Distortions to Agricultural Incentives in Australia and New Zealand

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Abstract

In 1990, Australia and New Zealand were ranked around 25th and 37th in terms of GNP per capita, having been the highest-income countries in the world one hundred years earlier. Those countries relatively poor economic growth performance over that long period contrasts markedly with that of the past 15 years, when these two economies out-performed most other high-income countries. This difference in growth performance is due to major economic policy reforms during the past two to three decades, both at and behind the border. We provide new evidence on the extent of governmental distortions to agricultural incentives in particular in the Australian and New Zealand economies since the late 1940s, both directly due to agricultural policies per se and indirectly (and negatively) through protection to manufacturing.

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Following its 'Gold Rush' in the 1850s, Australia surpassed Britain in having the highest per capita income in the world, and New Zealand was not far behind. Both suffered from depressions in the 1890s before recovering their equal-first ranking just prior to the World War I, but for the following seven decades their incomes kept falling behind those of the United States and some other developed economies.[1] They recovered briefly in the middle of the twentieth century thanks in part to the Korean war-induced boom in wool prices, when they were ranked equal second after the United States. But since then their rankings have continued to slide as the economies of Western Europe, Canada and Japan grew faster – and Australia and especially New Zealand grew slower – than the United States (Figure 1). By 2004 these two antipodean economies were ranked 25th and 37th respectively, according to the World Bank Atlas method of measuring GNP per capita (World Bank 2006). By that standard at least, the long-term economic performance of both the Australian and New Zealand (ANZ) economies over the one hundred years to the 1970s has to be described as relatively poor.

During the past two decades, by contrast, these two small economies (with just 20 and 4 million people, respectively) out-performed most other high-income countries, with their per capita incomes growing half as fast again as the OECD average.

This marked difference between these countries' recent and earlier relative performances is due to major economic policy reforms undertaken during the past two to three decades and in particular to the belated opening of the ANZ economies first to each other and then to the rest of the world. Having been more protectionist toward

[1] Two recent analyses by economic historians point to successful exploitation of natural resources as the key explanation of Australia's relatively high per capita income prior to World War I (Broadberry and Irwin 2007, McLean 2007).

manufacturing than all other OECD countries for most of the twentieth century (Anderson and Garnaut 1987), and having stood aside from the industrial trade policy reforms agreed to by other Contracting Parties to the General Agreement on Tariffs and Trade (GATT) in the first seven rounds of multilateral trade negotiations (1947 to 1979), Australia and New Zealand have since undergone a remarkable degree of opening up of their current and capital accounts. This liberalization reversed the downward trend in their trade share of GDP, although no more so than for other OECD countries (including the United States, whose share has trebled in the past three decades); and it has accelerated the downward trend in their average import tariff (Figure 2). The fact that this increased openness was accompanied by many domestic micro- and macro-economic reforms, and that it coincided with a long period of rapid global economic growth which was stimulated by the information and communication technology revolution and by the opening up of most economies but especially nearby resource-poor countries in East Asia, added to the scope for boosting gains from freeing their international trade and investment and floating their currencies.

Another difference between the ANZ economies and most other OECD countries is that they are relatively well endowed with agricultural land per worker. This endowment coupled with the development of valuable production and marketing technology provides them with a strong comparative advantage in agricultural products. The advantage is especially strong for New Zealand which, unlike Australia, is not also blessed with an abundance of mineral and energy resources. Trade protectionism in these economies thus meant restrictions on imports of manufactures, making their trade policy regime more like those of developing countries. True, in some decades they also had periods of agricultural subsidies, but overall the trade policy regime in both countries has long involved an anti-agricultural bias. The fact that those agricultural subsidies have been virtually eliminated over the past two decades also makes Australia and New Zealand an interesting political economy study, given the extreme difficulties other OECD countries have had in reforming their farm support programs (see Gardner 2007, Josling 2007, and Hayami and Honma 2007).

This chapter examines the extent to which that anti-agricultural bias has changed in these two countries since World War II, and identifies the forces that caused the policy

evolution in each case. It begins by summarizing the structural changes that have accompanied the economic growth of the Australian and New Zealand economies since the 1950s. It then describes the emergence/build-up of first manufacturing protection and some agricultural subsidies, and then after the 1970s the dramatic dismantling of those interventions. The analysis is conducted by compiling a new time series of nominal rates of protection for both agriculture and manufacturing, stretching back to the mid-1940s for Australia and to the mid-1950s for New Zealand. The reasons for these policy choices are then explored, dealing with first the gradual growth in market interventions to the 1970s and then their relatively rapid dismantling thereafter. The chapter concludes by discussing prospects for further policy reform and lessons for both other high-income countries and resource-rich developing economies.

Growth and structural changes since 1950

The comparatively poor growth performance of the ANZ economies for most of the twentieth century contrasts with that since the late 1980s when they out-performed many other advanced economies in terms of GDP per capita growth (World Bank 2006). This was a period of especially rapid total factor productivity (TFP) growth in ANZ (Parham et al. 1999, Dowrick 2001, Statistics New Zealand 2006), in contrast to Britain, for example, where much of its catch-up was due to growth in employment and hours worked per worker (Card and Freeman 2002). Australia's annual TFP growth rate accelerated a full percentage point during the 1990s (Parham 2004), while New Zealand's rose four-fifths of a percentage point. Since that was not the experience of other OECD countries, Parham asserts that domestic factors must provide a major part of the explanation, an important one being the greater openness of the Australian economy to trade and investment.[2]

[2] However, there is now evidence that the rate of growth of productivity in Australia has since slipped behind that in several OECD countries (Dolman, Parham and Zheng 2007).

A more recent econometric study by Diewert and Lawrence (2006) demonstrates that productivity growth has been the dominant contributor to the growth in real welfare in Australia since 1960, with the terms of trade playing only a very minor role. Certainly prices in international markets for primary products relative to manufactures have been on a downward trend over the past century, but the decline has averaged less than 0.5 percent per year (Appendix Figure 1).

The difference between these economies' recent and earlier relative performances is due very substantially to their economic policy reforms of the past three decades. The belated freeing of markets in these two economies not only has arrested the decline in their per capita income ranking, but also is having a remarkable influence on their patterns of production and trade.

For these natural resource-rich, relatively lightly populated economies,[3] the most appropriate theory of comparative advantage is a blend of two core models developed in the 20th century: the Heckscher-Ohlin-Samuelson model which assumes all factors of production are mobile between sectors, and the Ricardo-Viner model which assumes some factors are sector-specific. Such a blend is provided by Krueger (1977) and explored further by Deardorff (1984). They consider two tradable sectors each using intersectorally mobile labour plus one sector-specific factor (natural-resource capital or industrial capital). Assuming that labour exhibits diminishing marginal product in each sector, and that there are no services or nontradables and no policy distortions, then at a given set of international prices the real wage is determined by the aggregate per worker endowment of natural-resource and industrial capital. The commodity composition of a country's trade – that is, the extent to which a country is a net exporter of primary or industrial products – is determined by its endowment of natural relative to industrial capital compared with that ratio for the rest of the world.

Leamer (1987) develops this model further and relates it to paths of economic development. If the stock of natural resources is unchanged, rapid growth by one or more economies relative to others in their availability of industrial capital per worker would

[3] New Zealand has around five times the global average of both agricultural land per capita and arable land per worker, and Australia has around twenty five times as much (Sandri, Valenzuela and Anderson 2006). Of course the quality of farm land and associated water, rainfall, sunshine, etc. also matter, but even adjusting for these leave ANZ as relatively very well endowed in agricultural resources per worker.

cause those economies to strengthen their comparative advantage in non-primary products. On the other hand, a discovery of minerals or energy raw materials would strengthen that country's comparative advantage in mining and weaken its comparative advantage in farm and other goods, ceteris paribus. It would also boost national income and hence the demand for nontradables, which would cause mobile resources to move into the production of nontradables, further reducing farm and industrial production (Corden 1984).

Domestic or foreign savings can be invested to enhance the stock and/or to improve the quality not only of industrial capital but also of labour or natural resources, and to provide capital to the nontradables sector. Any such increase in the net stock of produced capital per worker will put upward pressure on real wages. That will encourage, in all sectors, the use of more labour-saving techniques and the development and/or importation of new technologies that are less labour intensive.

Which types of capital would expand fastest in a free-market setting depends on their expected rates of return. The more densely populated, natural resource-poor a country, the greater the likelihood that the highest payoff would be in expanding its capital stocks for non-primary sectors. At early stages of development of such a country with a relatively small stock of natural resources per worker, wages would be low and the country would have a comparative cost advantage in unskilled labour-intensive, standard-technology manufactures. Then as the stock of industrial capital grows, there would be a gradual move toward exporting more capital- and skill-intensive manufactures. Natural resource-abundant economies such as Australia and New Zealand, however, would develop a comparative advantage in manufacturing at a late stage of development, and their industrial exports would be relatively capital intensive. And with New Zealand's lesser mineral and energy resources per worker and poorer climatic conditions for broadacre cropping than Australia's, its agricultural comparative advantages would be stronger in aggregate but less focused on cereal and oilseed cropping than Australia's.

The above theory of changing comparative advantages has been used successfully to explain the evolving pattern of exports of Australia and its Asian trading partners (Anderson and Garnaut 1980, 1987; Anderson and Smith 1981; Anderson 1995), and is also consistent with New Zealand's trade pattern. It can be used also to explain shocks to

that evolutionary pattern, as with mining booms; and it is consistent with the larger shares of farm revenue from livestock and horticultural crops compared with grains, oilseeds, sugar and cotton for New Zealand relative to Australia, as reported in Appendix Figure 2.

But the evolving pattern of a country's production and trade specialization also depends on policy choices and their changes over time. In the ANZ cases, their long history of industrial protectionism (reflected in the relatively high implicit tariffs) resulted in a smaller share of GDP traded than would be normal for economies of their size (Figure 2).[4] It also ensured a bigger manufacturing sector than would have emerged under free trade, which was possible in their full-employment setting only at the expense of other sectors. The sectoral shares of GDP held by manufacturing in the early 1960s were close to the OECD average of around 30 percent, even though Australia and New Zealand have always been lightly populated and so have a weak comparative advantage in manufactures.

The removal of the ban on key mineral raw material exports in the early 1960s and the tariff reforms of the 1970s and 1980s corrected that distortion for Australia. Between 1960 and 2005, manufacturing's share of GDP fell much more rapidly for Australia than for the average OECD country, to just 11 percent, while the mining sectors share initially trebled (Table 1a).

Mining's share of Australian exports more than trebled between the early 1960s and early 1980s (Table 1a), helped of course by the dramatic rises in energy raw material prices in second of those decades.[5] And even though that lowered agriculture's *relative* contribution, the share of exports in the gross value of farm production increased considerably, from around 55 to 75 percent after the mid-1970s (Figure 3). Moreover, that growth in farm exports came from an increasing range of farm products, as farmers

[4] In terms of population, Australia is somewhat smaller than Argentina and Canada but similar in terms of arable land, and New Zealand is similar in population, arable land and other agricultural attributes to the average of the Nordic countries. But the antipodean location of Australia and New Zealand compared with those other countries leads one to expect them to have traded less (and be specialized in more storable and less bulky exports) than these comparator countries, at least prior to East Asia's trade-led growth takeoff.

[5] Mining was also an important export earner for Australia in the latter half of the nineteenth century, but due almost entirely to gold. Gold's share of total exports was 49 percent in 1861, and while it fell to about one-sixth in the 1980s it returned to 28 percent in 1900. During the 1961-90 period, wool plus gold accounted for almost three-quarters of all exports (Butlin 1962).

diversified away from the traditional wheat and sheep enterprises to beef, cotton, sugar, dairy products, wine, and rapeseed (Appendix Figures 3 and 4).

It was not only natural resource-based exportables that ANZ's protectionism had discouraged, however. Also discouraged were export industries *within* the manufacturing sector, as well as services exports. Together those two sectors contributed only one-twelfth of Australia's exports in the early 1950s. Even by 1980 their contribution was barely above one-quarter, but by 1990 it had risen to one-third and by 2005 to 44 percent or 22 percent each, thus each surpassing the 21 percent share for agriculture for the first time (Table 1a).

The transformation in New Zealand was similar, except it did not have the mineral resources with which to enjoy a mining boom. Furthermore, it was affected relatively much more than Australia by the coming into force from 1983 of the Australia New Zealand Closer Economic Relations Trade Agreement (ANZCERTA): its lower wages allowed it to rapidly expand exports of manufactures and services to the much bigger Australian economy under that preferential arrangement. Together with the virtual elimination of its manufacturing protection these forces brought to a halt the decline in agriculture's share of New Zealand's GDP, in fact raising it from its low of 7 percent in the latter 1980s to 9 percent in the early 2000s – notwithstanding the abolition of non-trivial agricultural subsidies in the 1980s. Over that same period the share of food and agricultural products in New Zealand's exports have fallen somewhat to the benefit of other manufactures and services (Table 1b). With the build-up for a decade and then removal in the mid-1980s of subsidies to agricultural exporting industries (see next section), agricultural and processed food as a percentage of the gross value of primary agricultural production rose and then fell, but has since been maintained despite the growth in exports of non-agricultural goods and services during the past two decades (Figure 3).

Policy evolution

This section begins with a brief history of policies up to the early 1970s, then the changes in the next dozen years before the reforms accelerated in the mid-1980s. Since there were relatively few agricultural subsidies or farm import barriers (other than quarantine restrictions) through most of the past century, the story in both countries is more about the *indirect* anti-agricultural bias that resulted from the protection of manufacturing. Nonetheless, we also include coverage of policies that directly distorted various agricultural markets post-World War II.[6]

We know that it is *relative* prices and hence relative rates of government assistance that affect incentives. In a two-sector model an import tax has the same effect on the export sector as an export tax (the Lerner Symmetry Theorem), and this carries over to a model that also includes a third sector producing only nontradables (Vousden 1990, pp. 46-47). For that reason we report the average nominal rate of assistance (NRA) for the tradable parts of the agricultural sector, based on NRA estimates for individual agricultural industries, along with the average NRA for the tradable parts of all non-agricultural sectors. The NRA is the equivalent of the percentage by which government policies have raised the producer price above what it would be without the government's intervention.[7] With those two sectoral NRAs we then calculate a Relative Rate of Assistance, RRA, defined as:

$$RRA = 100[(1+NRAag^t/100)/(1+NRAnonag^t/100) - 1]$$

where $NRAag^t$ and $NRAnonag^t$ are the average percentage NRAs for the tradables parts of the agricultural and non-agricultural sectors, respectively. Since the NRA must be greater than -100 percent if producers are to earn anything, so too must the RRA. The usefulness of this measure is that if it is below zero, it indicates the extent to which the policy regime has an anti-agricultural bias, and conversely when RRA is positive.

The cost of government policy distortions to incentives in terms of resource misallocation are greater the greater the degree of substitution in production. In the case of agriculture which involves the use of farm land that is sector-specific, the greater the variance of NRAs across industries within the sector, the higher will be the welfare cost of those market interventions. A simple if crude index of that cost is the standard

[6] The Australia part of what follows draws on Anderson, Lloyd and MacLaren (2007).
[7] It is thus a generalization of the nominal rate of border protection due, for example, to an import tariff, which is the percentage by which the domestic price is raised above the import unit value.

deviation of industry NRAs within agriculture. We therefore report not only the weighted mean NRA for the sector (using the values of production at unassisted prices as weights), but also the standard deviation around that mean each year.

Prior to the early 1970s

The long history of ANZ industrial protectionism has its roots in the formation in 1901 of the Australian Federation – which New Zealand decided not to join but instead became separately independent of Britain. Tariff revenue then accounted for almost one-fifth of government revenue in both countries. That is very high for what at the time were the world's highest-income economies, as that share typically falls as per capita income rises. It is twice that of the Nordic countries, for example, even though their per capita incomes were barely half ANZ ones (Figures 1 and 2a). Tariffs on manufactures rose steadily in the decades that followed. They were supplemented by quantitative import restrictions first imposed in the late 1930s (as 'wartime measures' in Australia and as industry protection in New Zealand), and then rose even further in the 1960s when they substituted for the import licences as the latter were removed (in 1960, with minor exceptions, in the case of Australia).[8] This trend over the 1950s and 1960s contrasted strongly with what other high-income countries were doing at that time, which was lowering tariffs on manufactures as part of multilateral trade negotiation under the General Agreement on Tariffs and Trade (GATT).[9] Hence by the early 1970s the average ANZ manufacturing tariff exceeded that of any other OECD country (Anderson and Garnaut 1987).

[8] The first major tariffs for the Australia federation were imposed in 1907. According to the indexes constructed by Carmody (1952), by the 1920s the decade average of the general tariff on Australia's imports of items other than food beverages and tobacco was double that 1907 level, and by the 1930s it averaged 60 percent higher than in the 1920s. Vernon (1965) reports averages for tariffs above 12.5 percent for the period from 1938-39 to 1962-63: they dipped somewhat in the late 1940s/early 1950s when import licences became the binding constraint but by the early 1960s they were back to the level of the late 1930s. The annual average level of protection since World War II is indicated by the carefully constructed customs duty rates in Appendix Table 3.

[9] The GATT came into effect in 1948. Even though Australia and New Zealand were founding signatories to that agreement, they both chose not to join the commitments to cut manufacturing tariffs – out of frustration with the unwillingness of other GATT contracting parties to commit to lowering their agricultural protection rates (Arndt 1965, Snape 1984, Capling 2001).

Meanwhile, the ANZ governments intervened in numerous markets for farm products, but the subsidies and protection they provided to agricultural industries was only a modest offset to the indirect disincentives caused by manufacturing protection during this era. In the immediate post-World War II period, Australia's agricultural programs were directly taxing the farm sector. Most of that was removed by the end of the Korean War, at which time farmers were enjoying a boom in export prices that spurred the highest inflation in Australia since its gold-rush era of the 1850s. Farm assistance then rose gradually such that by the end of the 1960s the nominal rate of assistance averaged 17 percent in Australia, whereas in New Zealand it averaged little more than 2 percent until the mid-1970s. During that period the standard deviation of agricultural NRAs also rose, indicating increasing misallocation of resources within the agricultural sectors of these two countries (Tables 2 and 3 and Appendix Tables 4 and 6).

A striking feature of ANZ agricultural assistance at that time was that it applied to export industries as much as to import-competing ones (Figure 4). Export industries in New Zealand including wool, dairy products and meat were assisted by so-called stabilisation schemes (Sandry and Reynolds 1990). Similar schemes in Australia assisted wheat, manufactured dairy products, sugar and dried vine fruit. The Australian schemes often also contained so-called home consumption price schemes whereby domestic consumers were forced to pay more than the export price (Sieper 1982, Edwards 2006). These schemes, which required the pooling of domestic and export returns, could only be implemented with the support of the Australian state governments.[10] Other policy measures included fertilizer subsidies, income tax incentives, rural credit measures, involvement in and subsidies to agricultural research and extension, and public investment in land and water development and rural infrastructure – but all those measures combined added the equivalent of no more than 2 percent to Australian farmers' gross income as of the early 1970s (Table 4).

[10] That pooling was inefficient in at least two senses: it led to excessive volumes of production because producers received the average rather than the marginal price; and because there was little differentiation in terms of quality and variety, producers were discouraged from seeking out niche markets by differentiating their product. Additional stabilization schemes were implemented by individual states, such as for fresh milk and eggs, and these led to different incentives in the various states. These were possible only by the states agreeing not to trade across state borders, in contravention of Section 92 of the Constitution which says there shall be no barriers to interstate trade.

The net effect of both farm and nonfarm policies on agricultural incentives is summarized in Table 4, Figure 5 and the final column of Appendix Tables 4 to 6. For Australia, the negative effect on incentives from agricultural policies in the 1940s was trivial compared with that from non-agricultural ones, mostly import protection for manufacturers. Together those policies effectively reduced farmers' gross returns by more than 20 percent. The price stabilization and other agricultural policies gradually provided more direct assistance to Australian farmers over the 1950s and 1960s when manufacturing protection remained steady, so that degree of overall taxation fell from 27 percent to just under 10 percent by 1965-69, as measured by the RRA. Of that decline, about two-thirds is due to changes in non-agricultural policies and only one-third to changes in direct assistance to farmers. New Zealand farmers, meanwhile, were effectively taxed an average of over 20 percent right through to 1972-73. The ANZ experience to the early 1972s was thus very similar to the degree of anti-agricultural bias in many developing countries in those decades.

Meanwhile, by the late 1960s the home consumption price schemes were imposing tax equivalents of over 100 percent on Australian consumers of butter, cheese, sugar and eggs (Appendix Table 7). These distortions are unusual in that the imposition they imposed on consumers or users of exportables was greater than the price impact on producers – something that does not arise from standard trade barriers.

