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ARE RESOURCE-ABUNDANT ECONOMIES DISADVANTAGED?

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Kym Anderson

At last year's Annual General Meeting of the Society, members approved changes to our Constitution that confirmed their desire to embrace not just agricultural but all primary production as well as resource and environmental issues. I therefore felt that the first Presidential Address following those changes should respect that broadened interest, however imperfectly. In doing so I have chosen to reflect on two recent developments, and to consider their implications for Australia and its primary producers. One stems from the renewed interest in national economic performance (as reflected, for example, in demands for reduced government intervention in markets), which has stimulated economists to seek better explanations of why economic growth rates differ between nations. That research has, among other things, raised again the question of why economies well endowed with natural resources relative to labour and other capital, including Australia, have performed relatively poorly over the long term. The other development -- which may seem at odds with the first -- is the burgeoning interest globally in environmental issues (broadly define the environment to include safer food, air and water and freedom from exotic pests and diseases) and the accompanied calls for *more* government intervention.

It takes only a moment's reflection to realize that these two developments are not inconsistent: reducing governmental distortions to markets boosts national income, and income growth boosts the demand for all normal goods and services, including a clean environment. If a cleaner environment is not only a normal good but a superior one (in the sense that its income elasticity of demand exceeds unity), all the more reason to expect income growth to generate greener politics. And if reducing government-induced wastage improves the efficiency of resource use, that too is consistent with more environmental consciousness. But there is a real risk that heavy

handed or otherwise inappropriate environmental policy responses could undermine the gains from other economic reforms -- and even be environmentally counter-productive. As a profession interested in the efficient use and conserving of resources, we have a role to play in minimizing that risk.

Important aspects of both developments -- the demand for better economic performance particularly through reducing government activities and regulations, and the demand for government intervention to better protect the environment -- have been their international dimensions. In the first case, economic rationalism has contributed to large-scale liberalizations of trade in goods, services, financial capital and technologies in many parts of the world during the past decade or so; and in the second case, we have heard calls for international environmental agreements and for guarantees that international trade and investment liberalizations do not harm the environment. Since those international dimensions are likely to continue to grow in importance, they are a particular focus of attention in what follows.

In what follows I first reflect on why economies well endowed with natural resources relative to labour and other capital (hereafter 'resource-abundant' or 'resource-rich' economies) have grown slower than resource poor ones over recent decades and whether that is changing. Then I look at how the greening of politics that accompanies income growth is altering policies and thereby affecting future prospects for resource-rich economies such as Australia's.

Why have resource-rich economies grown relatively slowly?

The world's fastest growing economies in recent decades -- Japan, Hong Kong, Singapore, Taiwan, South Korea, and more recently China -- are all poorly endowed with natural resources relative to people. In particular, they have very little agricultural land per capita. By contrast, among the slowest-growing of the more-advanced economies this century have been land-abundant Argentina, Australia and New Zealand, not to mention the slower-growing land-abundant economies of Latin America and Sub-Saharan Africa. More generally, statistically very significant

negative relationships have been found between GDP growth rates and indexes of comparative advantage in natural resource-based products. Sachs and Warner (1995b), for example, explore regression relationships between GDP growth from 1970 to 1989 and the ratio of resource-based exports to GDP in 1970 for a sample of 97 developing countries, and find the latter to be a significant explanator whatever other exogenous variables are included in the regressions. Anderson (1995) explored a slightly longer period with both wealthy and developing countries, using as a comparative advantage index an estimate of food self-sufficiency ratios in the early 1980s at free-trade prices. That too was highly negatively correlated with GDP growth since 1970. And Gelb (1988) and Auty (1990) note the poor performance of many oil-rich developing countries since 1973.

One possible explanation for this negative relationship is that easy riches lead to sloth. The sixteenth century French political philosopher, Jean Bodin (1576, reprinted 1962), asserted that:

"Men of a fat and fertile soil are most commonly effeminate and cowards; whereas contrariwise a barren country makes men temperate by necessity, and by consequence careful, vigilant, and industrious."

