Discussant comments

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Most of Australia's current population growth derives from its net positive migration intake. This intake has proven controversial from the viewpoint of a number of environmental concerns — a major one being the adequacy of water supplies, but there are also concerns with worsening traffic congestion in cities and with increasing costs of providing infrastructure on city boundaries. At the same time, business groups, and particularly the housing industry, clamour for higher migration to boost demand and to grow the economy (Clarke et al. 1990).

These alternative views comprise two alternative extreme ways of looking at the relation between population size and the environment that have considerable antiquity. In essence, each takes an alternative view on the role of fixed natural resource and environmental assets. The first dates at least to the Reverend Thomas Malthus's *An Essay on the Principle of Population* and sees environmental resources — Malthus took specifically agricultural land — as a fixed asset that is exploited under conditions of common property (Malthus 1798). With population increase, existing cultivated land must be more finely divided among the progeny who come to cultivate it. In the absence of technical progress, this division reduces the productivity of labour on existing land and forces some cultivation onto land with lower agricultural productivity. Both at the intensive and the extensive margin, the result is lower labour productivity and lower incomes. While Malthus focused on land, his views apply to any common property resource subject to congestion externalities — fish populations, forests, water and biodiversity resources, congested roads, or the right to pollute the atmosphere with, for example, CO_2.

Environmental resources can, alternatively, be viewed as assets that are private property subject to clear property rights. With this extreme view, an increased demand for the use of resources by new people increases their value to the pre-existing people who own them. This 'market-broadening' viewpoint sees the arrival of new people as increasing the value of assets held by the original people, making them better off. Provided the new people creating these enhanced values judge their

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lives as worth living in the expanded society, the arrival of the extra people provides an improvement in social welfare in terms of the standard Kaldor–Hicks criterion used in cost–benefit analysis. This is related to Adam Smith's views, in the early chapters of *The Wealth of Nations*, on the 'gains-from-trade' that can be achieved by increasing the extent of markets (Smith 1904). Although Smith did not expressly address the population issue, he saw market broadening as a source of economic gains. Indeed, from this perspective, having access to extra people is precisely analogous to removing a barrier to international trade, such as a tariff. Smith was mainly thinking, too, about trade in goods, but his analysis applies today to the owners of land and mineral assets, of rights to drive on private roads or, with privately owned emissions quotas, the right to pollute the atmosphere with CO_2.

The Malthusian or common property view of the population–environment link clearly suggests restricting population size, whereas the private property view suggests that such restrictions will reduce the welfare of both pre-existing and new people.

These alternative views of the connection between the environment and population clearly depend on the primary way new people gain their economic role in a society. Both of the extreme views cited are strikingly unrealistic. The common property perspective implicitly describes an idealised communist state in which new arrivals gain a share of all environmental assets as a birth or arrival right. It might make most sense, if it makes sense at all, where land is the important environmental asset that must be shared among progeny in populations experiencing net growth. The private property view, on the other hand, sees unambiguous property rights as potentially at least being imposed on *all* environmental assets — land, minerals, water, roads, the atmosphere and the right to pollute — in a type of libertarian nirvana. New people must then buy — or be granted on the basis of a voluntary bequest — claims on environmental assets at prices that make acquisitions mutually advantageous to extra people in the population acting as buyers and the pre-existing asset owners.

For a host of reasons, neither of these extreme views is realistic. The Malthusian view ignored the possibility of technical progress that has increased the productivity of agricultural land dramatically in the face of enormous population increases since the Industrial Revolution. It also downplays the economic drivers of fertility that will mitigate its pessimistic implications. In the face of declining incomes, parents will plausibly choose to have fewer children. Gains-from-trade arguments, on the other hand, suppose that all environmental externalities can be internalised by pricing or other policies when, clearly, they are not able to be. Indeed, such failures provide the rationale for modern environmental economics. The gains-from-trade view does, however, admit foresight as a determinant of migration-driven

population increase as well as natural fertility. Parents facing reduced returns from raising children — or migrants facing higher costs of getting established in a new society — face reduced incentives to add to or join a society. Rising environmental costs provide endogenous disincentives to add to population.