The reforms from the early 1970s

Disenchantment with the interventionist trade and related economic policies gradually spread in the 1960s. The 1968 National Development Conference in New Zealand almost agreed to simultaneously reduce import protection and tariff compensation to agriculture. But it was not until the 1970s that tariff reductions began in both countries. In Australia a 25 percent across-the-board cut in July 1973, preceded by some minor cuts in 1970-71, started the tariff reform process. It was accelerated in the 1980s and continued through the 1990s. As a result, the average nominal rate of assistance to Australian manufacturing fell from 23 to 3 percent, and the effective rate from 36 to 5 percent over those three decades. In the 1990s alone, both the mean and the standard deviation of Australia's

import tariffs on goods halved. This brought the average tariff for manufactures down to 4.2 percent in 1999.[11] The only manufacturers with significant tariff protection now are motor vehicles and parts, and textiles, clothing and footwear. Excluding them, the average effective rate of assistance to Australian manufacturing is just 3 percent (Productivity Commission 2000a).[12]

Australia's agricultural subsidies and regulatory interventions also have been close to eliminated over those 35 years. The average nominal rate of assistance to the farm sector has fallen from 16 percent in the early 1970s to less than 2 percent this decade, and the standard deviation has fallen from almost 60 percent to less than 1 percent. The process was piecemeal[13] and gradual, often involving a series of partial steps, but it was persistent. It began in 1972 with manufacturing milk and then two to four years later with cotton and tobacco, while it took another decade before supports for rice and eggs began to be dismantled, and almost a further decade for cuts to grape industry assistance. And it was not without at least one significant reversion, with the introduction of the reserve price scheme for wool in 1973 that took until the early 1990s to unravel.[14] There were just two farm groups still benefiting significantly from government programs in the latter 1990s: tobacco and milk producers, each with an NRA of more than 20 percent in 1997. Deregulation of tobacco marketing arrangements began in 1995 and was completed in 2000, bringing effective assistance to tobacco growing down from 30 to 2 percent over that period. As from 1 July 2000, the remaining

[11] This is still higher than for other OECD countries though (World Bank 2006). And WTO-bound tariffs average more than twice the applied rates. However, Australia uses non-tariff import barriers less frequently than other OECD countries, apart perhaps from anti-dumping duties (Productivity Commission 2000a, 2000b, 2004).

[12] Tariffs on motor vehicle imports fell from 40 to 15 percent over the 1990s and were cut again to 10 percent in 2005; for clothing the decline over the 1990s was from 55 to 25 percent, and for footwear from 45 to 15 percent, with cuts to 17.5 and 10 percent in 2005, respectively Further cuts, to as little as 5 percent, are scheduled for 2010 (Productivity Commission 2000a, Table 4.4).

[13] By contrast, the reductions in manufacturing protection were more systematic: the 1973 across-the-board tariff cut, a Tariff Review program begun in 1971 by the Tariff Board and subsequently conducted by its successors (the Industries Assistance/Industry/Productivity Commission), and the pre-announced phased reductions in tariffs on textiles, clothing footwear and motor vehicles and parts from 1988.

[14] This stabilization scheme operated conservatively for 15 years until the government transferred the power to set the reserve price to growers in 1987. Growers promptly raised that reserve price – which operated on the world market – by 71 percent. Predictably this encouraged growers to expand wool production and international buyers to reduce purchases (since the Australian Wool Corporation would then stockpile wool and thereby save the buyer the cost of storage). The scheme collapsed in 1991 and the AWC had to dispose of its 4.75 million bales, at some expense to the government and at great expense to woolgrowers (Richardson 2001).

impediments to a free domestic market in fluid milk began to be dismantled, for which an untied, one-off compensation grant (providing a total of around US$1.5 billion or US$110,000 per dairy farm) has been paid, funded by a consumer levy at the retail level over the eight years to 2008. Contrary to some pessimistic forecasts at the time, dairy output has continued to increase as production from those leaving the industry (17 percent over the first three years) has been more than compensated by output and productivity improvements on remaining farms (Harris 2005a,b).

In New Zealand, the anti-agricultural bias declined in the 1970s by a modest reduction in manufacturing protection and by a big boost to beef, sheep and dairy farmer assistance. In these two steps the effective taxation of agriculture (the negative of the Relative Rate of Assistance) fell from 22 to 14 and then to less than 7 percent. It fell further over the next dozen years as agricultural assistance increased slightly while manufacturing protection continued to fall slightly, then it rose a little from the late 1980s as assistance to farmers fell faster than that to manufacturing, and finally it fell to just 1 percent as the last of the interventions were removed from the late 1990s (Figure 5).

Thus distortionary government assistance to both manufacturing and agriculture, and hence the overall anti-agricultural bias, has now all but disappeared in both Australia and New Zealand – after being in place for more than seven decades.[15] In the past 35 years it was non-agricultural policies that overwhelmingly contributed to the improvement of ANZ farmers' incentives – in fact the decline in manufacturing protection was sufficiently large as to more than offset the decline in direct assistance to farmers from the late 1960s. Farmers also have benefited from the fact that service sectors too have not been spared reform in these countries. Banking, post and telecommunications, ports, higher education, health, and rail, air and sea transport have been opened up; there has been progressive out-sourcing of many government services; and substantial reforms to competition policy and practice, including privatization and the corporatization and de-monopolization of numerous government enterprises, are well

[15] Effective assistance to the mining sector is still slightly negative, as it was two decades ago (Industry Commission 1992, Appendix K; Productivity Commission 2004, Chapter 2.5), although that will be less so when the government eases the current quantitative restrictions on exports of uranium and its derivatives.

advanced.[16] Moreover, by 1985 both currencies were floating and foreign investment flows began to be freed up. That complemented financial sector reform and contributed to foreign direct investment, equity and foreign currency transactions growing at several times the pace of GDP. Even the previously highly unionised labour markets have undergone considerable reform. Households have gained substantially from these widespread reforms, including consumers of food who for most of the past two decades have faced tax equivalents of well below 10 percent on their food purchases (compared with the OECD average of between 23 and 36 percent over that period – see Appendix Table 8 and OECD 2008).

Reasons behind the policy evolution

In the early post-war years, successive ANZ governments sought to expand the output of the agricultural sector in order to improve the balance of trade position in the context of a fixed exchange rate regime. There were numerous factors in common, but since some were country-specific it is better to consider the Australian and New Zealand cases separately.

Australia

In the Great Depression years of the 1930s, and even more so in the two decades following World War II, agricultural policy instruments were introduced in profusion, including price stabilisation schemes implemented through buffer funds, guaranteed

[16] In addition, a comprehensive program of review of government regulations at all levels in Australia has been under way since the mid-1990s, with the aim of reducing/removing regulations that unjustifiably impede economic activities (Productivity Commission 2000b). For an early assessment of Australia's domestic microeconomic reforms, see Forsyth (1992, 2000). All Productivity Commission reports on the myriad reforms are downloadable at www.pc.gov.au. Recent research on barriers to trade in a wide range of services in almost 40 countries found that services markets in Australia, relative to those in the other countries in the study, are now ranked as either very liberal (banking, distribution services, telecoms, engineering professional services) or moderately restrictive (other professional services, maritime services) – see Productivity Commission (2000c, pp. 50-61).

prices and deficiency payments, home-consumption price schemes for wheat, dairying, sugar, and fruits and vegetables; input subsidies on fuel, fertilisers and interest rates; tax concessions; publicly funded research and development; publicly funded extension services; land development schemes; and the provision of rural infrastructure (Godden 1997, p. 6; Mauldon 1990, p. 320).

For some commodities, e.g., sugar and wheat, there were national-level statutory marketing authorities (SMAs) or, in the language of the GATT/WTO, state trading enterprises (STEs). This instrument was also used by State governments across a wide range of commodities. It often took the form of a producer-controlled board, with compulsory monopsony/monopoly powers in order to effect 'orderly marketing' and sometimes used in conjunction with marketing quotas. Often the SMAs were linked with regulations which required the shipment and storage of grain to be handled by State-owned enterprises. This form of intervention by Commonwealth and State governments was instigated in the 1920s and became central to marketing policy (Mauldon 1990, p. 311).[17,18]

In 1973, the Australian Labor Party (ALP) won office and, as a political party with few roots in rural areas, it set about establishing a review of the objectives and instruments of agricultural policy in order to define a set of principles which would underpin intervention. The result was the so-called '*Green Paper*' (Harris *et al*. 1974). The approach adopted by the authors was that of applied welfare economics: market failure provides a reason for government intervention to be potentially beneficial through improving economic efficiency. Some years later, Sieper (1982) argued that the public choice or private interest explanations fitted better with reality, and particularly with the choice of policy instruments, than those provided by the public interest approach. Although the insights provided by that set of theories was not entirely new, Sieper's use of them provided fresh and powerful insights into the Byzantine world of Australian agricultural policy as it existed up to the late 1970s.

[17] Even as recently as the late 1980s, there were some 10 Commonwealth and more than 50 State SMAs (Piggott 1990, p. 292).
[18] Agricultural SMAs were exempt from the regulation of competition under the *Trade Practices Act 1974*, although later on they were subject to assessment under the National Competition Policy.

In 1974, the Industries Assistance Commission (IAC) was established from the then existing Tariff Board. The IAC was designed to act as a forum for public discussion of economic policy by undertaking reviews and evaluation of government intervention and regulation economy wide. During the 1970s and 1980s, it produced reports on wheat, sugar, dairy, dried vine fruits, rural adjustment and income stabilisation (Edwards 1987, p. 142). This development signalled the government's intention that policies should be evaluated from the viewpoint of the public interest rather than, or perhaps as well as, the private interests of farm groups and regions. In other words, the year 1973 marked a watershed: applied welfare economic analysis would be used to analyse the effects of various policy instruments and the recommendations of that analysis treated objectively, even if not always implemented in full (or at all in a few cases).

In 1982, the Balderstone Report set out the agricultural policy options for the 1980s. The basic thrust was that of reduced protection, not just in agriculture but throughout the entire economy. The authors supported the position that the agricultural sector should receive compensation on the grounds of equity (but not efficiency as discussed in the 1970s – Martin 1990) for having to pay tariffs on imported inputs. In the Report, the authors adopted an incrementalist approach in that they supported a continuation of many of the then-existing instruments, e.g., input subsidies and price discrimination between domestic and export markets, but they did suggest that the objective of price stabilisation should be achieved through price underwriting linked to market conditions rather than through existing instruments such as buffer funds.

In 1988, a policy statement was issued by the Commonwealth government in which the objectives were stated to be, *inter alia*: the enhancement of productive capacity through balanced management of natural resources, development of human skills and improved research; the development of a more productive industry structure through an economy-wide approach to policy reform with lower and more balanced assistance; responding to the international environment through better marketing of agricultural produce and reductions in international trade distortions; and positive assistance for structural adjustment (see Godden 1997, p. 10). It is obvious that the policy objectives of the earlier post-war years had been substantially altered

The Australian Wheat Board lost its monopoly in the domestic food wheat market in 1989, as had been recommended by the Industries Assistance Commission (IAC) in 1984, but it retained (and continues to retain) its export monopoly. In 2000, this export single desk was reviewed under the National Competition Policy and, in the absence of strong evidence one way or the other, the Government accepted the recommendation that the export monopoly be retained until 2010. Reviews under National Competition Policy of the single export desk for rice and for sugar also recommended their continuation, based on a national interest test.

In 1991, a review was published of the statutory arrangements for the marketing of agricultural products (Industry Commission 1991). This investigation focused on the economic effects of these arrangements, and in particular their effects on efficient resource allocation. The Commission concluded that whilst many of the arrangements were beneficial to producers and to society generally, there were instances where this was not so. The SMAs did not operate in the public interest when they had powers to require producers to participate (i.e., the compulsory acquisition of product), when potential producers were excluded from entry (e.g., when there are non-tradable quotas in place), or where prices were raised to users and consumers (e.g., price discrimination between the domestic and export markets). In these instances, it was concluded that efficiency of resource use was not achieved.[19] The outcome of this review has been the disappearance of most, but not all, SMAs.

From its beginnings in the latter 1970s, the leadership in the National Farmers Federation (NFF, and before it the Grains Council) adopted an economy-wide approach to thinking about economic issues. The activities of the NFF also encouraged the development of a free-market faction in the Liberal Party in the late 1970s (Anderson and Garnaut 1987, pp. 73-4). That approach was to be the hallmark of much of the rigorous computable general equilibrium analysis conducted by the IAC over the decade to 1989 on matters agricultural and more generally. Early in that period the government had convinced the farm sector of the need for rationalisation of the sector. As a *quid pro quo*, the government would introduce measures to improve efficiency in the sectors supplying

[19] In the course of its investigations, the Commission located over 100 marketing arrangements at the State/Territory level, although not all of which were SMAs.

inputs to agriculture as well as the infrastructure required for distribution, e.g., rail, storage and the wharves. However, some commodity groups within the NFF complained that the leadership of the organisation had turned its back on protecting its constituents from harsh economic conditions (e.g., drought and the vagaries of international markets) and from the deregulatory zeal of the government (including through one of its main sources of advice on agricultural matters, namely, the IAC/IC).

The objectives and the instruments of agricultural policy that existed from the early post-war years until the late 1980s reflected not only the supply of assistance to producers through government from consumers (users) and taxpayers but also the demand for assistance from producer groups. It was shown by Anderson (1978) that the interaction between these two sides of the political market had generated a wide dispersion of support during the late 1960s to the mid-1970s. His findings are consistent with the interest group theory of political economy or public choice theory: the land-intensive sub-sectors such as cereals and livestock were found to be lightly supported whereas the labour-intensive sub-sectors such milk production and horticulture were heavily supported. Martin (1990) outlined several models in the literature on public choice theory and evaluated the extent to which each was relevant to the developments in agricultural policy that had occurred in the 1980s. In assessing the role of the IAC, he concluded that 'the establishment of the Industries Assistance Commission (IAC), also appears to have had a remarkably strong influence on the policy process, and to have been associated with and contributed to the change in ideas about industry assistance measures.' (p. 198). It is argued by MacLaren (1992), in a comparison of the processes of agricultural policy reforms in Australia and in the European Community (EC), that the IAC proved significant in the reform of Australian agricultural policy because it altered the political economy of policy making. No other industrial country has a body with the functions of the IAC, and the lack of such a body may help to explain why reductions in agricultural protectionism in other industrial countries, with the exception of New Zealand, have been very difficult to achieve.

In the past twenty-five years much of the intervention in both agriculture and manufacturing has disappeared. In agriculture the focus of government policy on incomes

and prices has given way to concerns about the quality of the resources used by the agricultural sector and the efficiency with which they are used. During the same period the principal farm lobby groups have acquiesced to the view that markets can perform better than can governments in the provision of an economically healthy sector. Sub-sectors that traditionally were heavily supported have accepted the benefits of reduced market-based intervention. In 2000, even the dairy sector accepted total deregulation of the prices of both market and manufacturing milk, with the subsequent free inter-State trade in market milk leading to better exploitation of regional comparative advantages. The bribe paid to secure acceptance by all regions was an adjustment assistance scheme that is financed by consumers who will continue to pay a high price for milk during the transition period of eight years.[20] This acceptance of reduced government involvement in the markets for agricultural products contrasts markedly with the situation in most other OECD countries as well as in many developing countries, as the continuing difficulties in defining modalities for domestic support and market access in the Doha Round negotiations confirms.

New Zealand

The problems that led to the complete removal of agricultural subsidies in New Zealand had their origins in the Great Depression and the aftermath of World War 2. Unlike most high-income countries, New Zealand continued well into the 1960s an isolationist economic policy (import selection through licensing) that had been introduced just after the Great Depression. Import selection effectively prohibited imports of competing goods by using a system of import licensing underpinned with high tariffs, although manufacturing industries using imported intermediate inputs were largely exempt from this regime through an extensive ad hoc tariff concession program for inputs. As a result of the latter exemptions, effective rates of assistance in manufacturing were typically much higher than nominal rates.

[20] The evidence suggests that the retail price of milk fell after deregulation as the supermarkets were able to exercise buying power with the milk processors which, in turn, were able to exert downward pressure on the farm-gate price which was no longer supported by State governments.

This pattern of assistance also applied to a group of food processing industries that became known as the "grocery" industry, to distinguish it from the larger export-oriented food processing industries producing dairy and meat products. A typical "grocery" manufacturer used non-competing imports (such as cocoa, vegetable oils or rice) as inputs. Such imports had low or zero tariffs but imports on the grocery products produced from these ingredients (such as chocolate) faced tight import-licensing and tariff restrictions. Mixing regulations were also used to protect certain import-substituting industries, including tobacco and motor vehicles. Import prohibitions were in place for selected food products, the most notable of which was for margarine, which could only be purchased with a doctor's certificate! Price supports coupled with import licensing increasingly protected the domestic wheat industry. At the other extreme, export prohibitions on coarse grains tended to lower the price of feed wheat, barley and oats to poultry and pork producers and to other users.

Import selection extended war-time-like price control systems and added additional monopoly marketing boards in the late 1940s. There was no political mandate for change, as incomes boomed as a result of high commodity prices around 1950, and the joke was told that each of the unemployed was known to the Minister of Labour on a first-name basis.

For a short period around 1955 the import licensing regime was liberalized (Rayner and Lattimore 1991), but another balance of payment crisis in 1957 (falling dairy product prices) caused a policy reversal.

In this environment, industries were responding to distorted market signals and the import selection policy tended to stifle the incentive to import best-practice technology, especially in manufacturing and services. The farm sector was caught in a major policy-induced cost-price squeeze: farm export prices were low and costs were high in New Zealand dollar terms. In spite of this, total factor productivity growth in agriculture was relatively high in that it was greater than productivity growth in the rest of the economy (Figure 6b).

The government maintained a large number of relatively small production subsidy programs aimed at the exportable agricultural sector, in an attempt to partially offset the impact of the strong import-substitution regime (Lattimore 1985; Sandry and Reynolds

1990). These programs took the form of fertilizer and lime subsidies, weed and pest control subsidies, tax exceptions, research and extension provision, adverse events expenditures, and the school milk program. Export subsidies were also introduced in the 1960s for non-food manufacturing. Over the period 1964-67, the nominal rate of assistance for these export promotion activities is estimated to be 9 percent (Tweedie and Spencer 1981).

In this strong import-substitution environment, exports were heavily concentrated in meat, wool and dairy products – the industries in which New Zealand had its strongest comparative advantage, and provided the least assistance (Table 3). Up to the mid-1950s, these "pastoral" exports had represented nearly 95 percent of total merchandise exports from New Zealand. However, non-agricultural exports began to grow, so that by 1969 agriculture's share of merchandise exports had fallen to 84 percent – in part due to the advent of the highly selective New Zealand Australia Free Trade Agreement that began in 1966.

The New Zealand economy suffered a series of domestic and international economic shocks over a seven year period from 1967 (Dalziel and Lattimore 2004). In 1967, export earnings were severely reduced by a fall in international wool prices, leading to the exchange rate being devalued. Furthermore, New Zealand was beginning to import inflation via its fixed exchange rate policy and the increases in US fiscal deficits surrounding the Vietnam War. Domestically, an increase in the rate of inflation led to a breakdown in the national wage-setting mechanism, resulting over the next few years in large wage increases. The government then began increasing farm input subsidies to counteract falls in income.

The terms of trade were shocked again in 1972-73 as meat prices rose to high levels as part of a general agricultural commodity price boom. The exchange rate was revalued to counteract the macroeconomic effects, but then the United Kingdom joined the EEC in 1973, reducing New Zealand's preferential access to this longstanding and very profitable agricultural export market.[21] The first oil price hike then caused an additional adverse major shock to the terms of trade (Appendix Figure 1).

[21] Unlike Australia, however, New Zealand continued to receive some non-reciprocal preferential access to the EEC market.

New Zealand's economic policies changed rather dramatically from the early 1970s in a number of other ways too, as a result of the extreme economic policy interventionism that was the New Zealand government's response to British entry to the EEC and the first two oil shocks. In an attempt to maintain consumption in the face of drastic falls in the terms of trade, a command economy approach was adopted which saw increasingly regulated industries, prices, interest rates, wages, and foreign exchange rates. The result was high inflation and large fiscal and current account deficits.

Foreign borrowing increased significantly in this period, and was used in part to finance major energy projects in an attempt to reduce New Zealand's reliance on imported fuel. In order to finance this debt, agricultural output subsidies on exportables were used for the first time in an attempt to generate additional export earnings. Farm development subsidies also were increased substantially. The sheep and wool industries were the favoured targets because they were the largest agricultural and export sectors, but export subsidies were also provided for some non-traditional export products. The result was a large increase in the nominal rate of assistance offered to the exportable sector and a closing of the historically large gap between rates of assistance to the import-competing and export sectors for about a decade (Figure 4b). The nominal rate of assistance on outputs in exportable primary agriculture rose to 19 percent during the 1980-84 period (Table 3).

During the reform period from the mid-1980s, output assistance to exportable primary agriculture was abruptly removed and its rate of assistance quickly fell to almost zero in less than a decade. The sharp rises within exportable primary agriculture in the early 1980s can be seen in Appendix Table 6b: 24 percent for beef in 1982 and 59 percent for mutton and lamb production in 1984. It was nearly as high for raw milk and wool production. No significant output subsidies applied to the other exportable sub-sectors, such as fruit and vegetables and deer production, nor to import-competing sub-sectors such as grains and oilseeds. Output assistance for other animal products appears to be the result of high non-tariff phytosanitary barriers on pigmeat (during the 1980s), poultry and eggs.

The NRAs for favoured exportables (sheep, beef, wool and dairy) reached their peaks in the 1975-84 period, although not in the same years because the deficiency

payments were tailored to the different world price levels ruling each year. Most of the importable NRAs are zero because New Zealand does not produce sugar, cotton, soybeans and rice.