I'm not sure how he perceived the impact on *women's* efforts, but in any case I suspect differences in inherent slothfulness *per se* (as distinct from inactivity induced by government policies that dampen incentives) are likely at most to be a minor explanator of growth rate differences -- although I'm not sure how one tests that empirically.

Another often-claimed and related explanation for growth rate differences is cultural determinism. A journalist from the London newspaper *The Times*, who was travelling abroad in the mid-nineteenth century, reported that the country he was in was inhabited by a homogeneous race of lazy people whom he believed were incapable of ever being industrious. He was referring to Japan just prior to the Meiji Restoration. That example, and the fact that it was Europe and not Asia that enjoyed the first few

centuries of industrial growth (Jones 1981), make nonsense the opposite claim that rapid economic growth is peculiar to Asian or Confucian cultures.

The other common explanations, about which I'd like to say a bit more, are more narrowly in the economic or political economy realms. One, popularized by Prebisch (1964) and contrary to the fear of Malthusians and other doomsdayers, is that resource-abundant economies face continual declines in their terms of trade. Another is the assertion that there are more growth-inducing factors associated with manufacturing industries than primary production. And a third is that the exports of resource-abundant countries face larger protectionist barriers than do exporters of non-primary products. Let me say something about each of these and then add a fourth.

Deteriorating terms of trade

The price of primary products relative to manufactures in international markets appears to have been on a long-run decline for a century or more (Grilli and Yang 1988). Even when more-sophisticated adjustments are made to the data to take into account improvements in the quality of manufactures, as Lipsey (1994) did recently, that trend is not reversed. What explains that downward trend?

The most commonly suggested explanation is that the demand for primary products, particularly food at the farm-gate level, is income inelastic. The logic is captured in Figure 1. Consider a frictionless world with just two goods A and B (primary and non-primary products), and suppose for a moment productivity growth were equally rapid in the two sectors. Then the supply curves would shift out at the same rate. In Figure 1 the supply curves in the first period are assumed to coincide, hence they would still coincide in the second period after the productivity growth but be further to the right. The income boost resulting from that productivity growth would shift out the demand curve for each good, but by less for good A (primary products) whose demand is less income elastic. In the illustrated example, the price of A relative to B would fall from 1 to $(85/115 =) 0.77$ -- clearly a deterioration in the terms of trade for primary exporting countries. For that not to happen the slower growth in global demand for primary products would need to be matched by slower growth in their global supply --

but then economies with relatively large primary sectors still would be growing slower, in that case because of slower output growth.

An additional reason to find the relative price of primary products declining could be relatively faster growth in their supply, for example because of faster productivity growth in primary sectors. In that case the lower price elasticity of demand for primary products would contribute too. As Figure 1 illustrates, if the primary products supply curve shifted from S_{A0} to not S_{A1} but S_{A1}' , then the relative price of primary products would have fallen from 1 to not 0.77 but $(65/115 \approx) 0.57$.

However, many people reject *on* of hand the possibility of faster productivity growth in primary production. After all, they say, why would labour be drifting from primary to secondary and tertiary sectors if the former was experiencing faster productivity growth? That ignores the distinction between total and labour productivity growth, however. It happens that agricultural technologies have proven to be very maleable, becoming more labour saving as the relative price of labour rises (Hayami and Ruttan 1985). So substituting land, other forms of capital, and other inputs for labour could be a sufficient explanation for the decline in agriculture's share of employment, leaving unanswered the question of which sector has the faster total factor productivity growth.

Two recent empirical studies examine sectoral productivity growth rates for a large number of industrial countries over the 1970s and 1980s (OECD 1995, Bernard and Jones 1996). Both find a much higher rate of TFP growth for agriculture than for other sectors. Bernard and Jones report an average TFP growth rate of 2.6 per cent for agriculture compared with 1.2 per cent for industry, with only one of their sample OECD countries having TFP growth higher for industry than agriculture. An even more recent study, by Martin and Mitra (1996), examined new data for a much larger and more diverse sample of countries (close to 50, two-thirds of them developing) for the quarter century from 1967 to 1992. They too found agriculture's TFP growth rate around twice that for manufacturing, with the difference being larger for developing countries but minor for OECD countries. And nor has TFP growth in mining and

mineral processing been slow (see, e.g., the Invited Paper at this conference by Tilton)

