed us to shocks as the structure of Asian economies change as modern economic growth propels them towards the global frontiers of productivity and incomes. In the immediate future, that leaves us with a big adjustment problem, as structural change in China takes away some of the increase in the terms of trade that earlier patterns of growth had delivered to us.

It is our proximity to Asia in ideas and attitude to change as well as opportunities for trade that leads us into the audacious thought that we might preserve a considerable part of the recent increase in incomes through re-committing our country to productivity-raising reform. That is what the White Paper invites Australians to do.

Acceptance of the invitation Requires us to throw off the Great Australian complacency of the early twenty first century.

Once we have thought about the alternative, the recommitment to reform will seem the more attractive.