The first agricultural adjustments occurred in 1981 in wheat, tobacco and meat processing. Tobacco growers were offered a production quota buyout of NZ$7000/ha. These quotas resulted from local-content regulations which prescribed that half of the tobacco leaf used for processing by the two firms (Wills and Rothmans) had to be New Zealand grown. Around two-thirds of the producers accepted the grant and relinquished their production rights. The remaining producers continued in production. Wills ceased operations in New Zealand in 1987 but Rothmans continued until 1994, paying NZ$6.52/kg for NZ dried leaf even though the import price (and over-quota price) was around NZ$4/kg. The NRA on tobacco at this time was accordingly 63 percent.

In 1983, New Zealand entered into a new and much more comprehensive free trade agreement with Australia (ANZCERTA). This arrangement was the first vehicle, after 1955, used to begin the process of removing the 1938 import licensing system and reducing import tariffs. In the same year it was announced that the agricultural output subsidies would have to be abolished, under some pressure from the United States.

Wide-ranging macro- and micro-economic reforms were introduced in 1984. They included monetary and fiscal policy reform, and reductions in industry regulation and support. The process of removing almost all agricultural subsidies was begun by abolishing agricultural output subsidies and phasing out agricultural input subsidies – a process that was completed by 1990. Policies affecting nontradables also were important, as they promoted greater macroeconomic stability and resource mobility which increased the effectiveness of changes in trade policies. The government did not remove the export monopoly rights of agricultural marketing boards over this period, and while it did signal in a general way that such action was on the agenda, it nonetheless introduced a new marketing board with monopoly export rights (for kiwifruit). Furthermore, winegrape growers were given a subsidy to remove old varieties and replace them with newer ones.

Import licenses for Australian goods were increasing tendered and then abolished once tender premia had fallen to low levels. This was followed by the removal of all other import licenses, the last ones (on textiles, clothing and footwear) being removed in

the early 1990s. Tariffs were progressively reduced from 1986 until 2000. Then further tariff reductions were stopped, as import tariffs had fallen to around the average of those in other high-income countries.

Monetary policy was reformed in 1989 followed by liberalization of labour market legislation and fiscal policy constraints. These initiatives completed the liberalization of the capital account begun earlier with the floating exchange rate, full currency convertibility and the removal of interest rate, price and wage controls. In this environment the New Zealand macroeconomy gradually stabilized over the period from 1984-91. The notable exception was unemployment which continued to rise to around 11 percent by 1991 (Evans et al. 1996). The unemployment rate did not fall to less than four percent (where it had been in 1984) until 2003.

From 1990 the major change to agricultural policy was the removal of export monopoly rights administered by some agricultural marketing boards (e.g. dairy, meat, apples and pears) and, in some cases such as dairy, the abolition of the marketing board itself. This process was complicated by the existence of bilateral import quotas – especially for exports to the EU, US, Canada and Japan. In the case of dairy quotas, the import quota rights were given to the three export dairy companies with the largest, Fonterra, buying out those rights from the smaller ones. In the case of meat, a regulatory body was retained within Meat New Zealand (the marketing and research organization that developed from the old New Zealand Meat Producers Board) to allocate bilateral quota use rights. Under pressure from trading partners in the Doha Round, Fonterra's quota use rights are planned to be removed and allocated in an alternative fashion that is yet to be decided.

Government assistance to New Zealand agriculture was limited by 1990 to biosecurity, adverse events relief, research and development subsidies, export market development assistance, and product quality control programs. The direct rate of assistance to exportable agriculture had fallen to around 1 percent by 1990. The consumer tax equivalent for exportable food products was down to a similarly low level, comprising mainly the import-export parity differential that can be gained by large export firms in dairy, meat and forestry products. The consumer tax equivalent for importable food products is somewhat higher because there are still import tariffs on some of these

import-competing items, although typically they are still within the range of 5-7 percent. The exceptions are poultry and eggs, imports of which are strictly controlled on animal health grounds. Accordingly, domestic prices are significantly higher than world market prices (Appendix Table 8). The OECD considers that these phytosanitary restrictions are non-tariff barriers and so are incorporated here as elements of nominal assistance to outputs (even though part of that protection may be correcting for a market failure).

By 2005, the rate of assistance to manufactured food products was in single digits. However, the traditional pattern of tariff escalation remains, in that tariffs on unrefined exportable products and non-competing imported food components tend to be zero while higher value-added foods have tariffs in the 5-7 percent range. In the non-food manufacturing sector, NRAs on output have fallen from 24 and 42 percent (on exportables and importables, respectively) in 1982 to 4 percent today. Following the removal of the last import licensing program in 1993, tariffs were continuously reduced until 2000 when the MFN tariff reduction programs stopped. One reason for this policy change was to allow for some bargaining chips in the pursuit of bilateral and plurilateral FTAs that New Zealand embarked on vigorously – most recently with China, the US and ASEAN plus. There were some larger one-off tariff reductions over the period though: early in the reforms the tariff on computers was reduced from 40 percent to zero, and in 1997 the last remaining MFN tariff on new cars (25 percent) was abolished.

Prospects for further policy reform

Notwithstanding the huge amount of ANZ reform over the past two decades, plenty of agricultural policy issues remain on the table. The key ones are in the resource and environmental areas. Three are mentioned briefly, by way of illustration.

The first is food and agricultural import restrictions for the protection of plant, animal and human health. The economic protection from import competition that this provides farmers has not been fully captured in the Productivity Commission's NRA estimates for Australia, especially for horticultural products. Some of that protection may

well be warranted on externality grounds, but some (such as a complete ban on imports of certain fruits from all countries) may be excessive from a national welfare viewpoint. The Australian government is slowly examining whether various measures are excessively restrictive, but mainly in response to pressure from other WTO members seeking greater market access. Typically consumer costs are not included in such assessments, nor are all the cheaper ways of reducing any costs associated with the importation of disease (James and Anderson 1998). New Zealand in particular would be a beneficiary of a more-liberal quarantine policy regime in Australia, for example as an exporter of apples and pears.

Second, both Australia and New Zealand have so far not allowed the commercial growing of genetically modified (GM) varieties of farm products, with the sole exceptions of cotton and carnations in Australia. While the Office of the Gene Technology Regulator has approved the commercial growing of GM canola, the State governments have placed moratoria on plantings. GM food can be sold only if strict labelling standards are adhered to (FSANZ 2007). These restrictions may or may not be in their economies' and consumers' interests, depending on their impact on market access abroad for ANZ farm products and on human health and the environment at home (Anderson and Jackson 2005), but emotion has played more of a role in formulating these policies than has sound technical and economic analysis, especially in the growing of GM crops.

Third, environmental policy has become a very important issue in ANZ agriculture (Vitalis 2005). Within this area, water policy was already becoming a major economic and political issue but was brought to a head in Australia during 2006 following the country's worst drought on record. There has been substantial reform in recent years. Much remains to be done to make the most of this resource, particularly in rural Australia where most of it is used but proposals for reform and several national enquiries are under way (see, e.g., Productivity Commission 2006). More-efficient pricing of that resource may lead to substantial reallocations of resources within the agricultural sector, with possible declines in Australian production of cotton, rice, and milk as horticultural industries (and urban areas) bid away water from those farmers.[22]

[22] The impact of past under-pricing of water for agriculture on farm returns has not been incorporated in the NRA estimates reported in this paper.

The remaining big frontier for policy reform that would boost farm incomes in Australia and New Zealand is the dismantling of agricultural subsidies and import protection abroad. A successful conclusion to the Doha Round negotiations in the WTO provides the greatest promise for achieving that outcome. According to global Linkage Model results reported in Anderson, Martin and van der Mensbrugghe (2006, Table 13), removing all merchandise trade barriers and agricultural subsidies globally would raise agricultural value added or net farm incomes in Australia and New Zealand by 26 percent. Even using the GTAP Model, whose supply response elasticities are lower than in Linkage, a similar study by Anderson and Valenzuela (2007, Table 4) reports agricultural value added in Australia and New Zealand would rise by 15 percent, compared with a rise of just 2 percent in value added by their non-agricultural industries.

Policy lessons for other economies

By way of conclusion, two lessons are worth emphasizing from the Australia and New Zealand experiences. For agricultural-subsidizing countries, these case studies show that removing even the largest and longest-lasting farm subsidies is possible. Even where that was done by providing generous adjustment assistance, support was time-bound. In the Australian case, adjustment assistance was able to be financed simply by delaying the rewards to domestic consumers and thereby creating a gap between the producer and consumer price, rather than through outlays from (and hence resistance by) the treasury.[23]

For developing countries still effectively taxing their agricultural sectors, these two case studies offer hope that good policy analysis and advisory institutions can alter the political economy sufficiently to remove that taxation. More than that, the ANZ cases also illustrate the growth dividend that can come from reforming such distortionary policies. Having now dismantled virtually all their import protection and agricultural subsidy policy distortions, and having undertaken major domestic macro- and micro-

[23] For detailed descriptions of Australia's adjustment and adjustment assistance programs, see Harris (2005b).

economic reforms over the past two plus decades, the fruits of that undertaking are beginning to be reaped. The impact on overall living standards was mentioned at the outset, but an indicator within the agricultural sector is the acceleration it has given to farm productivity growth.

It needs to be borne in mind that ANZ farmers have not been immune from the standard 'small farm problem' that requires them to 'get big or get out' as the economy develops. It is true that their farm sizes were large relative to those in most other market economies in the early post-World War II years, and that the 'wool boom' of the early 1950s provided massive incomes for woolgrowers. Nonetheless, as wages grew elsewhere in the economy, the need to adjust was felt strongly in ANZ just as elsewhere;[24] and it manifested itself in the same way, that is, with farmers funding agricultural research and adapting and adopting the new technologies it generated as appropriate, and with the number of farms and farmers declining steadily to lower the labor intensity of the sector even as output expanded (Appendix Figure 6).[25]

Within that context, the removal of the anti-agricultural policy bias over the past 30 years has boosted, with a not-unexpected delay, the rate of growth of ANZ farm productivity substantially. Figure 6 shows that in New Zealand, TFP growth *slowed* during the dozen or so years of high agricultural subsidies, and only increased to its previous rate after those subsidies were removed along with manufacturing protection. This pattern has been reflected in farm land prices: after initially halving when the subsidy cuts were announced in the early 1980s, they more than recovered in real terms by the turn of the century as farmers profitably adjusted to the new deregulated, level-playing-field domestic economic environment (Figure 7).

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[24] In the first half of the 1950s, farm incomes averaged more than 20 percent above non-farm self-employed incomes and more than twice those of male wage and salary earners; but in the next dozen years farm incomes fell to 5 percent below non-farm self-employed incomes and to just 30 percent above those of male wage and salary earners (McKay 1967, Table 1). The gap between farm and nonfarm incomes and spending power grew especially rapidly in the ten years from 1963 (Glau 1971, Figure 1).

[25] For example, Australia's dairy industry saw the following changes over the 25 years to 2004: the number of dairy farmers more than halved (from 22,000 to 10,000), the average herd size increased 2.5 times (from 85 to 210) average annual yield per cow nearly doubled (from 2850 to 4900 litres) and average annual milk production per farm quadrupled, from 0.25 to 1.05 million litres (Productivity Commission 2005, p.131; Harris 2005a). As well, the dairy processing industry has become significantly more productive (Balcombe, Doucouliagos and Fraser 2007). Overall, the number of farmers in Australia has fallen by more than one-third over the past half-century (ABARE 2007).

In Australia, farm multifactor productivity (MFP) growth increased following the international price hikes in 1973-74, but then plateaued during the next decade until the reforms from the mid-1980s began to have their effect (Figure 6). In the 1983-93 period farm MFP grew at just 1.4 percent per year, but during 1993-2000 its growth rate was 4.1 percent (Productivity Commission 2005, p.121). Similar results are reported in Parham (2004): less than 1.5 percent during 1974-88, then 2.6 percent in 1988-93 and 4.3 percent in 1993-98.[26] His estimates show that even that earlier rate of 1.5 percent compares favourably with that for the other sectors of Australia's economy, the MFP of which was well below 1 percent during 1973-93 (and only 1.8 percent in 1993-98).

Clearly, farmers are capable not only of surviving without subsidies, but of becoming more productive with their removal – and not with any obviously faster rate of decline in the total number of farmers or farms that occurs with normal economic growth (see Appendix Table 6).[27] These two case studies contradict one view in the economic growth literature that natural resource abundance (including a comparative advantage in agriculture) is a curse rather than a blessing.[28]

Three important aspects of the ANZ reform success need to be underlined. One is that it helps if assistance to non-agricultural sectors is cut at the same time. In ANZ those other micro- and macro-economic reforms made it easier for farmers to adjust and raise their productivity. This is relevant for those many developing countries that still have industrial protection and behind-the-border restrictions on domestic market activities. For other high-income countries, where manufacturing protection rates are already low and the macro economy is well managed, the reduction of high agricultural supports would be more painful unless coupled with adjustment assistance measures. Both sets of countries may benefit by following the adoption by Australia of rural R&D corporations to manage research investments funded by a levy on farmers matched dollar for dollar by a grant from the Federal Government. Introduced in 1989, this innovation funding model

[26] See also the results since the mid-1970s in Fleming (2007), who shows that MFP growth on Australia's farms enabled producers to cope with the fact that, over the past three decades, the prices they paid for their inputs grew 1.6 percent more per year than the prices they received for their products.

[27] Adjustment has been sharper within individual industries of course, especially those that faced dramatic cuts in subsidies such as Australia's dairy industry (see previous footnote).

[28] On this literature in general and its applicability to Latin America, see Lederman and Moloney (2006). See also Anderson (1998).

(together with a similar model for the generic promotion of Australia's farm products),[29] arguably has contributed significantly to the increased international competitiveness of Australian agriculture as reflected in Appendix Figure 3 (see CIE 2003, Productivity Commission 2007, pp. 428-38).

Second, adjustment to agricultural assistance cuts is easier the greater the heterogeneity within the agricultural sector. This can take at least two forms. Heterogeneity in rates of industry assistance within the sector, as captured by the standard deviation of farm industry NRAs shown near the bottom of Tables 2 and 3 above, ensures that as high rates of assistance are lowered, resources will find it profitable to move to lightly assisted farm industries. Such transfers are far easier than transferring mobile resources to other sectors, and involve much less reduction in the value of sector-specific assets, particularly farm land. For Australia the standard deviation was very high when the cuts in farm assistance began in the early 1970s, whereas for a country such as Norway the support levels are very similar across farm industries so there would be much less scope for adjustment within the sector.

The other form of heterogeneity has to do with firm efficiency within each industry. If some farmers are much more efficient than others, then a cut in assistance to that industry typically leads to the less-efficient being bought out by the more-efficient (who often are also the more innovative and export-oriented). The productivity effects of that could be substantial (Melitz 2003, Baldwin 2005, Long, Raff and Stahler 2007). In the case of the Australian dairy industry, that force does indeed seem to have been powerful (Harris 2005a). It may help explain also the rapid rise since the 1980s in export relative to domestic sales for a number of Australia's agricultural industries, including beef, canola, wine and cotton (see Figure 3 and Appendix Figure 3). Table 5 shows four other indicators of this increasing globalization of agriculture in these two countries, two of which also indicate growth in intra-sectoral trade: an increasing share of consumption being imported even though the self-sufficiency indicator is rising, and a slightly declining ratio of net exports to exports plus imports of agricultural products.

[29] On the basic economics of these supply and demand shifting investments in the presence of spillovers, see for example Levin and Reiss (1988).

The third important aspect of the ANZ reform success has to do with the scope and quality of public institutions. Both countries had strong institutional arrangements that facilitated the development of policy advice, provided the policy co-ordination, and administered the policy changes. The legal, accounting and media systems ensured relatively transparent and informed policy debate, and assisted in resolving a host of firm-level complications that arose during policy implementation. The lesson for those wishing to copy the ANZ reform experience, especially in a developing country context, is to not underestimate the importance of strong, pro-market, transparent, corruption-free institutions.

Getting domestic policies right in the food safety, natural resource (especially water) and environmental areas, and securing tariff and subsidy cuts abroad from the WTO's Doha Development Agenda, have the potential to yield even further productivity growth for farmers in Australia and New Zealand. But those are stories for the future.

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Table 1: Sectoral composition of GDP, employment and exports, Australia and New Zealand, 1820 to 2005-06

(percent, at current prices)

(a) Australia

GDP share	Agriculture	Mining	Manufacturing	Services	TOTAL
1820-24	53	1[a]	3	43	100
1861-64	23	15	13	49	100
1880-84	24	5	24	47	100
1910-14	23	6	23	48	100
1950-54	22	2	29	47	100
1960-64	16	2	28	54	100
1970-74	9	3	26	62	100
1980-84	5	6	20	69	100
1990-94	3	5	15	78	100
2005-06	3	4	11	82	100

Employment	Agriculture	Mining	Manufacturing	Services	TOTAL
1962-63	10	1	26	63	100
1972-73	7	1	24	68	100
1982-83	6	1	19	74	100
1993-94	5	1	14	80	100
2005-06	3	1	10	85	100

Export share	Agriculture	Mining	Other merchandise	Services	TOTAL
1950-51	86	6	3	5	100
1962-63	66	8	13	13	100
1972-73	44	28	12	16	100
1982-83	39	34	11	16	100
1993-94	26	41	14	19	100
2005-06	21	35	22	22	100

… continued

Table 1 (continued): Sectoral composition of GDP, employment and exports, Australia and New Zealand, 1820 to 2005-06

(percent, at current prices)

(b) New Zealand

GDP share	Agriculture	Industry	Services	TOTAL
1950-54				100
1960-64				100
1970-74	11	32	57	100
1980-84	9	32	59	100
1990-94	8	25	67	100
1995-99	7	24	69	100
2000-04	9	23	68	100

Employment share	Agriculture	Other primary	Manufacturing	Services	TOTAL
1960-64	14				100
1970-74	12				100
1980-84	11				100
1990-94	10				100
1995-99	9				100
2000-04	9				100

Export share	Agriculture and food	Other primary	Other manufactures	Services	TOTAL
1860-64	41[b]				100
1980-84	63[b]				100
1910-14	72[b]				100
1950-54	81[b]				100
1960-64	83	0	4	13	100
1970-74	70	2	10	18	100
1980-84	58	5	18	19	100
1990-94	50	5	23	22	100
1995-99	47	5	24	24	100
2000-04	44	5	24	27	100

[a] Assumes mining is one-quarter of the total of mining and manufacturing in 1820-24

[b] Refers to ag's share of just merchandise exports pre-1960

Sources: ABARE (2007), Sandri, Valenzuela and Anderson (2006) and, for Australian GDP and NZ trade prior to the 1960s, Mitchell (2003c) and Butlin (1962).

Table 2: Nominal rates of assistance to covered farm products, Australia, 1946 to 2007
(percent, for fiscal years starting 1 July)

	1946-49	1950-54	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04	2005-07
Exportables	**-7.5**	**0.9**	**6.4**	**7.0**	**10.0**	**7.6**	**3.6**	**4.6**	**5.6**	**4.8**	**3.0**	**0.0**	**0.0**
Rice	-3.2	-1.1	11.4	15.0	14.8	22.0	20.4	15.2	10.6	2.5	2.3	1.7	1.9
Wheat	-24.2	-8.4	1.9	6.1	10.1	7.2	-0.4	2.6	3.8	2.1	1.1	0.0	0.0
Barley	-14.1	-5.8	4.1	3.1	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oats	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grapes, total	10.5	4.5	5.6	9.7	18.7	39.7	19.2	21.3	18.3	13.3	4.9	0.0	0.0
Sugar	-8.2	0.7	12.8	15.9	32.8	7.6	-6.2	4.6	12.4	5.8	1.7	0.0	0.0
Cotton	0.8	2.0	26.7	52.1	73.9	53.4	17.6	4.4	2.0	0.0	0.0	0.0	0.0
Wool	0.0	0.0	0.0	0.0	0.0	6.0	1.4	1.0	1.0	5.4	0.7	0.0	0.0
Beef and veal	0.0	0.0	0.0	0.0	0.0	1.4	1.8	1.4	1.2	0.3	0.0	0.0	0.0
Mutton and lamb	0.0	0.0	0.0	0.0	0.4	1.6	1.8	1.4	1.8	0.9	0.0	0.0	0.0
Pigmeat	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Milk	2.1	18.7	46.9	43.1	74.5	32.8	35.8	32.2	39.6	23.8	19.3	0.0	0.0
Apple	na	na	6.0	6.0	6.0	9.0	5.4	3.4	1.2	0.4	0.1	0.0	0.0
Sunflower	na	na	na	na	na	na	na	5.6	1.4	0.0	0.0	0.0	0.0
Import-competing products	**0.0**	**10.1**	**13.4**	**12.5**	**13.1**	**18.3**	**11.6**	**8.0**	**3.7**	**1.8**	**0.4**	**0.1**	**0.0**
Maize	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sorghum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	2.0	0.0	0.0	0.0	0.0
Oilseeds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tobacco	0.0	34.2	51.0	46.9	51.3	250.0	122.2	56.4	37.6	48.5	19.8	0.0	0.0
Poultry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Banana	na	na	0.0	0.0	0.0	0.0	0.0	4.8	1.0	0.1	0.0	0.0	0.0
Olive	na	na	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Orange	na	na	25.0	25.0	25.0	25.8	32.8	38.2	13.0	2.7	0.7	0.6	0.6
Soybean	na	na	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Nontradables	**-1.2**	**12.6**	**31.4**	**41.6**	**78.1**	**25.3**	**19.5**	**24.2**	**12.2**	**1.8**	**0.2**	**0.0**	**0.0**
Eggs	-1.7	14.7	43.7	61.8	141.2	35.0	26.0	35.8	18.4	3.4	0.4	0.0	0.0
Potatoes	0.0	8.0	8.0	8.0	8.0	7.2	7.2	8.0	3.2	0.0	0.0	0.0	0.0

Wted. ave. of covered products	**-7.0**	**1.8**	7.8	8.5	12.3	8.8	4.6	5.4	5.7	4.4	2.6	0.0	0.0
Domestic market support	na	na	1.4	1.6	2.5	1.0	0.8	0.9	0.5	0.4	0.2	0.0	0.0
Border market support	na	na	6.5	7.0	9.8	7.8	3.9	4.6	5.2	4.0	2.5	0.0	0.0
Dispersion. of covered products	7.4	12.2	17.3	21.3	36.1	54.0	27.9	16.9	12.2	10.9	5.8	0.4	0.4
% coverage (at undistorted prices)	91	84	82	86	87	84	85	86	75	82	80	80	80

[a] Weighted averages, with weights based on the unassisted value of production (actual back to 1966, and the average for 1966-69 for earlier years). Dispersion of NRAs is their standard deviation of the simple 5-year average of the annual standard deviation around the weighted mean.
Source: Anderson and Valenzuela (2008), drawing on authors' spreadsheet.