An important contributor to rapid productivity growth is the speed with which new technologies can be imported, adapted and adopted. The international dissemination process may be even faster in primary production than in manufacturing. In mining this is because multinational corporations are typically needed to successfully develop large scale mines, and they bring with them the latest appropriate technology or sometimes develop it on site (witness the innovative, capital-intensive operations of some of the multinational activities in Papua New Guinea, for example). In agriculture it happens because of agroecological similarities. A recent study by Byerlee and Traxler (1996) found that international spillovers from agricultural research are pervasive, and considerably greater than previously perceived

Even if evidence on relatively rapid productivity growth in primary sectors is accepted, many people still reject the idea that primary production can contribute sustainably to long-run economic growth for another reason, namely, the finiteness of the natural resource base on which that production depends. There is only so much land that can be farmed or forested, or water that can be fished, or fuels and minerals that can be mined. Thus in terms of Figure 1, proponents of this view would say that in the long run, even if productivity growth was faster in the primary sector, the rightward shift of S_{A0} would eventually lag that of S_{B0} .

But the evidence casts doubt on the validity of this view as well. Technological developments continue to drive down the relative economic importance of natural resources in primary production. Farm chemicals -- much maligned by some conservationists -- raise crop yields and thereby reduce the number of arable acres needed to produce a tonne of grain. Intensive broiler, egg, and pig sheds and cattle feedlots -- criticised by animal liberationists -- reduce enormously the amount of land that would otherwise have to be trampled by cattle and sheep rather than cropped if all our meat supplies had to be grass-fed. Huge technological strides are also now being made that are changing fishing from a crude hunter-and-gatherer activity to high-tech

deep-sea operations and fish farming (aquaculture). Dripper and other new irrigation techniques and more-sensible pricing policies are making ever-more efficient use of water in agriculture too. And the technologies for mineral exploration, exploitation and processing continue to become more capital intensive also. Beckerman (1992) notes, for example, that world sales of many minerals during the past 25 years exceeded known commercially recoverable reserves around 1970, yet today's 'known reserves' exceed those of 25 years ago, despite the fact that the real price of minerals has trended downwards¹.

In short, primary production no less than and possibly even more than manufacturing and services is becoming ever-more intensive in the use of capital and intermediate inputs. This relative decline in the importance of land, water and mineral resources in primary production is likely to continue to erode the validity of the assertion that supply curve shifts cannot contribute to the explanation for the decline in the terms of trade for economies exporting natural resource-based products. What remains to be determined empirically is the extent to which the decline in the real price of primary products in international markets is due to the relatively slow growth in their demand versus the relative speed of the outward shift in their supply curve.

If the declining terms of trade for resource-abundant countries *are* due predominantly to rapid supply growth in primary sectors, then there is the further empirical question as to whether the consequent output growth more or less than offsets the drop in the relative price of primary products in its impact on real income growth in resource-rich versus resource-poor economies. Even if output growth does not fully compensate for the price decline, to what extent does the latter explain the lack-lustre growth performance of resource-rich economies? My hunch is that it would explain at most only a small part, but that is an empirical question still waiting to be answered.

More growth-inducing externalities in industry?

Let me turn now to the assertion, beginning with Adam Smith and David Ricardo, that there are more growth-inducing externalities associated with manufacturing industries

than primary production. Marshall (1890), for example, suggested this was because manufacturing was subject to increasing returns whereas primary production faced decreasing returns. Hirschman (1958) stressed the greater contribution of manufacturing via linkages. This idea was rejuvenated recently by Matsuyama (1992) using a two-sector model in which manufacturing is characterized by learning-by-doing that is external to the firm but internal to the sector, an idea extended by Sachs and Warner (1995b) for a 'Dutch disease' model with a third sector producing nontradable services. But these are simply theoretical possibilities yet to be convincingly demonstrated empirically, and in any case the Sachs and Warner point begs the question of why services might not have learning-by-doing properties similar to manufacturing. If the latter were the case, a contraction of manufacturing following a primary sector boom need not be growth-reducing as in the Matsuyama/Sachs and Warner models, given that that boom would also boost the demand for and hence production of nontradables in addition to primary products.