The key institutional feature of modern economies relevant here, however, is that they are mixed — a mix of both privately owned assets, including environmental assets, and common property or public goods. For the most part we have to buy land from landowners to grow crops or to build houses on, but for many assets that we utilise usage rights are unpurchased — travel on roads is for the most part unpriced, as is (for the most part) the release of greenhouse gas emissions and many other pollutants. Resources such as water have property rights enforced on them but they are often underpriced, and there are restrictions on the extent to which water can be traded among alternative types of users — for example, between urban and rural users. Native biodiversity resources are often not marketed at all — indeed, it is typically illegal in Australia to do so — for what are often seen to be ethical reasons.

I mention unpriced or underpriced resource assets and services, but the same argument applies to the provision of a wide variety of publicly provided goods. The social security system generally, and specifically education and health services, are typically publicly provided. Those services can, in principle, be provided either publicly or privately — they are not inevitably 'public goods' in the strict economic sense — and the implications for desired population size depend on this choice. The more unpriced environmental assets and the more public goods there are, the greater is the potential for increased population to damage the welfare of the pre-existing population and to be immiserising because new arrivals then do not pay for these costly entitlements. In addition, if education and health services are unpriced, the more susceptible the migration intake becomes to adverse selection and moral hazard problems and the greater the need for screening and other restrictions.

Recognising this mix suggests a way of making judgments about the desired size of population relative to the environment. Having extra people — whether they are migrants or the progeny of existing people — provides gains-from-trade between them and pre-existing people, provided there are clear property rights on environmental and other resources that are in short supply. To the extent that environmental resources or publicly provided goods are inadequately priced, those gains are replaced by the deadweight losses that are inflicted by newcomers via environmental and other externalities.

This suggests that restrictions on population become *increasingly less important* the more comprehensively use of the environment (and indeed the provision of social,

health and other services) can be priced. This means new people, whether they are children of current people or new migrants, must buy their way into a society on terms acceptable to current people.

The extent to which common property external costs offset the gains from trade is an empirical issue, although models that exclude most explicit external costs (compare Productivity Commission 2006) *should* show positive gains to pre-existing residents from an increase in, for example, skilled migration, as pointed out by Clarke (2007). The models of 'optimal population' determination that were developed in a total utilitarian context by Dasgupta (1969) and in an average utilitarian context by Pitchford (1974) assign as a birthright an equal share of a society's capital to new arrivals. These computations for determining optimal population are misconceived because a common property externality they that impose by assumption infects their analyses even before the computations commence (Clarke and Ng 1993).

For the most part, if environmental pricing is to be pursued it should be direct. Roads, for example, need to be privately owned by current people and their services then sold to newcomers. Even though it is clear that current people are worse off as consumers when using roads for which congestion tolls are increased as the result of population growth, it is straightforward to establish that the gains they enjoy as vendors outweigh such costs (Clarke and Ng 1995). Gains-from-trade arguments triumph! Of course, this pricing requirement is stringent and, under current circumstances, impractical. For immigrants an alternative is to extract from them, at the point of entry, a fee that covers the present value of the extra costs that the new arrivals inflict (Clarke 1994). The resources should still be priced but, if they are publicly owned, then extra costs incurred by pre-existing people are compensated for by transfers of entry fees to them.

These pricing arguments are not driven by population increase. Environmental economics shows that an established society benefits from pricing such resources with or without population increase, so that pursuing such policies is a type of 'no regrets' option. Moreover, in the presence of the option to increase population, the opportunity cost of not pricing increases because increased externalities will eventuate unless pricing is employed. If the choice is instead to leave the environment unpriced but to restrict population, then society must forgo the gains from trade that would have been associated with the population increase unless it can access those gains alternatively through trade in goods or factors of production. These latter possibilities are discussed below. We are better off pricing the environment properly because gains arise from doing that directly, but also because we can then better enjoy the gains from a possibly larger population via enhanced gains from trade.

The case for privatising the assets in the hands of current people is, however, driven by the fact of population increase. Efficiently pricing the environment at social marginal cost but leaving resources in public hands works well if population is fixed, but falls short of guaranteeing net gains to pre-existing populations when population itself is increasing. In that case, prices will rise when environmental demands grow but — in the absence of discriminatory and unrealistic sharing rules — the income gains to the public sector from such increased demands will be shared by the new and original residents of a society. There is no guarantee, then, that the costs to original people will be more than offset by income gains from the public purse.