Table 3: Nominal rates of assistance to covered farm products, New Zealand, 1955 to 2007
(percent)
[removed othergrains and wine grape, see email]

	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04	2005-07
Exportables	**0.1**	**0.1**	**0.2**	**2.8**	**13.1**	**18.8**	**11.8**	**1.2**	**0.8**	**0.9**	**0.6**
Barley	na	na	na	na	na	10.6	1.8	0.0	0.0	0.0	0.0
Beef	0.1	0.1	0.3	5.0	10.0	15.6	11.0	1.4	1.0	1.0	0.3
Coarsegrains	4.0	4.0	4.0	4.0	4.0	4.0	2.2	0.4	0.0	0.0	0.0
Other fruit&veg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maize	na	na	na	na	na	12.0	2.2	0.0	0.0	0.0	0.0
Milk	0.2	0.2	0.2	-1.0	16.0	18.0	11.6	1.4	1.0	1.0	0.3
Oat	na	na	na	na	na	9.2	2.4	0.0	0.0	0.0	0.0
Othercrops	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sheepmeat	0.1	0.1	0.3	5.0	19.0	32.9	27.8	1.8	1.0	1.0	0.3
Wool	0.0	0.0	0.0	5.0	11.0	19.0	10.2	1.4	1.0	1.0	0.3
Import-competing	**28.3**	**28.3**	**28.8**	**32.0**	**27.0**	**28.1**	**41.1**	**22.5**	**19.6**	**15.8**	**8.9**
Egg	59.0	59.0	59.0	59.0	59.0	59.0	80.2	38.2	50.4	36.4	25.0
Pigmeat	2.0	2.0	2.8	5.4	-19.9	10.3	-2.8	0.0	0.0	0.2	0.3
Poultry	31.0	31.0	31.0	31.0	31.0	31.0	61.6	57.0	40.8	34.6	28.3
Wheat	11.0	11.0	11.0	11.0	11.0	11.0	6.6	0.6	0.0	0.0	0.7
Mixed trade status											
Grape	120.0	120.0	134.0	106.0	53.8	23.2	23.8	5.0	5.0	5.0	5.0
All covered	**1.8**	**1.8**	**1.9**	**5.0**	**14.3**	**20.0**	**14.9**	**2.9**	**2.1**	**2.0**	**1.3**
Domestic market support	0.0	0.0	0.0	0.0	0.0	0.2	2.0	0.0	0.0	0.0	0.0
Border market support	1.8	1.8	1.9	5.0	14.3	19.8	12.9	2.9	2.1	2.0	1.3
Dispersion of NRA of covered products	40.7	40.7	44.5	36.3	23.2	17.4	27.1	17.5	17.3	14.0	9.8
% coverage at undistorted prices	100	100	100	100	100	100	100	100	100	100	80

[a] Weighted averages, with weights based on the unassisted value of production (actual back to 1966, and the average for 1966-69 for earlier years). Dispersion of NRAs is their standard deviation shown is the simple 5-year average of the annual standard deviation around the weighted mean.
Source: Anderson and Valenzuela (2008), drawing on authors' spreadsheet.

Table 4: Nominal rates of assistance to agricultural relative to non-agricultural industries, Australia and New Zealand, 1946 to 2007
(percent, for fiscal years starting 1 July)

(a) Australia

	1946-49	1950-54	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04	2005-07
Covered products	-7.0	1.8	7.8	8.5	12.3	8.8	4.6	5.4	5.7	4.4	2.6	0.0	0.0
Non-covered products	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All agriculture (excl NPS)	-6.4	1.5	6.3	7.4	10.7	7.6	3.9	4.6	4.4	3.7	2.1	0.0	0.0
All importables	na	na	3.8	4.5	4.9	7.4	4.9	3.5	1.2	0.8	0.2	0.0	0.1
All exportables	na	na	5.7	6.4	9.3	7.0	3.3	4.2	4.8	4.3	2.6	0.0	0.0
All nontradables	na	na	31.4	41.6	78.1	25.3	19.5	24.2	12.2	1.8	0.2	0.0	0.0
TBI	na	na	0.02	0.02	0.04	0.00	-0.02	0.01	0.04	0.03	0.02	0.00	0.00
Non-product specific (NPS)	0.6	1.2	1.8	2.1	2.0	2.1	1.4	1.1	0.9	0.7	0.8	0.5	2.2
Inputs	na	na	na	na	na	na	1.2	0.7	2.0	3.0	3.3	2.8	2.8
Other	na	na	na	na	na	na	1.4	1.1	-1.1	-2.3	-2.5	-2.3	-0.6
All agriculture (incl NPS)	-5.7	2.7	8.1	9.5	12.7	9.4	5.3	5.8	5.3	4.4	2.9	0.5	2.2
Decoupled payments	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.4	1.2	1.2	2.3	2.6
All agric (incl NPS & dec)	-5.7	2.7	8.1	9.5	12.7	9.4	5.4	6.6	6.6	5.6	4.1	2.8	4.8
All ag tradables (inc NPS)	-5.9	2.3	7.3	8.4	10.9	8.9	4.9	5.2	5.1	4.5	3.0	0.5	0.2
All nonag tradables	28.0	23.5	19.6	20.7	20.7	16.8	12.0	11.1	8.2	5.3	2.6	2.0	2.0
RRA	-26.3	-17.1	-10.3	-10.2	-8.2	-6.8	-6.4	-5.3	-2.9	-0.7	0.4	-1.5	-1.8

Table 4 (continued): Nominal rates of assistance to agricultural relative to non-agricultural industries, Australia and New Zealand, 1955 to 2007

(percent)

(b) New Zealand

	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04	2005-07
Covered products	1.8	1.8	1.9	5.0	14.3	20.0	14.9	2.9	2.1	2.0	1.3
Non-covered products	nap	nap	nap	nap	nap	nap	nap	nap	nap	nap	na
All agriculture (excl NPS)	1.8	1.8	1.9	5.0	14.3	20.0	14.9	2.9	2.1	2.0	1.2
All importables	28.3	28.3	28.8	32.0	27.0	29.6	42.1	24.3	20.7	17.6	9.8
All exportables	0.1	0.1	0.2	2.8	13.1	18.9	12.0	1.2	0.8	0.9	0.6
All nontradables	na	na	na	na	na	na	na	na	na	na	na
TBI	-0.22	-0.22	-0.22	-0.22	-0.11	-0.08	-0.21	-0.18	-0.16	-0.13	-0.07
Non-product specific (NPS)	na	na	na	na	na	8.9	5.5	0.5	0.6	0.4	0.3
Inputs	na	na	na	na	na	na	4.6	0.5	0.6	0.4	0.3
Other	na	na	na	na	na	8.9	0.9	0.0	0.0	0.0	0.0
All agriculture (incl NPS)	1.8	1.8	1.9	5.0	14.3	28.9	20.9	3.4	2.6	2.4	1.4
Decoupled payments	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1
All agriculture (incl NPS & decp)	1.8	1.8	1.9	5.0	14.3	28.9	20.9	3.5	2.6	2.4	1.5
All agricultral tradables (incl NPS)	1.8	1.8	1.9	5.0	14.3	28.9	20.9	3.4	2.6	2.4	1.4
All nonag tradables	21.3	24.0	34.3	30.0	21.7	20.3	16.6	10.8	6.5	3.8	3.3
RRA	-16.1	-17.8	-24.1	-19.0	-6.0	7.1	3.5	-6.7	-3.6	-1.3	-1.8

[a] Before including Non-Product Specific (NPS) assistance. [b] Total of assistance to primary factors and intermediate inputs divided to total value of primary agriculture production at undistorted prices (%). [c] The Relative Rate of Assistance, RRA = $100[(1+NRAag^t/100)/(1+NRAnonag^t/100) - 1]$, where $NRAag^t$ and $NRAnonag^t$ are the average percentage NRAs for the tradables parts of the agricultural and non-agricultural sectors, respectively

Source: Anderson and Valenzuela (2008), drawing on authors' spreadsheet.

Table 5: Growth in agricultural export orientation, Australia and New Zealand, 1961 to 2004

(a) Australia

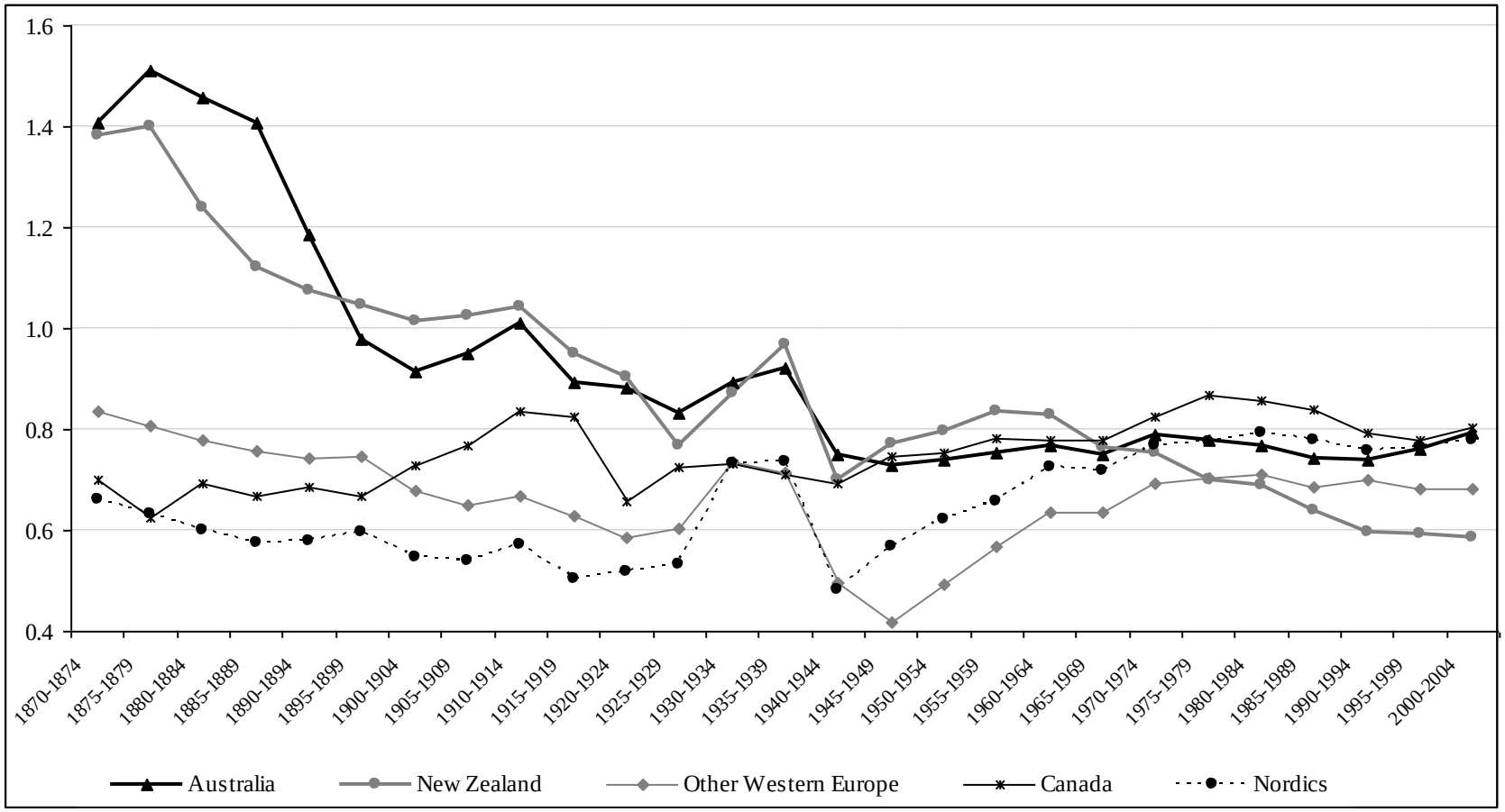
	Share of agric. production[a] exported (percent)	Share of agric. consumption[b] imported (percent)	Agricultural self-sufficiency ratio[c] (percent)	Agricultural export specialization index[d]
1961-65	48	3	187	0.93
1966-70	45	3	178	0.94
1971-75	41	2	166	0.94
1976-80	46	3	186	0.93
1981-85	53	4	218	0.94
1986-90	57	4	225	0.93
1991-95	47	4	183	0.90
1996-00	64	7	266	0.92
2001-04	55	7	220	0.89

(b) New Zealand

1961-65	45	6	171	0.86
1966-70	35	4	148	0.85
1971-75	40	6	157	0.84
1976-80	49	7	185	0.86
1981-85	58	9	215	0.86
1986-90	63	12	240	0.86
1991-95	66	16	251	0.83
1996-00	67	16	258	0.83
2001-04	64	14	244	0.84

[a] Production valued at undistorted prices of the product traded, so as to be consistent with the fob prices of exports.
[b] Consumption is assumed to be production valued at undistorted prices plus the value of imports minus exports.
[c] Production as a percentage of production plus imports minus exports.
[d] Exports minus imports as a ratio of exports plus imports.
Sources: Value of trade data are from the FAOSTAT at www.fao.org; value of production at distorted prices for each agricultural product are taken from national sources and are divided by 1+NRA for that product to obtain a value at undistorted prices, where NRA is the authors' estimated nominal rate of assistance summarized in Tables 2 and 3.

Figure 1: Real GDP per capita in Australia, New Zealand and other high-income countries relative to the United States, 1870 to 2004 (United States = 1)

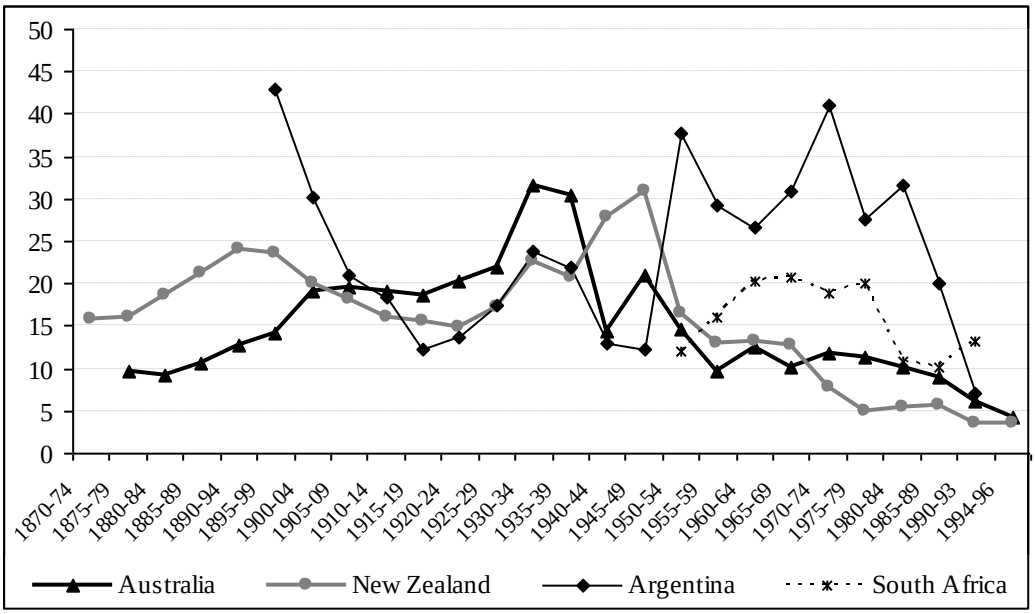


Source: Based on 1990 International Geary-Khamis dollars from Maddison (2003), shown relative to the United States which is set as the numeraire at 1.00. 'Nordics' includes Denmark, Finland, Norway and Sweden; 'Other Western Europe' includes all with data from 1870, namely Belgium, France, Germany, Italy, Netherlands, Portugal, Spain, Switzerland, and the United Kingdom.

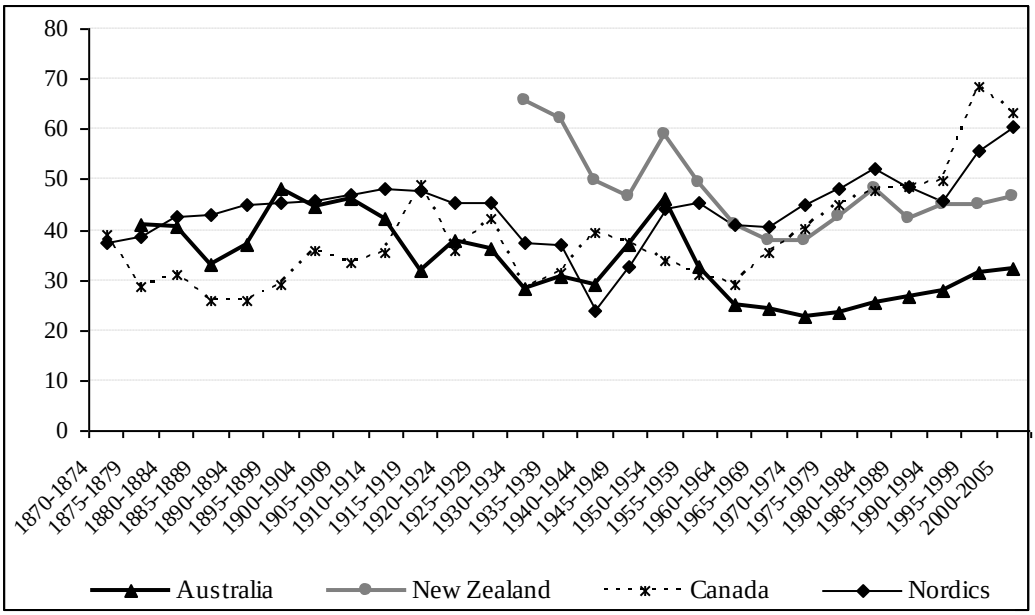
Figure 2: Openness indicators, Australia and New Zealand plus other high-income countries,[a] 1865 to 2005

(percent, five-year averages)

(a) Customs revenue as a share of merchandise imports



(b) Merchandise exports plus imports as a share of GDP

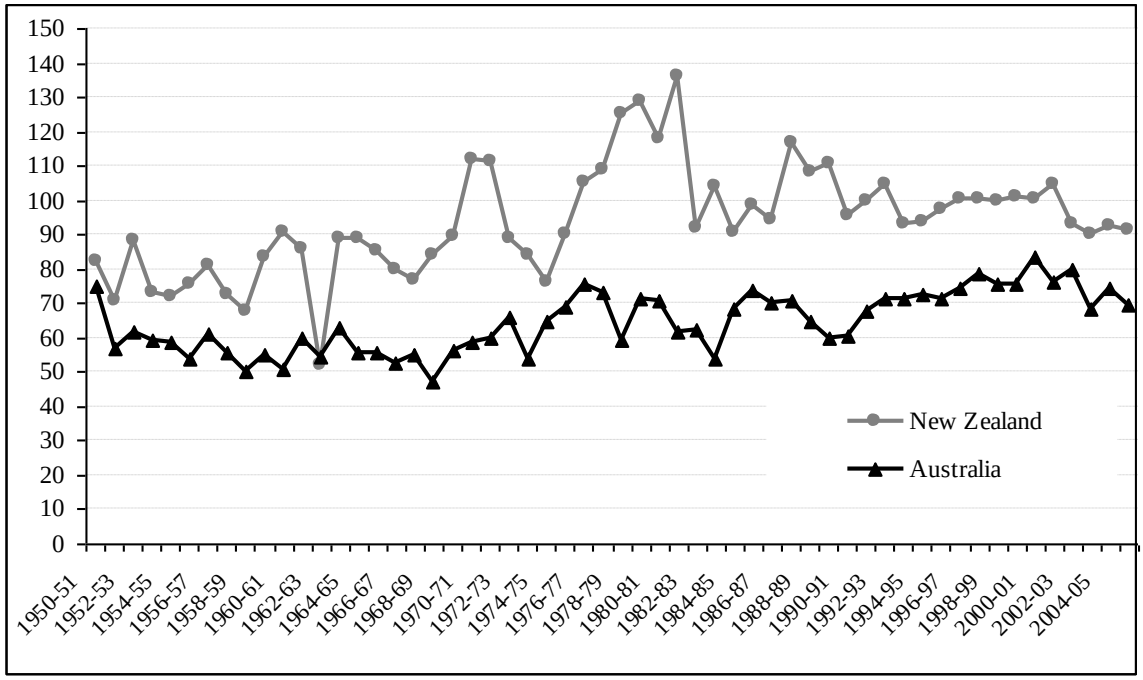


[a] Weighted average for Denmark, Finland, Norway and Sweden, using mid-period imports as the weights for each 5-year period. Data for Australia pre-1901 are from Maloney (2002).