Ever-higher protectionist barriers facing primary exports?

What of the third assertion, that natural resource-abundant countries grow less rapidly because their exporters face ever-higher protectionist barriers than do exporters of non-primary products? If this were a true description of the pattern of distortions to world trade, it would simply be a contributor to the deteriorating terms of trade mentioned above rather than a separate factor. But is it a true description of that distortion pattern? Certainly agricultural and coal protectionism in Western Europe and Northeast Asia has been rising for decades, which gives Australians and New Zealanders the feeling that their growth opportunities are thwarted. But resource-poor, newly industrializing developing countries also feel thwarted by OECD countries' restrictions to trade in such items as textiles, clothing, low-priced cars and steel; and services trade in which many resource-poor richer economies have a comparative advantage also is still highly protected.

Would the removal of all policy induced barriers to goods and services trade and investment globally make it easier or harder for resource-abundant economies to keep pace with other economies? The agricultural and coal protectionism mentioned above,

for example, certainly lowers international prices for these products. But the policies of many developing countries depress their domestic prices and exports of these same primary products, keeping their international prices *higher* than they otherwise would be. And OPEC, too, has indirectly supported international coal prices.

In the case of food products, empirical analysis by Tyers and Anderson (1992, Table 6.9) suggests the food policies of rich countries on international food prices have been offset almost exactly by the opposite policies of poorer countries. And preliminary empirical results suggest much the same could be true for coal (Anderson and McKibbin 1997). Whether this would generalize if distortions to all product markets were removed simultaneously is an empirical question that global CGE models could in principle, but to my knowledge have not, addressed. However, the above examples suggest this is unlikely to be a major explainer of the relatively poor performance of resource-rich economies. Nor are the trade policy reforms that are in prospect, following the Uruguay Round and APEC free trade by 2010/2020 initiatives, especially likely to favour resource-rich countries. This is particularly so if the promised MFA reforms affecting textiles and clothing trade are only partly implemented, as seems likely. The reason slow MFA reform matters is that it slows the structural adjustment of resource-poor developing economies such as China's away from primary production, which in turn slows the growth in their demand for primary imports from resource-rich economies (Anderson et al. 1997).

Above-average distortions at home?

A fourth possible explanation for the slow growth of resource-rich economies is that they have been more distorted than other economies. This hypothesis is suggested not just by the new growth theories but by virtually all the empirical evidence which shows that economies that are less open to trade, investment and technology inflows grow slower, and conversely that those economies that reform most in multilateral trade liberalizations gain the most.

It is true that resource-abundant countries protect their manufacturers more than other countries at similar stages of development. Australia and New Zealand are classic

examples, not to mention low-income countries of Africa and Latin America which tend also to limit imports of foreign direct investment and discourage, through poorly enforced intellectual property rights, the importation of new technologies.

One might counter by pointing out that land-scarce economies such as in Western Europe and Northeast Asia also are highly protectionist, albeit of their farmers and coal miners rather than their manufacturers? There is a difference between the protectionist stances of that group of countries and at least the rich resource-abundant countries though: the former are protecting a very small and declining portion of the tradables part of their economies, whereas Australia and New Zealand have been protecting the bulk of tradables production, namely manufacturing, and so have harmed their economies more. And resource-abundant developing countries that have heavily discriminate against their primary sectors with industrial protection and overvalued exchange rates certainly harmed the vast bulk of their tradables sectors too.¹ Thus to this economist at least, it seems likely that it is their own distortionary policies that are the major reason resource-rich economies have grown relatively slowly.

If this is true, then the fact that Australia and New Zealand along with many other (particularly South American) resource-rich developing countries are at last liberalizing and opening their economies bodes well for their futures. Whether they liberalize sufficiently rapidly to match the growth rates of the rest of the world's economies, however, is a moot point and only time will tell. One encouraging bit of information is the growth record of the past decade which shows Australia and New Zealand to be doing much better than the OECD average. That piece of casual empirical evidence is at least not inconsistent with the hypothesis that past distortionary domestic policies rather than such things as the terms of trade or the nature of production are to blame for slow growth in resource-rich economies.