This need for pricing and microeconomic reforms suggests a refocusing of the debate on the size of Australia's population away from speculation about long-run population targeting — which are often irrelevant anyway, given large year-to-year variations in the immigration intake — to thinking about the sorts of environmental (and other) policies that should be put into place to help ensure that current citizens get benefits from the environment and to ensure that future population increases will not immiserise us (Clarke 2003).

It is important to emphasise that environmental pricing reforms do not mean that population will increase without limit or increase to what are very large levels. It means only that the case for restricting population growth becomes less reasonable. Efficiency in commodity and asset markets helps to maintain efficiency in procreative investments and the migration intake. Families might choose to have fewer children, and the sorts of migrants Australia seeks to encourage will choose not to come here if extra costs, reflecting the extra environmental damages new people impose and extra infrastructure costs incurred in getting established, are large enough.

It is also important to understand that there are also alternative ways of securing at least some of the gains from trade from having the possibility of trading with extra people without having more immigrants. The famous Heckscher–Ohlin theorem of trade shows that trade can act as a substitute for factor movements, such as labour migrations, and that capital exports can, to some extent, act as a substitute for both trade and labour imports. Specifically, in Australia's case, importing labour-intensive goods can substitute for importing labour, and exporting capital to labour-wealthy destinations can substitute for trade and/or migration. These are not merely theoretical possibilities but important features of the modern globalised trading world. In some cases, relying on trade or capital exports can avoid the difficult issue of pricing such things as congestion and pollution by shifting these problems to other parts of the world.

Finally, it is important to stress that these notes address the connection between environmental issues and population size alone. Skill externalities in labour markets can, for example, justify a positive migration intake provided the external costs associated with unpriced environmental externalities are large enough.

Many straightforward environmental pricing policies have already been implemented in Australia and, compared to many other countries, the quality of the Australian environment is very good. I do not agree with Don Henry that Australia's track record has been that bad. The important pricing issues that do remain either involve complex distributional or transaction cost issues (congestion pricing road travel in major cities, pricing infrastructure on city boundaries), or involve complex social–political issues of assigning values to non-marketed goods, such as biodiversity and the environmental uses of water. Unfortunately, these are all population-sensitive environmental concerns.

Comprehensive pricing of the environment is difficult. Environmental valuation issues raise fundamental questions about the usefulness of efficiency-based welfare economics in resolving issues of optimal population on standard utilitarian terms. Assigning values to biodiversity, to wilderness or to the desire for space and partially developed landscapes involves assessing intensely subjective issues that reflect underlying ethical uncertainties, such as the valuations that should be placed on non-human life and the value of solitude. Economic analysis only brings into focus a range of insights into how large our population should be from an environmental perspective.

Don Henry's remarks deal with 'planning' approaches to dealing with environmental concerns, rather than market mechanisms. There is a parallel set of arguments that correspond to those I have developed above for using planning rather than market-based reforms when addressing the issue of population growth. They might make practical sense in situations where social valuations are unclear, where there are coordination problems or myriad second-best issues, and where achieving clarity about objectives is a problem, but many key environmental concerns that arise when population increases can be best dealt with using market mechanisms. Infrastructure levies, for example, effectively limit the growth of unwarranted urban sprawl. Correctly pricing traffic congestion reduces both low-value vehicle journeys in cities and the propensity of cities to sprawl unnecessarily because transport is underpriced. Don Henry mentions the reduction in water use that has been driven in our cities by water supply restrictions during the recent drought, but as a long-term measure the correct pricing of urban water supplies will achieve the same sorts of objectives at much lower cost.

Economics does not provide all the answers but it provides some. The key lesson of economics is that what matters most is not population size in relation to the environment per se, but what people who live in Australia can do to the environment. History shows, for example, that much of the worst environmental damages inflicted on Australia's agricultural land occurred when Australia had a much smaller population that it now has. It is difficult to provide a logical calculus that suggests how many people should live in Australia and, indeed, that might be the wrong way of looking at things. It is much easier to set in place environmental policies that ensure extra people provide advantage rather than disadvantage to current residents. This is closed-loop rather than open-loop planning that offers greater simplicity. If Australian environments do become poor, that is not a consequence of excessive immigration or natural population growth but partly, at least, because of market failures in the provision of environmental and public services.

Of course, there are a host of social arguments on the immigration issue that have been ignored here, mainly because they are beyond my competence. Even if the environment is comprehensively priced, there are plausible non-economic reasons for restricting population growth.

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