Source: Mitchell (2003a,b,c), Maloney (2002), World Bank (2006)

Figure 3: Value of agricultural exports as a share of gross value of farm production, Australia and New Zealand, 1950-51 to 2005-06

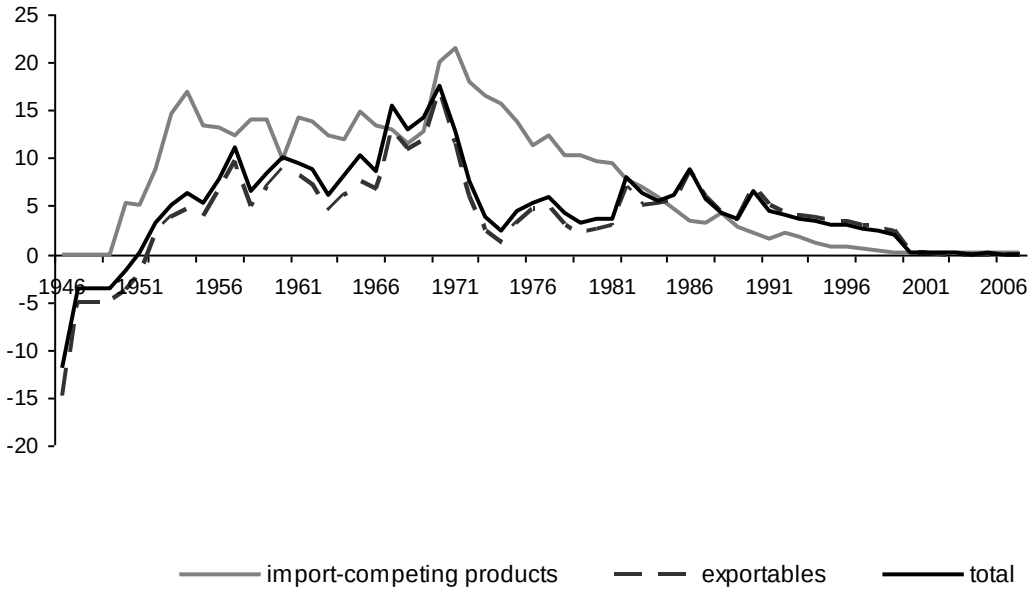
(percent)



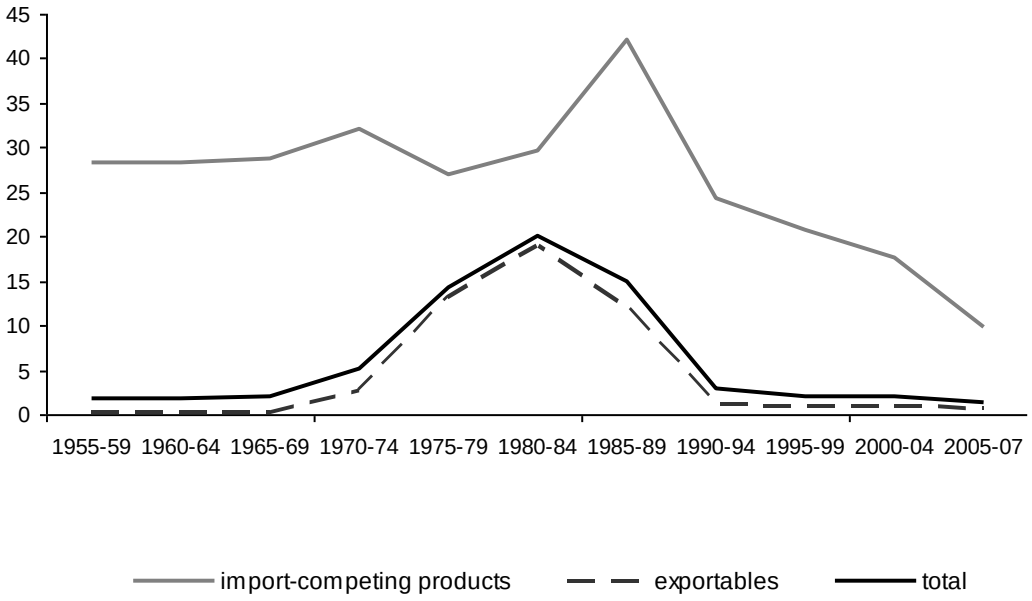
Source: Compiled by the authors from data taken from ABARE (2007) for Australia and from the NZ Ministry of Agriculture and Forestry from 1972 and the NZ Treasury before 1972.

Figure 4: Nominal rates of assistance to exportable, import-competing and all[a] covered products, Australia and New Zealand, 1946 to 2007
(percent, five-year averages for NZ)

(a) Australia



(b) New Zealand

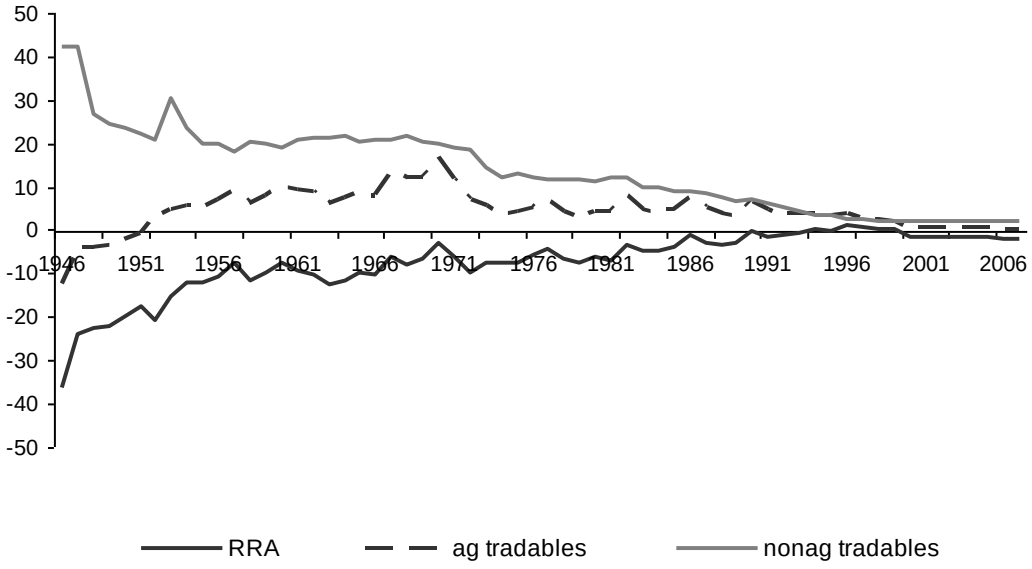


[a] The total NRA can be above both the exportable and importable averages because assistance to nontradables assistance is also included.
Source: Anderson and Valenzuela (2008), drawing on authors' spreadsheet.

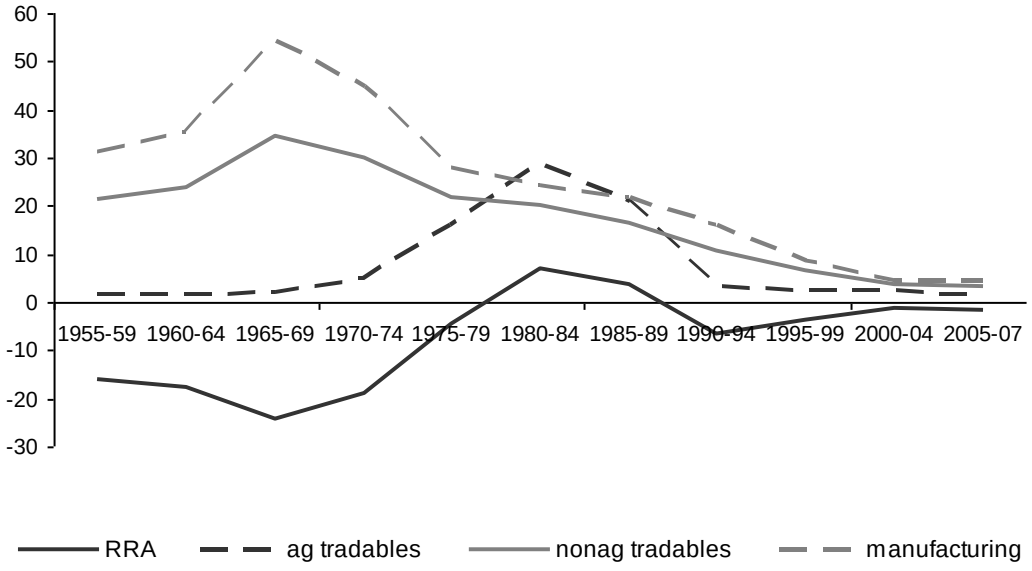
Figure 5: Nominal rates of assistance to manufacturing, all non-agricultural tradables, all agricultural tradable industries, and relative rate of assistance,[a] Australia and New Zealand, 1946 to 2007

(percent, five-year averages for NZ)

(a) Australia



(b) New Zealand

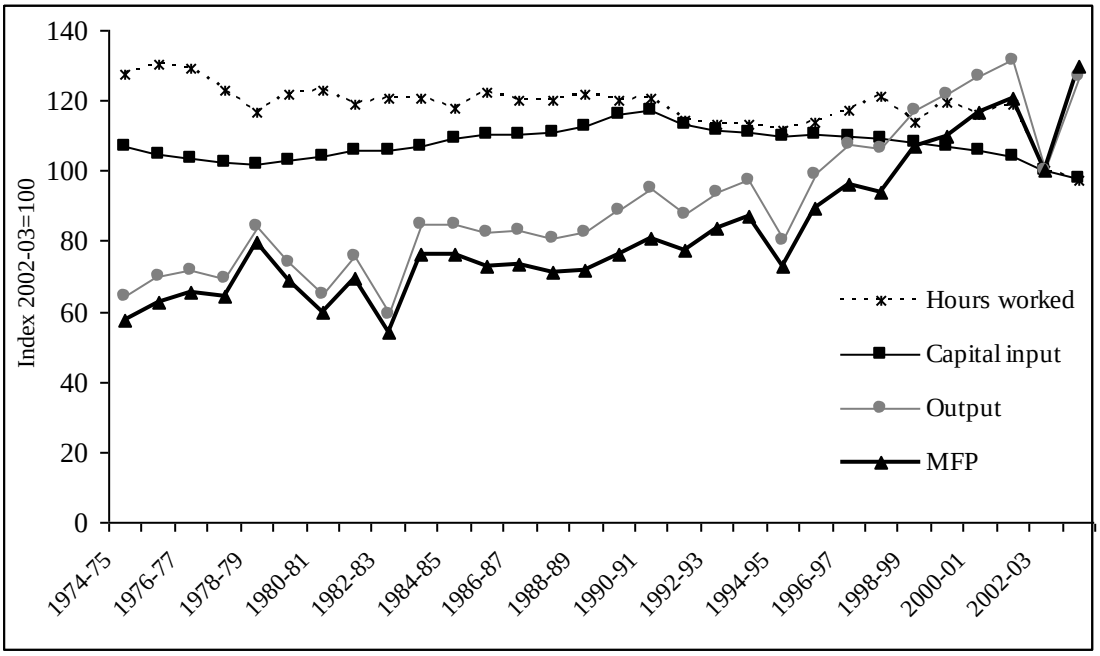


[a] The RRA is defined as $100*[(100+NRAag^t)/(100+NRAnonag^t) - 1]$

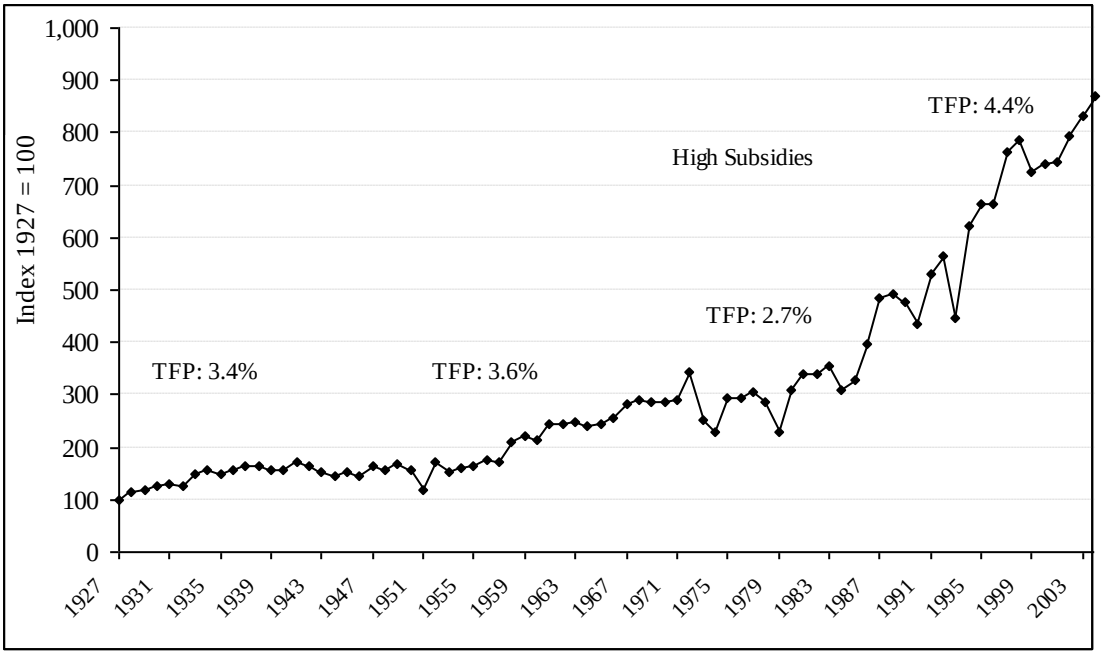
Source: Anderson and Valenzuela (2008), drawing on authors' spreadsheet.

Figure 6: Real agricultural total/multi-factor productivity growth, Australia and New Zealand, 1927 to 2004

(a) Australia

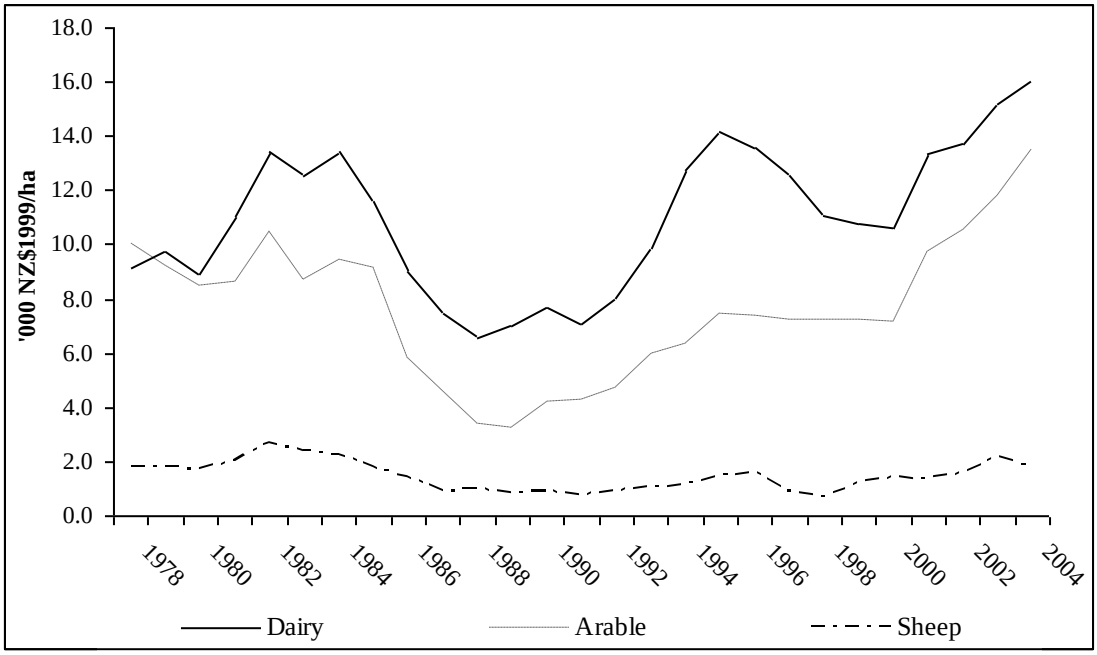


(b) New Zealand



Sources: Productivity Commission (2005, p.121) and Lattimore (2006)

Figure 7: Real farmland prices, New Zealand, 1978 to 2004
(1999 NZ dollars per hectare)



Source: Lattimore (2006)

Appendix: Data Sources for Australia and New Zealand

(a) Australia

Measuring the nominal rates of assistance to agricultural commodities

Australia's Industries Assistance Commission began calculating estimates of the nominal rates of assistance for major agricultural commodities beginning with the year 1970-71. (All years are fiscal, beginning 1 July.) This series has been continued by its successors, the Industry Commission and the Productivity Commission.[30] There are four breaks in the series as each sub-series is benchmarked to the reference years 1970-71, 1983-84, 1990-91 and 1996-97. There are some differences between estimates for these periods. For example, the first three series were compiled on an agricultural commodity basis. On the other hand, for the latest (1996-97 benchmarked) series, the Productivity Commission moved to a ANZSIC industry-based classification of activities, in line with the methodology used for the manufacturing sector industries. For this reason, the series for most individual commodities is not available from 1999-2000. The changes are detailed in Productivity Commission (2002, Methodological Annex A).

For the years before 1970-71, the only comprehensive series available is that published in Lloyd (1973, pp. 149-58), which was prepared by Australia's Bureau of Agricultural Economics. They followed one of the methods used by Harris (1964) in his pioneering paper on agricultural protection in Australia, as explained in Lloyd (1973, Appendix Notes). They cover the major agricultural commodities for which data were available at the time, for the years 1946-47 to 1970-71. The Lloyd/BAE series and the PC series use essentially the same methods. Commodities are designated as either export or import commodities and then direct estimates of the implicit price changes to producers resulting from agricultural assistance were made and expressed as a percentage of the export or (in the case of tobacco and cotton pre-1970) import parity price. Appendix Table 1 reports the Lloyd/BAE and the PC series for the main distorted commodities. (For milk prior to 1970-71, we took a simple average of the Lloyd/BAE estimates for Butter and Cheese, shown in Appendix Table 4, to get the milk NRA shown in Table 2 for those years.)

The two series provide estimates for one year in common, 1970-71. This common year provides a check on the comparability of the two series. As shown at the bottom of Appendix Table 4, the estimates for the common year are reasonably close with the exceptions of tobacco and eggs. For tobacco the differences are explained by differences in the source of imports used to establish the import parity price. Imports of tobacco leaf used in the manufacture of tobacco products in Australia varies greatly in quality and price by source. The choice of source to establish the import parity price is discussed at length in reports by the Industries Assistance Commission (1981, Appendix 5; 1983a, chapter 6.4; and 1983b, Section 4.2). For eggs, it is not clear why the Lloyd/BAE and the PC series give such widely different estimates of the level of assistance, as they cover the

[30] On the history and workings of this remarkable transparency agency and the policy reform process of which it has been an active participant, see Productivity Commission (2003).

same forms of assistance and use similar methods. That industry has a very small weight in the sectoral aggregate, however, so it does not affect the average NRA for the sector as a whole. For the larger range of industries examined by the Productivity Commission from 1970-71, we report their NRA estimates in Appendix Table 5.

For the industries covered by the Commission but not by Lloyd, 'guesstimates' have been made for the years before 1970, based on the policy descriptions in Edwards (2006) and the references cited therein. The only guesstimate of significant size is for wine grapes, whose NRA is assumed to equal that estimated by Lloyd for dried vine fruit up to 1970. All the other industries had either no assistance (maize, oats, rapeseed, soybean, bananas, olives, wool, beef, sheepmeat, pigmeat, chicken meat) or a very small weight in the total gross value of farm production (for the 1950s and 1960s: apples 6 percent, oranges 25 percent and potatoes 8 percent; and zero NRA for all three pre-1950-51), this introduces little uncertainty as to the average for the sector.

To obtain the weighted averages for agriculture as a whole shown in Table 4, we assumed the NRA was zero for products not covered by the above estimates and 'guesstimates'. This is reasonable since those not covered are mostly small horticultural industries which are not subject to market interventions (apart from quarantine restrictions, which are in place purportedly for health rather than economic protection reasons). For weights we used gross value of production at undistorted prices, calculated by dividing that value at domestic producer prices by (1+NRA/100).

The Commission has used a new, less-disaggregated industry classification from 2000-01 (see Productivity Commission 2004, Appendix B), which provides direct estimates for only dairy, poultry and pig farming. Since all the others have very close to zero nominal assistance, that has been assumed for all but two products whose 1999-00 values are assumed to continue to 2003-04 (rice 1.7 percent and oranges 0.6 percent). OECD (2008) is used to provide NRA estimates from 2004 to 2007.