¹ Furthermore, the political economy is such that if the governments of these countries are inclined to favour the non-primary sectors with respect to price and trade policies, they are also likely to underinvest in such things as public agricultural research.

How will environmental concerns alter growth prospects for resource-rich economies?

With economic growth comes increasing demands for all normal goods and services, including a cleaner environment (broadly defined to include safer food and freedom from exotic pests and diseases). Governments are thus asked to impose tougher environmental standards as incomes rise.

When this is done, each industry's producers often think they are losing competitiveness because of more stringent standards they must meet over time. However, this is true only relative to a situation that excluded them *but only them* from those tougher regulations. Typically, cost-raising standards will be rising in numerous industries simultaneously, both at home and abroad, so it is not inconceivable that an industry's international competitiveness could improve even though its costs are rising due to tougher regulations.

If these environmental regulations optimally overcome environmental externalities (an important assumption to which I return below), they can be thought of as just another determinant of comparative advantage. In that case, rapidly growing economies might be expected to lose comparative advantage to slower-growing economies in those industries producing tradables whose production costs rise most because of tougher environmental standards/regulations, other things equal.

Environmental standards are not likely to rise at the same rate even in equally rapidly growing economies though. Rather, the severity of environmental regulations tends to be positively correlated with population density, with the degree of urbanization, and (possibly increasingly for middle-income economies but then decreasingly) with the level of per capita income.² For example, mining on the edge of a city or popular resort area is likely to be subject to stricter regulations than mining in remote, unpopulated areas; and farm chemicals are likely to be subject to stricter environmental taxes in settings where farms are close to urban areas or where

² For empirical verification of the fact of these correlations especially, see Grossman and Krueger (1995) and the references therein.

chemicals are used exceptionally heavily. This might lead us to expect resource-rich economies on average to have relatively lower environmental standards, and to have to raise fewer of those standards or raise them less as incomes grow, than resource-poor, densely populated economies with the same per capita income and growth rate.

Furthermore, lightly populated resource-rich economies such as Australia are highly urbanised with a large nontradables sector, for the reasons we have become familiar with from booming sector theory (Gregory 1974, Corden 1984). Their concentration of non-primary activities in just a few large cities means their stricter environmental standards are likely to apply more to the urban-based industrial sector than to more-remotely located primary production.

One might be tempted to conclude from these quick thoughts that the greening of world politics will tend if anything to strengthen the income-earning opportunities of resource-rich economies and particularly their primary sectors. However, an important assumption has been made above. It is that the environmental policies being progressively introduced are optimal, that is, in the sense of equating at the margin social rather than private benefits and costs of each activity. Yet we know from experience that environmental policies are typically far from optimal. Sometimes (always, green groups would claim) governments delay or neglect to respond adequately to community pressures to raise standards. And often when they do respond, excessive and/or blunt policy instruments are used whose economic cost far outweighs any reasonable valuation of the environmental benefits. Explaining these policy choices in terms of the economics or politics is an area ripe for research but beyond the scope of this paper.¹ But to begin to illustrate the complexity of evaluating how the greening of politics will affect resource-abundant and other economies, it is helpful to examine some of the issues involved. For the sake of brevity, attention is confined to just three. They are the greening of protectionism, harmonization to international standards, and quarantine issues.

The greening of politics and protectionism

¹ Early political economy studies that focus on what impact the greening of politics would do to trade policies can be found in Anderson and Blackhurst (1992, Chs. 10 and 11).

An important consequence of declines in traditional barriers to international trade and investment (transport and communication costs, trade and FDI policies) is that domestic assistance policies are replacing assistance previously provided via border measures. And with environmentalism being politically correct, assistance in green garb has a reasonable chance of not being challenged. Hence it is not surprising that there are already European Union Council Regulations (e.g., No. 2078/92) allowing certain environmental subsidies to agriculture, including subsidies to reduce the use of fertiliser and plant health products, to promote environmentally-sound production methods, to encourage extensive agricultural techniques, to maintain practices that are already compatible with the environment, and to assist organic farming. These 'Green Box' measures are likely to become more substantial over time, substituting somewhat for traditional protectionism. Hence monitoring their rise may be just as important as monitoring the promised declines in border protection.

Another consequence of international economic integration is that interest groups are beginning to focus on other causes of comparative cost differences, including domestic environmental and technical product or production process standards at home compared with abroad. The motivation comes not just from a desire to reduce administrative and conformance costs of meeting agreed international standards, and to counter the greater risk of exotic pests and diseases being spread. It also results in the absence of harmonized standards from concerns in high-standard countries that costs of production for some of their industries are higher than in countries with lower standards, causing them to be less competitive.

This generates two sets of pressures in high-standard countries. At the domestic level, disadvantaged industries seek a lowering of standards and/or protection from imports from low-standard countries. The promoters of high standards tend to support the call for import protection, since that can both reduce the opposition by local firms to higher standards at home *and* increase the incentive for foreign firms and their governments to adopt higher standards abroad. However, because such uses of trade policy are both discriminatory and protectionist, they contravene GATT rules and thereby erode the global trading system. Fortunately the first case of this type to come

before a GATT dispute settlement panel (the infamous US-Mexico tuna/dolphin case)⁴ ruled against the use of import restrictions, but other cases are bound to arise. Countries like Australia with a vested interest in maintaining a strong rules-based multilateral trading system need to both argue against this abuse of trade policy abroad and not sin at home (see the quarantine section below).

International harmonization of standards

The other set of persuasive pressures generated by high-standard countries is at the international level, namely for the establishment or raising of minimum international environmental standards. For the reasons mentioned above, what may seem desirable standards by one country may be seen as excessive by others, particularly countries relatively abundant in natural resources. Hence the latter have a strong interest in ensuring the former do not impose unreasonably high standards.

To help calm this process, the Uruguay Round produced an Agreement on the Application of Sanitary and Phytosanitary Measures to protect human, animal or plant life or health. Members have a right to take such measures, provided they are not inconsistent with the agreement which includes not being unduly trade-restrictive. The SPS Agreement adopted already agreed international standards (the Codex Alimentarius Commission for food safety, the International Office of Epizootics for animal health, and the International Plant Protection Convention for plant health -- see the Nairn Report 1996, Appendix C for details). It establishes clear and detailed rights and obligations for environmental health and food safety issues, as well as measures to prevent the spread of pests or diseases among animals and plants. It outlines procedure for product inspection, treatment and processing, risk assessment and

⁴ When animal welfare groups succeeded in getting US legislation to ban the use by American fishermen of dolphin-unfriendly nets to catch tuna in the Northeast Pacific, Mexican tuna imports expanded rapidly so those groups sought, successfully, to get a ban on tuna imports as well. The import ban was an extraordinarily heavy handed action, particularly since only a subset of US consumers care greatly about how tuna are caught. Once the GATT ruled that the import ban infringed on Mexico's legal trade rights, alternative solutions were sought. Eventually the import ban was dropped and "dolphin-friendly" labelling of cans was introduced. US Consumers could then choose whether to pay extra for cans so labelled, and Mexican fishing fleets could choose whether to incur the extra costs of production and compliance in order to sell certified cans at the higher price. Had the GATT dispute settlement process ruled otherwise it would have opened up the possibility of a flood of uses of trade impediments to unilaterally impose the standards of one nation (or more usually of one group within a nation) on other nations. Inevitably this would lead to an escalation of trade disputes.

allowable maximum levels of pesticide residues and certain food additives. WTO members may establish measures which result in a higher levels of protection than the relevant international standards only with appropriate scientific justification. This allows governments to challenge, via the WTO's Dispute Settlement Body, another country's food safety requirements based on evidence showing the measure is not justified. Canada, for instance is currently challenging Australia's justification for sanitary measures banning salmon imports. Another important case that is currently before the WTO has to do with the European Union banning the import of beef produced with the use of growth hormones. The EU claims the ban applies to domestic producers and so does not contravene the national treatment provision of the GATT, whereas the US argues that the hormones are not harmful to humans and hence the EU standard is excessive and labelling should be sufficient protection for consumers. For the first time the WTO will be calling on scientific experts (including an Australian) to help resolve this case.