The final column in Appendix Tables 4 and 5 includes 'non-product-specific' assistance (including all assistance via factor and intermediate input markets, even though some of that is in fact product-specific), estimates of which are taken from the Productivity Commission for the period from 1970. We assume them to have been 1.8 percent of the gross value of farm production in 1969, 2 percent in 1960, 0.5 percent in 1946, and linear interpolations between those years.

Lloyd (1993, Table 10.6) also provides consumer tax equivalents for his set of products, reproduced in Appendix Table 7. And in the Appendix Table 8 we reproduce the CTE values for subsequent years as calculated by the OECD (2008).

Measuring the nominal rates of assistance to non-agricultural tradable commodities

The Productivity Commission has not provided systematic NRA estimates for mining for every year, but for those years it has done so in recent decades the values vary within the range of -1 to +1 percent. We therefore simply assume that sector's NRA has been zero since 1960 when the ban on iron ore and coal was lifted. We also assume it is zero for other primary products, since they are not subject to government interventions other than for resource and environmental conservation reasons (and in any case they represent a tiny fraction of GDP).

Estimates of the NRA for manufacturing for the period prior to 1968-69, when Productivity Commission estimates begin, rely on tariffs only. During 1952 to 1960 there were also protective quantitative restrictions on imports of manufactures (ostensibly for balance of payments reasons in the presence of fixed exchange rates), but since we do not have estimates of the protective effects of those import licences, we simply assume their impact on the average NRA for non-agricultural tradables is exactly offset by the negative impact of the ban on key mining exports in those years.[31]

Since Australia's imports pre-1970 were almost exclusively manufactures, customs revenue as a percentage of the value of all merchandise imports provides a reasonable proxy for the country's nominal rate of tariff protection for manufacturing. Data for that indicator are reported for Australia and New Zealand, together with several other industrial countries, in Appendix Table 1 for 1870 to 1993. They are also reported in Appendix Table 3 from 1944-45 along with that referring just to dutiable imports, using data from the Australian Bureau of Statistics (ABS, previously the Commonwealth Bureau of Census and Statistics, CBCS). The latter were compiled by Lloyd (2006). Since these series relate to customs duties only they do not include assistance due to non-tariff measures, apart from anti-dumping and countervailing duties and also revenue duties ("Primage"). They include an adjustment for refunds and drawbacks of customs duties, and they include primage duties where applicable because these added significant protection to Australian producers of many goods. The first column also includes duties levied on excisable goods,[32] and refers to actual rates levied on imports, thereby combining MFN, preferential and concessional tariffs on final goods and intermediate or capital inputs. Since those inputs that were not competitive with Australian-produced goods were admitted duty free under by-law and concessional import schemes, the series has long been regarded as less useful than the series of the average tariff on dutiable imports only. Thus the best available series measuring the average nominal protection due to the Australian tariff over the period to 1968 (after which more-comprehensive Productivity Commission estimates are available) is that in the second column of Appendix Table 3.

Both tariff series in Appendix Table 3 are averages calculated using import weights. The problem of selecting weights has vexed economists worldwide since the pioneering study on this subject by the League of Nations (1927). In Australia, it vexed economists from the time of the first attempts to consider the problem by Crawford (1930) and Carmody (1952). The method of calculating the average tariff by dividing the total duty collected by the value of imports is of course simply an arithmetic mean, using the percentage of imports of each good in the current period as the weights (a Paasche Index). This statistic has the desirable statistical properties that the weights are all positive fractions and sum to unity. Since the time of the League of Nations study it has been standard practice to object to the use of import weights on the ground that this

[31] In years prior to the 1950s, the relatively low international prices of mineral and energy products (world Bank 2000), combined with the very high cost of transporting bulky coal and iron ore from Australia to the North Atlantic's industrial hub, means that export ban was probably redundant – other than to signal Australia's unwillingness at that time to provide industrial raw materials to Japan. For more on mining policies historically, see Doran (1984), and on mineral taxation in particular, see Gruen (1978, Ch. 4).

[32] The duty collected should be adjusted to cover only the margin over the excise duty levied on like Australian-produced goods, but that was not possible.

practice understates the relative importance of goods subject to high tariffs. In particular, prohibitive tariffs, which are extremely important from a welfare point of view, receive a zero weight. But this is not a fatal objection. The simplest and most instructive way to view this is with a partial equilibrium version of the Trade Restrictiveness Index (Anderson and Neary 1994, Anderson 1995), using the formula for the tariff's welfare loss on each good due to Harberger (1959, 1964) or some restatement of the formula in terms of equivalent variation (rather than the Marshallian triangle for the consumer surplus component). When this formula is used, the average tariff is defined as the single uniform tariff that would result in the same aggregate loss to the economy as the structure of differentiated tariffs. Amazingly, this turns out to be the mean of order two, not the arithmetic mean or the geometric mean favoured by the League of Nations (1927) and some others since. This choice of mean reflects the importance of the Harberger "square rule", that is, the loss of welfare due to a tariff is proportional to the square of the (ad valorem) tariff rate.[33] Because the arithmetic mean obtained by dividing the revenue by the value of imports (total or dutiable only) is the only readily available index from long time series, it simply needs to be recognized that the resultant import-weighted average of the tariff rates on individual goods understates the true figure because it uses current period import weights and because it uses the ad valorem (or ad valorem equivalent) rates rather than the squares of these rates. However, it is the best we can do, and it is better than using any other system of weights in an arithmetic mean or the unweighted mean.

For the period since 1968-69, the Productivity Commission (and its predecessors the Industries Assistance Commission and the Industry Commission) provides estimates of both nominal and effective rates of assistance to manufacturing, for industry sub-categories down to the 4-digit level. In addition to tariffs these cover subsidies, bounties and discriminatory sales taxes but initially did not cover quantitative restrictions, content plans, etc. (Industries Assistance Commission 1976, p.4). The latter are covered for the later period from 1982-83 though. The average nominal assistance on outputs for the whole sector is reproduced in the final column of Appendix Table 3. The treatment of tariffs and para-tariffs differs in some respects from that in the other two columns. The Commission uses General (MFN) tariff rates, except for those few items where imports are overwhelmingly from the preferential source. For excisable goods, the Commission includes only the margin of protection. Both of these procedures are preferable, but the differences they make to the estimates are small. Probably of more importance, the Commission's estimates of nominal rates of assistance use production weights at unassisted prices, which are preferable for current purposes than import weights. Nonetheless, the average tariff on dutiable imports may be as reliable an indicator of the turning points and trends in the levels of assistance to the manufacturing sector as the Commission's series.

[33] Thus the weighting problem with the import-weighted mean is not the use of import weights but the incorrect choice of current period import weights rather than the free trade situation weights. And one should calculate the mean of order two, not the arithmetic mean (which is the mean of order one). It is easy to show by example that the use of current period import weights and the use of the arithmetic mean can both result in serious understatements of the true welfare-relevant average tariff. But the estimation of free trade weights is difficult. And the calculation of the square of the tariff rates is a huge job in each year of a time series as it requires the explicit statement of the ad valorem rates for each tariff item or, worse, the calculation of the ad valorem equivalent rates. This must be repeated in every year of the series.

The calculation of the two tariff series is not just a simple matter of transcribing the customs revenue and import values for each year and dividing. First, there is a break in the series in 1988-89 at which time the ABS switched to electronic recording. We obtained from the ABS an electronic copy of the annual revised series of Import Clearances and Duty paid on all imports, cross-classified by the rate of duty and type of imports (Normal, Concessional, Government) for the years 1988-89 to 2004-05. Then the averages calculated from these series can be compared with the averages calculated from the hard copy figures published for earlier years, although there are minor differences due to the different treatment of Refunds and Drawbacks in the electronic series.

Second, for the pre-electronic series, CBCS and ABS published the figures on different bases over different periods. It is necessary to make several adjustments to obtain a series which maintains a consistent definition of duties collected and of the values of imports cleared home consumption. One problem is that, in the pre-electronic period that spans the 38 years from 1949-50 to 1987-88, some of the series are reported in gross terms and some in net terms, that is, net of Refunds and Drawbacks of Customs and Primage Duties. A second problem is that some revenue duties are excluded in the figures of customs duties collected and some are included. These problems are discussed in turn.

After the end of each financial year, refunds and drawbacks are made of some duties collected because the duties were levied improperly in the first instance or because the imports were found to be eligible for drawback as the goods in which the imports were incorporated were subsequently exported. Any series of average duties which is intended to measure the protective effect of import duties should use duty statistics which are net of both refunds and drawbacks. Prior to 1988-89, statistics published by the CBCS/ABS are sometimes reported on a gross basis and sometimes on a net basis. The net figures have been used where available. Where not available, the total value of Refunds and Drawbacks for each year is published separately and has been used in the calculation of the adjusted series of average duty on dutiable imports (see below). From 1988-89, there is no longer a series of refunds and drawbacks. The ABS receives a daily file from the Customs Department of all records cleared the previous day. The daily file records any adjustments to a record previously lodged with Customs and the ABS records are amended as long as the original files are kept. Since previous records are kept for just six months, only those refunds and drawbacks which are recorded within six months of the original clearances are netted. Those refunds and drawbacks that take more than six months to be processed are not reflected in the ABS data. For this reason, there is a minor inconsistency between the pre-electronic and the post-electronic statistics, the latter overstating slightly the true value of net customs duty collected.

Over the period since 1950, four different revenue duties have been levied for sub-periods. These duties are troublesome for the calculation of a consistent series of average tariffs. There are four types:

(i) Primage duties were introduced in 1930 and remained until the last primage duties were abolished on 1 January 1983. They were introduced as a revenue tax, mainly on luxury items, but they applied to imports of many goods produced in Australia as wells to some non-competitive imports and, for these goods, they provided additional

protection.[34] They were ad valorem duties and in the early part of our 50-year period the most common rate was 10 percent. In the early 1950s primage duties amounted to almost 10 percent of the total duties including primage, and therefore added significantly to the measured levels of protection from the Australian tariff. However, from the mid-1950s, the number of tariff items on which primage was levied was steadily reduced by the abolition of some of these duties or by their incorporation in normal duties, and the rates were also lowered. By the mid-1960s they amounted to roughly 2 percent only of the total duties collected. To maintain a consistent series, for the years in which they applied we incorporated the revenue collected in the statistics of total duty collected each year.

(ii) A 2 percent duty on items previously cleared free of duty was applied for almost nine years, from 1 July 1979 to 11 May 1988. This was a revenue measure, announced in May before the 1979 Budget and removed in the Budget of 1988. During the period in which it applied, this tax collected on average around $150 million each year. This amounted to about 7.5 percent of total duty collected during the period.

(iii) A 3 percent duty on imported business inputs which did not have a substitute manufactured in Australia was introduced before the Budget of 1996, effective from 1 July 1996. This too was a revenue measure. However, there was an exemption for inputs used in the textile, clothing, footwear, motor vehicle and food industries. The duty remained until it was abolished in the Budget of 2005, effective from 11 May 2005, after a report by the Productivity Commission (2000) had recommended its abolition. During the period in which it applied, this tax collected around $200million each year, amounting to about 5 percent of total duty collected during the period. Since both the 2 percent and the 3 percent duties were levied on non-competitive imported materials and inputs, they raised the prices in Australia of the goods concerned but they did not provide protection to Australian manufacturers. Indeed they reduced the effective rates of protection of those goods which used these inputs. The adjustments have been made each year by identifying, exactly or as closely as possible, the goods cleared and subject to these duties, and then subtracting the value of duty collected from the revenue tax in the numerator and subtracting the value of the dutiable imports on which these duties were levied in the denominator.

(iv) Excise taxes (specific duties levied on the production or manufacture of certain goods) in Australia apply to three main groups of goods, namely, alcoholic beverages excluding wine, tobacco products, and refined petroleum fuels. These duties are revenue taxes, levied on these so-called "sin goods" at high rates when expressed in ad valorem terms. All goods that are excisable when produced in Australia are subject to a specific tariff at a rate which is as higher than or as high as the excise duty rate on the corresponding domestic like product. When excise duty rates have been increased or decreased, the same adjustment has usually been made for the tariff on corresponding imports. All statistics of duty collected published by CBCS/ABS include the whole duty collected from the tariff rates on these items, rather than capturing just the margin of protection. Hence they overstate the rates of assistance to these excisable goods.
The only published study that has calculated the ad valorem equivalent nominal rates of assistance to excisable goods is for the years 1950-51 to 1971-72 (Lloyd 1975). He found

[34] Goods which were the produce or manufacture of New Zealand, Fiji, Papua New Guinea and some other Pacific Islands were exempt and, therefore, the duties discriminated by source.

that the nominal rates of protection to excisable goods were generally high (the solitary exception was Motor Spirits) compared to those due to tariffs on non-excisable goods. However, he also found this protective part was on average less than one-quarter of the average customs duty on these goods, the rest being a duty to match the rate of excise duty levied on excisable goods produced in Australia. However, since the customs duty collected on excisable goods is a small part of the total customs duty collected, this overstatement is not serious. And note that the Productivity Commission and its predecessors have included only the protective margin in their calculations of nominal rates of assistance to excisable goods.

To get the average nominal rate of assistance (NRA) for all non-agricultural tradables, we assumed only (and all) service sectors produce non-tradables, and a zero NRA for non-agricultural primary sectors. For manufacturing, we use the Productivity Commission NRA output estimates from 1968-69 (ignoring their estimates of net assistance via primary factor and intermediate input markets, which in the past decade would have lowered them by about one-fifth), while for earlier years the dutiable import tariff averages estimated by Lloyd are used (the second column in Appendix Table 3). The latter may overstate assistance to the sector in so far as some competing imports come in duty free; but that is assumed to be offset by the numerous non-tariff barriers to imports that were in place in the years prior to 1970. For the first two years of overlap in the two series in the late 1960s, they are almost identical (at 23 percent). The manufacturing sector's share of non-agricultural tradables output is assumed to be in proportion to its share of GDP from manufacturing plus non-agricultural primary activities, shown in column 4 of Appendix Table 3. That share times the manufacturing NRA in column 2 or (after 1967-68) column 3 provides the estimated NRA for total non-agricultural tradables, shown in column 5 of Appendix Table 3.

(b) New Zealand

Unlike Australia, there is no consistent time series of rates of protection in New Zealand. As a result the assistance measures used in this study are interpolations drawn from a number of point estimates produced by a number or researchers. In 1984, the NZ Planning Council (EMG 1984) reviewed past studies of nominal and effective protection going back to 1955 by Elkan (1972). These studies focused on the non-food manufacturing sector plus beverages and tobacco. Importantly, they did not estimate rates of protection for food manufacturing. EMG argue that the early Elkan estimates for 1955-58 and 1964-67 are of higher quality than later estimates they report because they are derived from primary price comparison data to ensure the protective effect of import licensing is incorporated. Later studies for 1973 and 1979 did not involve primary data collections and more simply projected Elkan's earlier estimates based on indirect data. Lattimore (1985) produced an estimate of direct assistance to the primary agricultural sector from 1935 to 1984. This study provides a picture of assistance to exportable agriculture, but it leaves a gap with respect to importable agriculture that was protected by the range of import restrictions discussed above.

In a very comprehensive study of industry assistance during the economic reforms, Syntec (1988) produced nominal and effective assistance measures for the entire

tradable sector for the three years 1982, 1986 and 1988. Tyler and Lattimore (1991) also produced detailed estimates of protection afforded exportable agriculture over the period 1970-90.

In 1979, OECD began providing policy data that permits us to estimate nominal rates of assistance for the exportable and importable agricultural sector from 1979 to 2007. However, there is a gap in assistance measures for the manufacturing sector (food and non-food) from 1989 until 2001 when Lattimore (2003) produced a new set of estimates of nominal protection for manufacturing that included food. This latter set of estimates is robust for the single year 2001 but the intervening estimates (1989-2001) rely on qualitative assessments of on-going removals of import licensing plans (finally completed in 1993) and tariff reductions that are continuing in 2006 (although further planned tariff reductions were halted in 2000).

Two measures of assistance are utilised in this study. The nominal rate of direct assistance (NRA) to outputs comprises market price support via production subsidies or trade policy interventions. Nominal rates are expressed relative to world prices and not distorted domestic prices as is customary in OECD work on producer support estimates. Taxpayer assistance to industry input costs is expressed on an ad valorem basis and termed the nominal rate of direct assistance to inputs.

One innovation that has been incorporated in this study concerns the incidence of the meat deficiency payments (Supplementary Minimum Prices, SMPs) and payments from the Meat Industry Stabilisation fund (MISA) made to farmers and meat processing firms over the period 1975-86. Meat processing firms in New Zealand tend to be regional monopsonies. In a preliminary study, Egarr, Lattimore and Griffiths (1991) found some evidence that around 65 percent of SMP payments for lambs passed through processing companies to farmers with the remaining 35 percent accruing to the meat processing companies. This factor has been used to estimate the respective nominal rates of assistance for sheepmeats and beef. Similar adjustments for the same type of payments have not been made for raw milk and wool on the grounds that the government payments for two latter commodities were made to farmer controlled organizations, namely, the New Zealand Dairy and Wool Boards. So while these organizations may have acted monopsonistically, there is perhaps a higher probability that farmers would have viewed the funds as private benefits.

As for Australia, the average nominal rate of assistance (NRA) for all non-agricultural tradables is computed assuming only (and all) service sectors produce non-tradables, and that the NRA for non-agricultural primary sectors is zero.

Appendix Table 1: Customs revenue as a share of merchandise imports, Australia, New Zealand and other high-income countries, 1865 to 1993
(percent, five-year averages)

	Australia	New Zealand	Argentina	Canada	United States	Nordics[a]
1865-69	na	na	na	na	42	na
1870-74	na	16	na	12	35	11
1875-79	10	16	na	16	29	11
1880-84	9	19	na	19	29	11
1885-89	11	21	na	21	30	12
1890-94	13	24	na	18	23	10
1895-99	14	24	43	17	23	10
1900-04	19	20	30	16	27	11
1905-09	20	18	21	16	23	10
1910-14	19	16	18	16	18	9
1915-19	19	16	12	17	8	4
1920-24	20	15	14	13	12	9
1925-29	22	17	17	14	13	11
1930-34	32	23	24	15	19	15
1935-39	30	21	22	13	15	13
1940-44	14	28	13	9	11	8
1945-49	21	31	12	10	7	8
1950-54	15	17	38	9	5	6
1955-59	10	13	29	9	6	7
1960-64	12	13	27	9	7	6
1965-69	10	13	31	7	7	5
1970-74	12	8	41	6	5	2
1975-79	11	5	28	5	3	1
1980-84	10	5	32	4	3	1
1985-89	9	6	20	4	3	1
1990-93	6	3	9	3	3	1

[a] Weighted average for Denmark, Finland, Norway and Sweden, using mid-period imports as the weights for each 5-year period. Nordic data pre-1900 refers just to Denmark, Norway and Sweden, taken from Maloney (2002). Data for Australia pre-1901 also are from Maloney (2002).
Source: Mitchell (1998a,b,c) and Maloney (2002).

Appendix Table 2: Merchandise exports plus imports as a share of GDP, Australia and New Zealand plus other high-income countries,[a] 1865 to 2000
(percent, five-year averages)

	Australia	New Zealand	Argentina	Canada	United States	Nordics[a]
1865-69	na	na	na	na	7	na
1870-74	na	na	na	39	12	38
1875-79	41	na	na	29	12	39
1880-84	41	na	na	31	12	43
1885-89	33	na	na	26	11	43
1890-94	37	na	na	26	12	45
1895-99	48	na	na	29	11	45
1900-04	45	na	na	36	11	46
1905-09	46	na	na	33	11	47
1910-14	42	na	na	36	12	48
1915-19	32	na	na	49	16	48
1920-24	38	na	na	36	11	46
1925-29	36	na	58	42	10	46
1930-34	28	65	49	28	6	37
1935-39	30	62	38	32	6	37
1940-44	29	50	31	40	7	24
1945-49	37	47	26	37	7	33
1950-54	46	59	22	34	7	44
1955-59	32	49	34	31	7	45
1960-64	25	41	14	29	7	41
1965-69	24	38	10	36	7	41
1970-74	23	38	11	40	10	45
1975-79	24	43	17	45	14	48
1980-84	25	48	18	48	15	52
1985-89	27	42	13	49	15	48
1990-94	28	45	12	50	16	46
1995-99	31	45	18	69	19	56
2000	35	47	18	78	20	65

[a] Weighted average for Denmark, Finland, Norway and Sweden, using mid-period imports as the weights for each 5-year period. Data after 1993 are from World Bank (2006) and for Australia pre-1901 are from Maloney (2002).
Source: Compiled from data in Mitchell (1998a,b,c), Maloney (2002) and World Bank (2006).

Appendix Table 3: Customs revenue as a share of imports and nominal rate of assistance for manufacturing, Australia, 1945-46 to 2004-05
(percent)

	Net[a] customs plus primage, all imports	Net[a] customs plus primage, dutiable imports	Nominal rate of assistance, manufacturing	Assumed share of manufacturing in total value of non-ag tradables[b]	Average NRA for non-ag tradables
1945-46	18.2	47.1	na	90.0	42.4
1946-47	24.8	46.9	na	90.0	42.2
1947-48	17.0	29.7	na	90.0	26.7
1948-49	15.3	27.0	na	90.0	24.3
1949-50	14.5	26.2	na	90.0	23.6
1950-51	12.4	24.5	na	90.0	22.1
1951-52	10.9	23.0	na	90.0	20.7
1952-53	13.9	33.9	na	90.0	30.5
1953-54	14.0	26.3	na	90.0	23.7
1954-55	12.0	22.9	na	90.0	20.6
1955-56	10.7	22.0	na	90.0	19.8
1956-57	9.6	21.9	na	91.0	19.9
1957-58	9.1	19.8	na	92.0	18.2
1958-59	9.0	21.7	na	93.0	20.2
1959-60	9.1	21.2	na	93.0	19.7
1960-61	9.4	20.0	na	94.0	18.8
1961-62	9.6	22.1	na	95.0	21.0
1962-63	9.7	22.0	na	96.0	21.1
1963-64	9.8	22.3	na	95.0	21.2
1964-65	9.8	22.9	na	94.0	21.5
1965-66	9.3	22.0	na	93.0	20.5
1966-67	9.1	22.4	na	92.0	20.6
1967-68	9.6	22.8	na	91.0	20.7
1968-69	10.1	23.0	24.0	90.0	21.6
1969-70	10.7	23.3	23.0	88.0	20.2
1970-71	12.4	25.5	23.0	87.0	20.0
1971-72	12.9	26.6	22.0	86.0	18.9
1972-73	13.2	30.1	22.0	85.0	18.7
1973-74	10.4	26.8	17.0	84.0	14.3
1974-75	10.8	28.6	15.0	82.0	12.3
1975-76	11.7	29.7	16.0	81.0	13.0
1976-77	11.5	29.4	15.0	80.0	12.0
1977-78	10.4	29.0	15.0	79.0	11.9
1978-79	10.2	31.3	15.0	78.0	11.7
1979-80	9.9	28.8	15.0	77.0	11.6
1980-81	9.7	28.4	15.0	76.0	11.4
1981-82	9.2	27.7	16.0	76.0	12.2
1982-83	9.5	28.1	16.0	76.0	12.2
1983-84	9.9	27.0	13.0	76.0	9.9
1984-85	10.0	27.0	13.0	76.0	9.9
1985-86	9.6	26.3	12.0	76.0	9.1
1986-87	8.7	24.8	12.0	76.0	9.1
1987-88	8.9	24.3	11.0	76.0	8.4

	Net[a] customs plus primage, all imports	Net[a] customs plus primage, dutiable imports	Nominal rate of assistance, manufacturing	Assumed share of manufacturing in total value of non-ag tradables[b]	Average NRA for non-ag tradables
1988-89	8.3	23.5	10.0	76.0	7.6
1989-90	8.0	22.9	9.0	76.0	6.8
1990-91	7.3	21.3	9.0	77.0	6.9
1991-92	6.9	20.4	8.0	77.0	6.2
1992-93	6.0	18.9	7.0	76.0	5.3
1993-94	5.4	17.1	6.0	74.0	4.4
1994-95	4.9	16.1	5.0	73.0	3.7
1995-96	4.3	14.7	5.0	72.0	3.6
1996-97	4.4	12.2	3.5	72.0	2.5
1997-98	4.4	11.3	3.3	71.0	2.3
1998-99	4.1	10.9	3.2	71.0	2.2
1999-00	3.7	10.6	3.0	71.0	2.1
2000-01	4.0	11.2	2.8	71.0	2.0
2001-02	4.0	10.4	2.8	71.0	2.0
2002-03	3.9	10.0	2.8	71.0	2.0
2003-04	3.9	10.0	2.8	72.0	2.0
2004-05	3.5	9.5	2.6	72.0	1.9

[a]Net of Refunds and Drawbacks of Customs and Primage Duties

[b]The NRA for non-agricultural tradables other than import-competing manufacturing is assumed to be zero, so the final column is column 2 up to 1967-68 (column 3 thereafter) times column 4 divided by 100

Sources: Lloyd (2006, 2007) based on data from Australian Bureau of Statistics files and, for the final column from 1968-69, Productivity Commission (2003) and Industry Commission (1995).

Appendix Table 4: Nominal rates of assistance, main distorted agricultural products, Australia, annual 1946-47 to 1969-70

(percent)

	Rice	Wheat	Barley	Sugar	Cotton	Eggs	Butter	Cheese	Dried vine fruits	Tobacco	**ALL, wted. Ave.**[a] Covered Products	**ALL, wted. Ave.**[a] Allproducts and inputs	**Std. dev.** of covered products	**RRA** (agric rel to manuf)
1946-47	-1.0	-44.3	na	1.6	na	3.0	1.4	5.9	7.5	na	**-13.5**	**-12.0**	9.3	**-36.4**
1947-48	-4.0	-16.7	-23.9	-15.6	na	1.1	1.2	4.5	9.8	na	**-4.6**	**-3.6**	7.3	**-24.1**
1948-49	-4.4	-18.0	-16.7	-9.5	na	-5.2	-0.2	1.8	12.0	na	**-4.9**	**-3.7**	6.5	**-22.6**
1949-50	-3.5	-17.9	-15.7	-9.2	na	-5.5	-0.1	1.9	12.8	na	**-4.9**	**-3.7**	6.5	**-22.0**
1950-51	-14.2	-21.2	-18.0	-14.2	na	2.4	4.4	6.1	2.3	na	**-3.2**	**-1.7**	9.1	**-19.7**
1951-52	-7.2	-17.6	-14.5	-6.6	na	21.6	11.4	15.6	22.9	5.5	**-1.1**	**0.1**	9.2	**-17.6**
1952-53	-0.8	-7.6	-1.2	3.7	na	8.8	24.1	25.8	4.0	22.2	**2.5**	**3.3**	9.1	**-21.0**
1953-54	5.9	-0.1	4.1	9.9	3.2	9.9	22.2	24.1	6.8	58.2	**4.5**	**5.1**	14.3	**-15.2**
1954-55	10.7	4.3	0.5	10.6	-2.6	30.9	22.9	30.3	6.5	79.5	**6.1**	**6.4**	19.2	**-12.3**
1955-56	10.1	1.2	4.5	10.0	5.4	35.0	32.0	13.0	4.2	48.4	**5.3**	**5.9**	14.3	**-12.2**
1956-57	8.9	-2.1	3.7	13.1	30.3	31.6	53.5	50.1	4.1	46.4	**7.9**	**7.9**	17.7	**-10.6**
1957-58	9.9	1.4	-0.4	7.7	30.9	48.8	89.8	100.5	3.7	45.7	**11.0**	**10.3**	25.0	**-7.4**
1958-59	12.8	2.5	2.2	15.4	23.8	57.0	43.0	11.5	4.1	58.2	**6.5**	**7.5**	19.2	**-11.5**
1959-60	15.3	6.6	10.6	17.8	43.3	46.3	40.0	35.4	11.9	56.4	**8.4**	**8.9**	20.3	**-9.7**
1960-61	13.8	8.2	3.8	22.9	42.9	58.2	78.9	34.6	11.0	29.2	**10.1**	**11.0**	20.9	**-7.4**
1961-62	11.6	6.9	3.2	27.9	-2.1	41.8	58.4	40.2	11.5	64.0	**9.5**	**10.3**	20.2	**-9.4**
1962-63	13.9	8.9	5.5	16.9	34.2	59.6	44.8	30.9	11.6	57.3	**8.8**	**9.8**	20.9	**-10.2**
1963-64	17.2	0.6	2.1	-2.6	93.2	55.6	41.4	31.9	7.5	44.1	**6.1**	**7.2**	25.6	**-12.4**
1964-65	18.5	5.9	0.9	14.2	92.3	94.0	41.8	27.7	6.8	40.0	**8.2**	**9.1**	29.5	**-11.4**
1965-66	13.0	7.1	1.7	26.6	106.0	138.2	51.1	32.6	11.7	62.4	**10.3**	**10.6**	39.2	**-9.7**
1966-67	10.5	3.4	2.2	30.5	86.8	100.0	51.4	38.4	13.4	46.1	**8.6**	**9.6**	30.9	**-10.3**
1967-68	11.4	18.8	13.2	38.9	75.5	129.5	94.4	89.9	15.2	48.3	**15.4**	**15.4**	38.2	**-6.1**
1968-69	15.7	8.2	2.9	37.4	61.4	187.9	107.2	105.6	32.5	52.6	**13.0**	**13.8**	48.2	**-7.9**
1969-70	23.4	12.8	1.8	30.6	39.8	150.6	88.6	85.8	21.3	47.0	**14.2**	**14.2**	38.6	**-6.7**
1970-71	16.2	15.6	-0.6	19.2	46.1	119.3	92.2	60.2	37.1	46.5	**17.5**	**17.0**	58.4	**-2.8**
1970-71	*28.0*	*20.0*	*0.0*	*23.0*	*100.0*	*29.0*	*92.2*	*60.2*	*44.0*	*>250*	***17.5***	***16.1***		

a The TOTAL agric weighted average uses weights based on the unassisted value of production (actual back to 1966, and the average for 1966-69 for earlier years), from Anderson, Lattimore, Lloyd and MacLaren (2007). For the products covered by the Commission but not by Lloyd, 'guesstimates' have been made for the years before 1970, based on the policy descriptions in Edwards (2006) and the references cited therein. The only guesstimate of significant size is for wine grapes, whose NRA is assumed to equal that estimated by Lloyd for dried vine fruit up to 1970. All others had either no assistance (maize, oats, rapeseed, soybean, bananas, olives, wool, beef, sheepmeat, pigmeat, chicken meat) or a very small weight in the total gross value of farm production (for the 1950s and 1960s: apples 6 percent, oranges 25 percent and potatoes 8 percent; and zero NRA for all three pre-1950-51). The standard deviation in the second-to-last column is the simple 5-year average of the annual standard deviation around the weighted mean. The final column, which shows the relative rate of assistance as defined on page 8 of the text, assumes all products not shown had an NRA of zero, and it includes non-product-specific assistance which is assumed to have been 1.8 percent of the gross value of farm production in 1969, 2 percent in 1960, 0.5 percent in 1946, and linear interpolations between those years.
Sources: Lloyd (1973, Table 10.4) except last row which is provided, for comparative purposes, from Appendix Table 2 from the Industry Commission (1995)

Appendix Table 5: Nominal rates of assistance,[a] all agricultural products, Australia, annual, 1970-71 to 2003-04

(percent)

Year	Rice	Wheat	Barley	Oats	Sorghum	Maize	Apples	Grapes, drying	Grapes, wine	Bananas
1970-71	28.0	20.0	0.0	0.0	0.0	0.0	6.0	44.0	52.0	0.0
1971-72	46.0	20.0	0.0	0.0	0.0	0.0	11.0	27.0	53.0	0.0
1972-73	15.0	12.0	0.0	0.0	0.0	0.0	8.0	34.0	51.0	0.0
1973-74	6.0	-10.0	0.0	0.0	0.0	0.0	8.0	0.0	50.0	0.0
1974-75	15.0	-8.0	0.0	0.0	0.0	0.0	12.0	7.0	50.0	0.0
1975-76	23.0	-2.0	0.0	0.0	0.0	0.0	9.0	36.0	36.0	0.0
1976-77	26.0	3.0	0.0	0.0	0.0	0.0	9.0	27.0	30.0	0.0
1977-78	26.0	2.0	0.0	0.0	0.0	0.0	2.0	0.0	17.0	0.0
1978-79	13.0	-2.0	0.0	0.0	0.0	0.0	2.0	3.0	17.0	0.0
1979-80	14.0	-3.0	0.0	0.0	0.0	0.0	5.0	-3.0	17.0	0.0
1980-81	18.0	2.0	0.0	0.0	1.0	0.0	2.0	4.0	21.0	4.0
1981-82	8.0	2.0	0.0	0.0	1.0	0.0	8.0	19.0	21.0	7.0
1982-83	22.0	5.0	0.0	0.0	2.0	0.0	2.0	31.0	21.0	7.0
1983-84	20.0	2.0	0.0	0.0	2.0	0.0	2.0	45.0	16.0	5.0
1984-85	8.0	2.0	0.0	0.0	2.0	0.0	3.0	21.0	16.0	1.0
1985-86	11.0	2.0	0.0	0.0	2.0	0.0	1.0	18.0	16.0	1.0
1986-87	19.0	14.0	0.0	0.0	2.0	0.0	1.0	17.0	16.0	1.0
1987-88	17.0	1.0	0.0	0.0	2.0	0.0	1.0	25.0	18.0	1.0
1988-89	3.0	1.0	0.0	0.0	2.0	0.0	1.0	22.0	21.0	1.0
1989-90	3.0	1.0	0.0	0.0	2.0	0.0	2.0	18.0	16.0	1.0
1990-91	4.4	4.6	0.1	0.0	0.0	0.0	1.0	19.0	14.8	0.3
1991-92	2.4	1.2	0.0	0.0	0.0	0.0	0.4	16.0	14.0	0.1
1992-93	2.5	1.6	0.0	0.0	0.0	0.1	0.2	26.3	13.1	0.0
1993-94	0.8	1.7	0.0	0.0	0.0	0.0	0.3	12.0	10.4	0.0
1994-95	2.4	1.5	0.0	0.0	0.0	0.0	0.3	5.4	8.7	0.0
1995-96	2.0	1.3	0.0	0.0	0.0	0.0	0.2	4.6	7.0	0.0
1996-97	3.0	1.4	0.0	0.0	0.0	0.0	0.2	6.3	4.4	0.0
1997-98	2.4	1.4	0.0	0.0	0.0	0.0	0.0	5.8	4.4	0.0
1998-99	2.5	1.4	0.0	0.0	0.0	0.0	0.0	3.7	4.4	0.0
1999-00	1.7	0.0	0.0	0.0	0.0	0.0	0.0	3.8	4.4	0.0
2000-01	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7
2001-02	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0
2002-03	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9
2003-04	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0

… continued

Appendix Table 5 (continued): Nominal rates of assistance,[a] all agricultural products, Australia, annual, 1970-71 to 2003-04

(percent)

Year	Olives	Oranges	Potatoes	Soybean	Rapeseed	Sugar Cane	Seed Cotton	Tobacco leaves	Beef and veal	Mutton and lamb
1970-71	0.0	25.0	8.0	0.0	0.0	23.0	100.0	250.0	1.0	2.0
1971-72	0.0	25.0	8.0	0.0	0.0	14.0	6.0	250.0	1.0	2.0
1972-73	0.0	26.0	8.0	0.0	0.0	8.0	19.0	250.0	1.0	1.0
1973-74	0.0	26.0	6.0	0.0	0.0	7.0	126.0	250.0	1.0	1.0
1974-75	0.0	25.0	6.0	0.0	0.0	-14.0	16.0	250.0	3.0	2.0
1975-76	0.0	23.0	6.0	0.0	0.0	-13.0	40.0	250.0	3.0	3.0
1976-77	0.0	21.0	6.0	0.0	0.0	-9.0	20.0	113.0	2.0	2.0
1977-78	0.0	38.0	8.0	0.0	0.0	-4.0	9.0	84.0	2.0	2.0
1978-79	0.0	41.0	8.0	0.0	0.0	-3.0	11.0	76.0	1.0	1.0
1979-80	0.0	41.0	8.0	0.0	0.0	-2.0	8.0	88.0	1.0	1.0
1980-81	0.0	47.0	8.0	0.0	0.0	-8.0	6.0	77.0	1.0	1.0
1981-82	0.0	52.0	8.0	0.0	0.0	-2.0	2.0	59.0	1.0	1.0
1982-83	0.0	34.0	8.0	0.0	0.0	11.0	7.0	44.0	2.0	2.0
1983-84	0.0	34.0	8.0	0.0	0.0	7.0	5.0	55.0	2.0	2.0
1984-85	0.0	24.0	8.0	0.0	0.0	15.0	2.0	47.0	1.0	1.0
1985-86	0.0	18.0	8.0	0.0	0.0	21.0	1.0	38.0	1.0	2.0
1986-87	0.0	19.0	8.0	0.0	0.0	13.0	5.0	16.0	1.0	2.0
1987-88	0.0	10.0	0.0	0.0	0.0	13.0	2.0	37.0	1.0	1.0
1988-89	0.0	12.0	0.0	0.0	0.0	9.0	2.0	56.0	2.0	2.0
1989-90	0.0	6.0	0.0	0.0	0.0	6.0	0.0	41.0	1.0	2.0
1990-91	0.0	5.0	0.0	0.0	0.0	10.0	0.0	35.0	0.7	3.2
1991-92	0.0	2.7	0.0	0.0	0.0	7.0	0.0	36.0	0.1	0.4
1992-93	0.0	2.3	0.0	0.3	0.0	4.7	0.0	61.6	0.2	0.3
1993-94	0.0	1.8	0.0	0.0	0.0	3.9	0.0	60.3	0.3	0.4
1994-95	0.0	1.5	0.0	0.0	0.0	3.5	0.0	49.5	0.1	0.1
1995-96	0.0	1.1	0.0	0.0	0.0	4.0	0.0	39.6	0.0	0.0
1996-97	0.0	0.6	0.0	0.0	0.0	4.3	0.0	29.7	0.2	0.2
1997-98	0.0	0.5	0.0	0.0	0.0	0.0	0.0	19.8	0.0	0.0
1998-99	0.0	0.8	0.0	0.0	0.0	0.0	0.0	9.9	0.0	0.0
1999-00	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2000-01	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2001-02	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2002-03	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2003-04	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

… continued

Appendix Table 5 (continued): Nominal rates of assistance, covered agricultural products, Australia, annual, 1970-71 to 2003-04

(percent)

Year	Pig meat	Chicken meat	Eggs	Milk	Wool	**Weighted average,**[a] covered products	**Standard deviation** of covered products
1970-71	0.0	0.0	29.0	63.0	10.0	**17.5**	52.8
1971-72	0.0	0.0	35.0	24.0	15.0	**12.8**	50.0
1972-73	0.0	0.0	48.0	24.0	2.0	**7.5**	50.2
1973-74	0.0	0.0	46.0	27.0	1.0	**3.9**	55.1
1974-75	0.0	0.0	17.0	26.0	2.0	**2.4**	50.4
1975-76	0.0	0.0	28.0	40.0	1.0	**4.5**	50.5
1976-77	0.0	0.0	15.0	35.0	1.0	**5.4**	24.1
1977-78	0.0	0.0	17.0	36.0	2.0	**5.9**	19.3
1978-79	0.0	0.0	37.0	34.0	2.0	**4.3**	18.6
1979-80	0.0	0.0	33.0	34.0	1.0	**3.1**	20.4
1980-81	0.0	0.0	32.0	19.0	1.0	**3.6**	18.6
1981-82	0.0	0.0	15.0	20.0	1.0	**3.7**	15.7
1982-83	0.0	0.0	51.0	32.0	1.0	**8.0**	15.5
1983-84	0.0	0.0	69.0	38.0	1.0	**6.3**	19.7
1984-85	0.0	0.0	12.0	52.0	1.0	**5.6**	14.2
1985-86	0.0	0.0	29.0	49.0	1.0	**6.1**	13.4
1986-87	0.0	0.0	35.0	54.0	1.0	**8.8**	13.1
1987-88	0.0	0.0	10.0	49.0	1.0	**5.8**	12.8
1988-89	0.0	0.0	9.0	22.0	1.0	**4.3**	12.5
1989-90	0.0	0.0	9.0	24.0	1.0	**3.6**	9.8
1990-91	0.0	0.0	7.0	28.0	10.5	**6.5**	9.4
1991-92	0.0	0.0	2.0	28.0	5.6	**4.5**	9.3
1992-93	0.0	0.0	2.2	19.7	5.7	**4.0**	13.4
1993-94	0.1	0.1	2.5	19.2	4.0	**3.7**	12.5
1994-95	0.1	0.1	3.5	24.0	1.0	**3.5**	10.7
1995-96	0.0	0.0	1.6	18.7	1.6	**3.0**	8.5
1996-97	0.2	0.2	0.4	22.2	1.0	**3.1**	7.2
1997-98	0.0	0.0	0.0	20.5	0.6	**2.7**	5.6
1998-99	0.0	0.0	0.0	17.1	0.4	**2.4**	3.9
1999-00	0.0	0.0	0.0	17.9	0.0	**2.1**	3.7
2000-01	0.0	0.0	0.0	0.0	0.0	**0.0**	0.4
2001-02	0.0	0.0	0.0	0.0	0.0	**0.0**	0.4
2002-03	0.0	0.0	0.0	0.0	0.0	**0.0**	0.4
2003-04	0.0	0.0	0.0	0.0	0.0	**0.0**	0.4

[a] The weighted average uses weights based on the unassisted value of production (actual back to 1966, and the average for 1966-69 for earlier years). The standard deviation in the last column is the simple 5-year average of the annual standard deviation around the weighted mean.

Sources: Productivity Commission (2004 and earlier) and Industry Commission (1995).