Quarantine issues

To conclude, let me turn to the issue of quarantine, which is currently under the spotlight in Australia with the recent release of the Nairn Report (1996). Under previous GATT agreements, a country's import restrictions to protect human, health and plant life were difficult to challenge. The new rules under the SPS Agreement require a country's sanitary and phytosanitary measures to be based on "scientific principles and not maintained without sufficient scientific evidence". This is likely to help those agricultural exporters who have been facing unduly restrictive barriers in potential export markets abroad, while reducing returns to those producers who have enjoyed protection from import bans on quarantine grounds that cannot be scientifically justified. In the latter cases, removal of unjustified import barriers would boost domestic consumer welfare by more than it would harm domestic producer welfare, as well as boost producer welfare abroad of course (the usual gains from trade liberalization). From Australia's perspective, getting rid of our own excessive quarantine restrictions would also make it easier for us to argue with other governments and in international fora for similar reforms abroad. With environmental

groups becoming increasingly active in pushing for more and more such restrictions, now is the time to take a hard look at this issue.

I was not surprised but was nonetheless a little disappointed that the Nairn Report did not give more emphasis to the role economics can play in the analysis of quarantine issues. Risk assessment based on empirical evidence is being demanded increasingly in domestic policy debates and for the resolution of international disputes. The Nairn Report correctly stresses the role model Australia could play in developing state-of-the-art quantitative risk assessment procedures. But if those procedures do not include all the relevant economic effects, inappropriate standards will result. The likely bias is a conservative one, since the main losers from excessive quarantine restrictions are -- as with traditional protectionism -- domestic consumers and exporters at home and overseas suppliers of the allegedly offensive product, all of whom are typically less influential than the industry group lobbying for the barrier. The building in of appropriate economic analysis in our risk assessment procedures can help to correct that imbalance, to the benefit of Australia's consumers and exporters. The latter would be helped by less-excessive quarantine restrictions potentially in two ways: via the general equilibrium effects of reduced protectionism at home, and via the export to other countries and such institutions as WTO's Dispute Settlement Body of a more-complete risk assessment procedure that ultimately would lead to less-excessive quarantine restrictions to our export markets abroad.

Indeed, economic analysis at the outset might even eliminate the need for a technical risk assessment, for it might show that *under no circumstances* would quarantine restrictions be justified. Let me illustrate with a simple (but I hope not too simple-minded) example. Suppose, as with bananas and chicken, Australia bans imports because it does not want to introduce diseases that could raise domestic costs of production. What are the net benefits of that policy, and how do they compare with less extreme policies? The most liberal alternative is to have no import restriction. (A less-extreme policy would be to tax imports and use the tax revenue to subsidize producers to help them cover the now-higher cost of disease prevention.)

The effect of switching from a complete import ban to free trade is shown in Figure 2. With an import ban S and D are the domestic supply and demand curves and P is the domestic price under autarky. Economic welfare from having this industry under these conditions is the sum of the consumer and producer welfare triangles, abd plus cbd .

Suppose the price at the country's border is P_w , and that eliminating the import ban risks introducing a disease that raises expected costs of production in this industry (but had no other adverse effects) such that the supply curve intersects the vertical axis at a point above c (not shown). The local industry would disappear while consumers would benefit from the price fall. National economic welfare would change to age , which may be more or less than before the import ban was lifted depending on whether triangle cfe is smaller than or exceeds fgh . Thus even in this most extreme of cases, where disease prevention costs decimate the industry, it would be sounder to go to free trade than maintain the ban (that is, when cfe is smaller than fgh).

This conclusion, which requires no technical disease risk assessment at all, would be more likely the more elastic is S and the larger the gap between P and P_w . It happens that for many small industries such as chickens or bananas, the domestic supply curve is fairly elastic, because the resources used in producing its product could readily be used in other industries. And in the cases of both chicken and bananas, domestic prices are up to twice those observed in the United States, suggesting the gap between P and P_w is large for them. In short, do we need to protect these industries?

What about partial liberalizations, as with the proposed importation into Australia of cooked chicken meat? Here again economics has an important part to play in assessing the net benefits of then continuing the ban on other chicken products. Even if that partial liberalization introduces no diseases and so does not alter domestic production costs, re-assessment of the remaining restrictions is necessary. This is because cooked chicken imports would shift the demand curve for domestically produced chicken to the left, thereby reducing the producer welfare contribution of the local industry. That shift makes it more likely that a policy of unrestricted imports of

all chicken meat is desirable economically -- even when there is no change in the risks of disease importation. The reason is that there is now a higher chance of *cfe* being smaller than *fgb* in Figure 2.

Conclusions

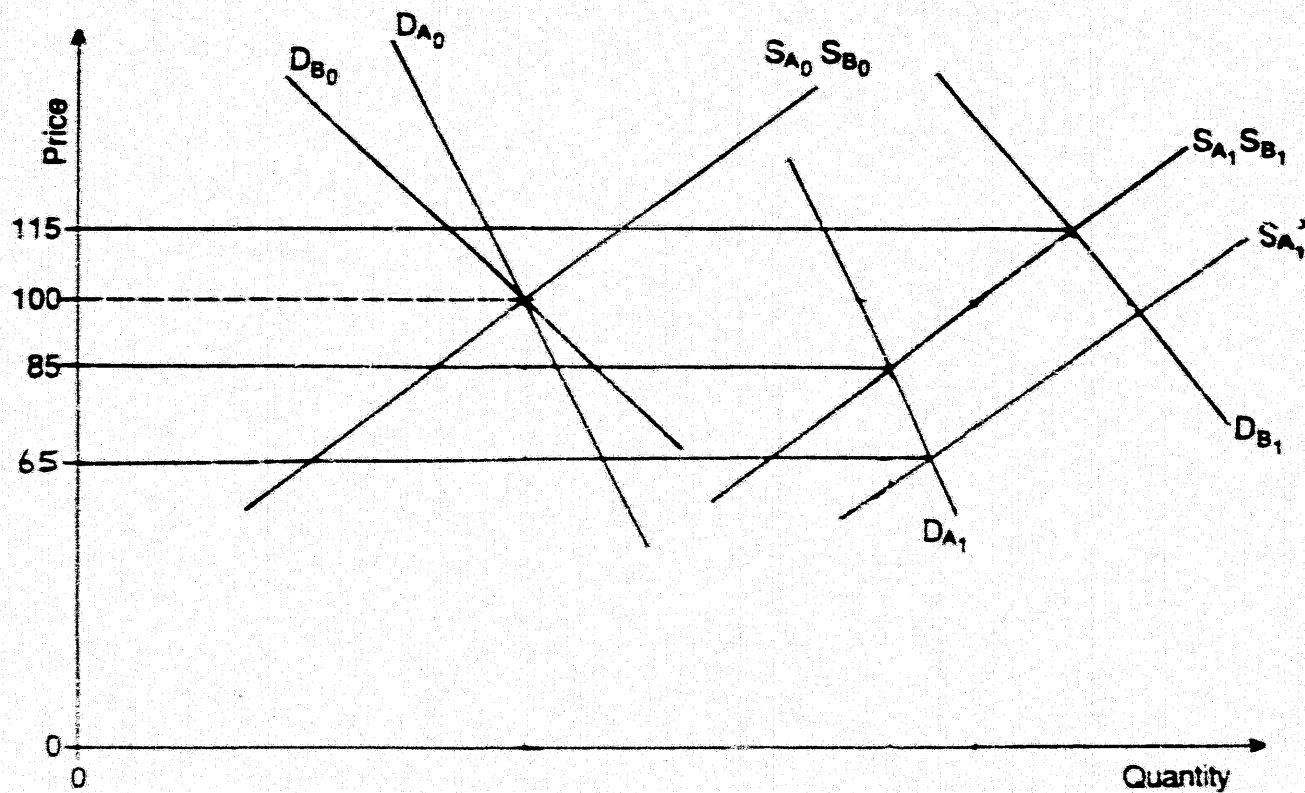
[to be added later]

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Figure 1: Changes in supply and demand for primary and non-primary products in a growing economy



Source: Adapted from Tyers and Anderson (1992, p. 31).

Figure 2: Effects of altering quarantine import restrictions