Appendix Table 6: Annual estimates of nominal and relative rates of assistance to all agricultural products, to exportable and import-competing agricultural industries, and relative to non-agricultural industries, Australia, 1955 to 2007
(percent)

	NRA, all agric products,[a] by component					NRA, agric tradables				
	NRA, covered products[a] (1)	NRA, non-covered products (2)	NRA, non-product-specific support (3)	NRA, all ag products (incl NPS) (4)=1+2+3	NRA, all ag products (incl NPS and decoupled) (5)	NRA, ag export-ables (6)	NRA, ag import-competing (7)	NRA, all agric tradable goods[c] (8)=6+7	NRA, all non-ag tradable goods (9)	RRA[b] (10)
1955	5	0	2	6	6	4	4	5	20	-12
1956	8	0	2	8	8	6	3	7	20	-11
1957	11	0	2	10	10	8	3	9	18	-7
1958	7	0	2	7	7	4	5	6	20	-11
1959	8	0	2	9	9	6	4	8	20	-10
1960	10	0	2	11	11	8	4	10	19	-7
1961	9	0	2	10	10	8	5	10	21	-9
1962	9	0	2	10	10	7	5	9	21	-10
1963	6	0	2	7	7	4	4	6	21	-12
1964	8	0	2	9	9	6	4	8	22	-11
1965	10	0	2	11	11	7	5	9	20	-10
1966	9	0	2	10	10	6	5	8	21	-10
1967	15	0	2	15	15	12	5	13	21	-6
1968	13	0	2	14	14	10	5	12	22	-8
1969	14	0	2	14	14	11	5	12	20	-7
1970	18	0	1	17	17	16	10	17	20	-3
1971	13	0	1	12	12	11	9	11	19	-6
1972	8	0	2	8	8	5	5	7	19	-10
1973	4	0	3	6	6	2	4	6	14	-7
1974	2	0	2	4	4	1	8	4	12	-8
1975	4	0	1	5	5	3	8	4	13	-8
1976	5	0	1	6	6	4	5	5	12	-6
1977	6	0	3	8	8	4	5	7	12	-4
1978	4	0	2	5	5	3	3	4	12	-7
1979	3	0	1	4	4	2	4	3	12	-8
1980	4	0	2	5	5	2	4	4	11	-6
1981	4	0	1	5	5	3	5	4	12	-7
1982	8	0	2	9	11	6	3	8	12	-4
1983	6	0	0	6	7	5	3	5	10	-5
1984	6	0	0	5	5	5	3	4	10	-5
1985	6	0	0	5	6	5	2	5	9	-4
1986	9	0	1	8	11	7	1	8	9	-1
1987	6	0	1	5	7	5	1	5	8	-3
1988	4	0	1	4	5	3	1	4	8	-3
1989	4	0	1	4	5	3	1	4	7	-3
1990	7	0	0	6	8	7	1	6	7	0
1991	5	0	1	4	5	4	1	5	6	-1
1992	4	0	1	4	5	4	1	4	5	-1
1993	4	0	1	4	5	3	1	4	4	-1
1994	4	0	1	4	5	3	0	4	4	0
1995	3	0	1	3	5	3	0	4	4	0
1996	3	0	1	4	5	3	0	4	2	1
1997	3	0	1	3	4	3	0	3	2	1
1998	2	0	1	3	3	2	0	3	2	0
1999	2	0	1	2	3	2	0	2	2	0
2000	0	0	0	1	2	0	0	1	2	-1
2001	0	0	1	1	3	0	0	1	2	-1
2002	0	0	1	1	4	0	0	1	2	-1
2003	0	0	1	1	3	0	0	1	2	-1

2004	0	0	1	1	3	0	0	1	2	-2
2005	0	0	0	0	3	0	0	1	2	-2
2006	0	0	3	3	6	0	0	0	2	-2
2007	0	0	3	3	6	0	0	0	2	-2

a. NRAs including assistance to nontradables and non-product-specific assistance.

b. NRAs including product-specific input subsidies.

c. The Relative Rate of Assistance (RRA) is defined as $100*[(100+NRAag^t)/(100+NRAnonag^t)-1]$, where $NRAag^t$ and $NRAnonag^t$ are the percentage NRAs for the tradables parts of the agricultural and non-agricultural sectors, respectively.

Appendix Table 7(a): Nominal rates of assistance (excluding product-specific subsidies), covered agricultural products, New Zealand, 1955 to 2005
(percent)

	Wheat	Coarse grains	Wine grapes	Other fruit & veg.	Other crops	Beef and veal	Mutton and lamb	Pig meat
1955-59	11.0	4.0	120.0	0.0	0.0	0.0	0.0	2.0
1960-64	11.0	4.0	120.0	0.0	0.0	0.0	0.0	2.0
1965-69	11.0	4.0	134.0	0.0	0.0	0.0	0.0	2.8
1970	11.0	4.0	134.0	0.0	0.0	0.0	0.0	-18.1
1971	11.0	4.0	134.0	0.0	0.0	0.0	0.0	14.7
1972	11.0	4.0	134.0	0.0	0.0	0.0	0.0	3.3
1973	11.0	4.0	64.0	0.0	0.0	0.0	0.0	1.9
1974	11.0	4.0	64.0	0.0	0.0	0.0	0.0	25.4
1975	11.0	4.0	64.0	0.0	0.0	1.0	9.1	-16.6
1976	11.0	4.0	64.0	0.0	0.0	0.0	0.0	-32.4
1977	11.0	4.0	64.0	0.0	0.0	0.0	0.0	-12.8
1978	11.0	4.0	64.0	0.0	0.0	0.0	0.0	-24.0
1979	11.0	4.0	13.0	0.0	0.0	0.0	0.0	-13.5
1980	11.0	4.0	13.0	0.0	0.0	1.0	2.6	25.5
1981	11.0	4.0	13.0	0.0	0.0	7.0	2.6	27.4
1982	11.0	4.0	30.0	0.0	0.0	14.0	16.9	2.8
1983	11.0	4.0	30.0	0.0	0.0	10.0	48.1	7.6
1984	11.0	4.0	30.0	0.0	0.0	2.0	51.4	-11.5
1985	11.0	4.0	30.0	0.0	0.0	1.0	46.2	-22.9
1986	11.0	4.0	28.0	0.0	0.0	2.0	39.7	5.0
1987	5.0	0.0	28.0	0.0	0.0	2.0	3.3	2.0
1988	3.0	1.0	28.0	0.0	0.0	1.0	2.0	1.0
1989	3.0	2.0	5.0	0.0	0.0	1.0	2.0	1.0
1990	2.0	1.0	5.0	0.0	0.0	1.0	1.3	0.0
1991	1.0	1.0	5.0	0.0	0.0	0.0	0.0	0.0
1992	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0
1993	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0
1994	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0
1995	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0
1996	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0
1997	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0
1998	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0
1999	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0
2000	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0
2001	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0
2002	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0
2003	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0
2004	0.0	0.0	5.0	0.0	0.0	0.0	0.0	1.0
2005	2.0	0.0	5.0	0.0	0.0	0.0	0.0	1.0

… continued

Appendix Table 7(a) (continued): Nominal rates of assistance (excluding product-specific subsidies), covered agricultural products, New Zealand, 1955 to 2005
(percent)

	Chicken meat	Eggs	Milk	Wool	**Wted average[a]**	**Standard deviation**
1955-59	31.0	59.0	0.0	0.0	1.7	39.0
1960-64	31.0	59.0	0.0	0.0	1.7	39.0
1965-69	31.0	59.0	0.0	0.0	1.8	42.7
1970	31.0	59.0	1.0	0.0	1.9	42.9
1971	31.0	59.0	0.0	0.0	2.5	42.4
1972	31.0	59.0	0.0	0.0	2.4	42.3
1973	31.0	59.0	0.0	0.0	2.7	25.5
1974	31.0	59.0	0.0	0.0	3.3	26.1
1975	31.0	59.0	2.0	1.0	4.7	25.4
1976	31.0	59.0	0.0	0.0	2.1	27.7
1977	31.0	59.0	0.0	0.0	2.3	26.1
1978	31.0	59.0	0.0	0.0	2.5	26.8
1979	31.0	59.0	0.0	0.0	2.7	19.3
1980	31.0	59.0	22.0	0.0	8.4	18.0
1981	31.0	59.0	2.0	0.0	5.6	18.7
1982	31.0	59.0	7.0	16.0	13.7	16.5
1983	31.0	59.0	9.0	21.0	21.2	18.4
1984	31.0	59.0	2.0	8.0	15.2	21.2
1985	31.0	59.0	2.0	1.0	12.5	22.3
1986	31.0	107.0	2.0	0.0	9.7	31.1
1987	129.0	59.0	3.0	0.0	8.0	38.8
1988	69.0	83.0	1.0	0.0	4.9	30.1
1989	48.0	93.0	0.0	0.0	4.0	28.8
1990	68.0	39.0	0.0	0.0	3.6	21.4
1991	70.0	44.0	0.0	0.0	2.0	23.1
1992	52.0	34.0	0.0	0.0	1.5	17.4
1993	41.0	32.0	0.0	0.0	1.2	14.6
1994	54.0	42.0	0.0	0.0	1.4	19.2
1995	67.0	62.0	0.0	0.0	2.1	25.6
1996	51.0	28.0	0.0	0.0	1.3	16.4
1997	47.0	51.0	0.0	0.0	1.4	19.5
1998	17.0	49.0	0.0	0.0	0.9	14.7
1999	22.0	62.0	0.0	0.0	1.1	18.6
2000	17.0	8.0	0.0	0.0	0.4	5.4
2001	-4.0	36.0	0.0	0.0	0.3	10.5
2002	31.0	44.0	0.0	0.0	1.0	15.2
2003	68.0	27.0	0.0	0.0	2.1	20.4
2004	61.0	67.0	0.0	0.0	2.4	25.3
2005	60.0	45.0	0.0	0.0	2.1	20.9

[a] The TOTAL agric weighted average uses weights based on the unassisted value of production (actual back to 1966, and the average for 1966-69 for earlier years)
Source: Authors' compilation based on Tweedie and Spencer (1981), Tyler and Lattimore (1990) and Silverstone, Bollard and Lattimore (1996).

Appendix Table 7(b): Nominal rates of assistance (including product-specific subsidies), covered agricultural products, New Zealand, annual, 1955 to 2005
(percent)

	Wheat	Coarse grains	Wine grapes	Other fruit & veg.	Other crops	Beef and veal	Mutton and lamb
1955-59	11.0	4.0	120.0	0.0	0.0	0.1	0.1
1960-64	11.0	4.0	120.0	0.0	0.0	0.1	0.1
1965-69	11.0	4.0	134.0	0.0	0.0	0.3	0.3
1970	11.0	4.0	134.0	0.0	0.0	5.0	5.0
1971	11.0	4.0	134.0	0.0	0.0	5.0	5.0
1972	11.0	4.0	134.0	0.0	0.0	5.0	5.0
1973	11.0	4.0	64.0	0.0	0.0	5.0	5.0
1974	11.0	4.0	64.0	0.0	0.0	5.0	5.0
1975	11.0	4.0	64.0	0.0	0.0	10.0	19.0
1976	11.0	4.0	64.0	0.0	0.0	10.0	19.0
1977	11.0	4.0	64.0	0.0	0.0	10.0	19.0
1978	11.0	4.0	64.0	0.0	0.0	10.0	19.0
1979	11.0	4.0	13.0	0.0	0.0	10.0	19.0
1980	11.0	4.0	13.0	0.0	0.0	5.0	14.0
1981	11.0	4.0	13.0	0.0	0.0	17.0	14.0
1982	11.0	4.0	30.0	0.0	0.0	24.0	23.4
1983	11.0	4.0	30.0	0.0	0.0	19.0	54.6
1984	11.0	4.0	30.0	0.0	0.0	13.0	58.5
1985	11.0	4.0	30.0	0.0	0.0	9.0	52.0
1986	11.0	4.0	28.0	0.0	0.0	16.0	48.8
1987	5.0	0.0	28.0	0.0	0.0	13.0	16.0
1988	3.0	1.0	28.0	0.0	0.0	12.0	14.0
1989	3.0	2.0	5.0	0.0	0.0	5.0	8.0
1990	2.0	1.0	5.0	0.0	0.0	3.0	5.0
1991	1.0	1.0	5.0	0.0	0.0	1.0	1.0
1992	0.0	0.0	5.0	0.0	0.0	1.0	1.0
1993	0.0	0.0	5.0	0.0	0.0	1.0	1.0
1994	0.0	0.0	5.0	0.0	0.0	1.0	1.0
1995	0.0	0.0	5.0	0.0	0.0	1.0	1.0
1996	0.0	0.0	5.0	0.0	0.0	1.0	1.0
1997	0.0	0.0	5.0	0.0	0.0	1.0	1.0
1998	0.0	0.0	5.0	0.0	0.0	1.0	1.0
1999	0.0	0.0	5.0	0.0	0.0	1.0	1.0
2000	0.0	0.0	5.0	0.0	0.0	1.0	1.0
2001	0.0	0.0	5.0	0.0	0.0	1.0	1.0
2002	0.0	0.0	5.0	0.0	0.0	1.0	1.0
2003	0.0	0.0	5.0	0.0	0.0	1.0	1.0
2004	0.0	0.0	5.0	0.0	0.0	1.0	1.0
2005	2.0	0.0	5.0	0.0	0.0	1.0	1.0

… continued

Appendix Table 7(b) (continued): Nominal rates of assistance (including product-specific subsidies), covered agricultural products, New Zealand, 1955 to 2005 (percent)

	Pig meat	Chicken meat	Eggs	Milk	Wool	**Weighted average, covered products**[a]	**Standard deviation** of cov. products
1955-59	2.0	31.0	59.0	0.2	0.0	**1.8**	39.0
1960-64	2.0	31.0	59.0	0.2	0.0	**1.8**	39.0
1965-69	2.8	31.0	59.0	0.2	0.0	**1.9**	42.6
1970	-18.1	31.0	59.0	-1.0	5.0	**4.3**	42.0
1971	14.7	31.0	59.0	-1.0	5.0	**4.8**	41.4
1972	3.3	31.0	59.0	-1.0	5.0	**4.8**	41.3
1973	1.9	31.0	59.0	-1.0	5.0	**5.5**	24.3
1974	25.4	31.0	59.0	-1.0	5.0	**5.7**	24.8
1975	-16.6	31.0	59.0	40.0	11.0	**22.0**	23.7
1976	-32.4	31.0	59.0	10.0	11.0	**12.3**	25.2
1977	-12.8	31.0	59.0	10.0	11.0	**12.4**	22.8
1978	-24.0	31.0	59.0	10.0	11.0	**12.4**	24.1
1979	-13.5	31.0	59.0	10.0	11.0	**12.7**	17.4
1980	25.5	31.0	59.0	32.0	10.0	**16.0**	16.5
1981	27.4	31.0	59.0	10.0	10.0	**13.3**	16.0
1982	2.8	31.0	59.0	17.0	26.0	**21.0**	16.5
1983	7.6	31.0	59.0	18.0	30.0	**28.0**	19.8
1984	-11.5	31.0	59.0	13.0	19.0	**22.8**	21.6
1985	-22.9	31.0	59.0	11.0	10.0	**18.8**	22.3
1986	5.0	31.0	107.0	16.0	14.0	**19.3**	29.0
1987	2.0	129.0	59.0	14.0	11.0	**16.5**	36.3
1988	1.0	69.0	83.0	12.0	11.0	**13.4**	27.3
1989	1.0	48.0	93.0	5.0	5.0	**7.8**	27.6
1990	0.0	68.0	39.0	3.0	3.0	**5.9**	20.7
1991	0.0	70.0	44.0	1.0	1.0	**2.8**	22.9
1992	0.0	52.0	34.0	1.0	1.0	**2.2**	17.1
1993	0.0	41.0	32.0	1.0	1.0	**1.9**	14.3
1994	0.0	54.0	42.0	1.0	1.0	**2.1**	19.0
1995	0.0	67.0	62.0	1.0	1.0	**2.8**	25.3
1996	0.0	51.0	28.0	1.0	1.0	**2.0**	16.1
1997	0.0	47.0	51.0	1.0	1.0	**2.2**	19.2
1998	0.0	17.0	49.0	1.0	1.0	**1.6**	14.5
1999	0.0	22.0	62.0	1.0	1.0	**1.8**	18.4
2000	0.0	17.0	8.0	1.0	1.0	**1.2**	5.1
2001	0.0	-4.0	36.0	1.0	1.0	**1.1**	10.3
2002	0.0	31.0	44.0	1.0	1.0	**1.8**	14.9
2003	0.0	68.0	27.0	1.0	1.0	**2.8**	20.2
2004	1.0	61.0	67.0	1.0	1.0	**3.1**	25.0
2005	1.0	60.0	45.0	1.0	1.0	**2.9**	20.6

[a] The weighted average uses weights based on the unassisted value of production (actual back to 1966, and the average for 1966-69 for earlier years)

[b] The final column shows the relative rate of assistance as defined on page 8 of the text

Source: Authors' compilation based on Tweedie and Spencer (1981), Tyler and Lattimore (1990) and Silverstone, Bollard and Lattimore (1996).

Appendix Table 8: Annual estimates of nominal and relative rates of assistance to all agricultural products, to exportable and import-competing agricultural industries, and relative to non-agricultural industries, New Zealand, 1955 to 2007 (percent)

	NRA, all agric products,[a] by component					NRA, agric tradables				
	NRA, covered products[a] (1)	NRA, non-covered products (2)	NRA, non-product-specific support (3)	NRA, all ag products (incl NPS) (4)=1+2+3	NRA, all ag products (incl NPS and decoupled) (5)	NRA, ag export-ables (6)	NRA, ag import-competing (7)	NRA, all agric tradable goods[c] (8)=6+7	NRA, all non-ag tradable goods (9)	RRA[b] (10)
1955	2	na	na	2	2	0	28	2	21	-16
1956	2	na	na	2	2	0	28	2	21	-16
1957	2	na	na	2	2	0	28	2	21	-16
1958	2	na	na	2	2	0	28	2	21	-16
1959	2	na	na	2	2	0	28	2	21	-16
1960	2	na	na	2	2	0	28	2	21	-16
1961	2	na	na	2	2	0	28	2	22	-17
1962	2	na	na	2	2	0	28	2	22	-16
1963	2	na	na	2	2	0	28	2	22	-17
1964	2	na	na	2	2	0	28	2	32	-23
1965	2	na	na	2	2	0	28	2	34	-24
1966	2	na	na	2	2	0	28	2	35	-24
1967	2	na	na	2	2	0	34	2	35	-24
1968	2	na	na	2	2	0	28	2	34	-24
1969	2	na	na	2	2	0	25	2	34	-24
1970	4	na	na	4	4	3	26	4	34	-22
1971	5	na	na	5	5	3	34	5	35	-22
1972	5	na	na	5	5	3	30	5	35	-22
1973	5	na	na	5	5	3	31	5	23	-14
1974	6	na	na	6	6	3	39	6	23	-14
1975	22	na	na	22	22	21	28	22	24	-1
1976	12	na	na	12	12	11	25	12	22	-8
1977	12	na	na	12	12	11	28	12	22	-8
1978	12	na	na	12	12	11	27	12	22	-8
1979	13	na	8	20	20	11	27	20	18	2
1980	16	na	8	24	24	14	33	24	18	5
1981	13	na	9	22	22	11	32	22	18	4
1982	21	na	9	30	30	20	28	30	20	8
1983	28	na	10	38	38	27	29	38	22	13
1984	22	na	7	30	30	22	25	30	22	6
1985	19	na	13	32	32	18	24	32	22	8
1986	19	na	7	26	26	16	43	26	20	5
1987	16	na	7	23	23	11	61	23	16	7
1988	13	na	2	15	15	10	44	15	13	1
1989	8	na	1	9	9	5	39	9	12	-3
1990	6	na	1	6	7	3	33	6	12	-5
1991	3	na	0	3	3	1	31	3	12	-8
1992	2	na	0	3	3	1	19	3	11	-8
1993	2	na	0	2	2	1	18	2	10	-7
1994	2	na	1	3	3	1	20	3	9	-6
1995	3	na	1	3	3	1	32	3	8	-5
1996	2	na	1	3	3	1	22	3	7	-5
1997	2	na	1	3	3	1	21	3	7	-4
1998	2	na	1	2	2	1	12	2	5	-3
1999	2	na	1	2	2	1	16	2	5	-2
2000	1	na	0	2	2	1	6	2	4	-2
2001	1	na	0	2	2	1	4	2	4	-2
2002	2	na	0	2	2	1	16	2	4	-1
2003	3	na	0	3	3	1	28	3	4	-1
2004	3	na	0	4	4	1	33	4	4	0
2005	3	na	0	3	4	1	29	3	3	0
2006	1	na	0	0	0	1	0	0	3	-3
2007	0	na	0	1	1	0	0	1	3	-2

a. NRAs including product-specific input subsidies.

b. The Relative Rate of Assistance (RRA) is defined as $100*[(100+NRAag^t)/(100+NRAnonag^t)-1]$, where $NRAag^t$ and $NRAnonag^t$ are the percentage NRAs for the tradables parts of the agricultural and non-agricultural sectors, respectively.

Appendix Table 9: Value shares of primary production of covered[a] and non-covered products, Australia and New Zealand, 1955 to 2007

(percent)

(a) Australia

	Apple	Banana	Barley	Beef	Cotton	Egg	Grape	Maize	Milk	Oat	Olive	Orange	Pigmeat	Potato	Poultry	Rapeseed	Rice	Sheepmeat	Sorghum	Soybean	Sugar	Sunflower	Tobacco	Wheat	Wool	Non-covered
1955	1	1	2	15	0	2	1	0	10	2	0	1	2	1	1	0	0	6	0	0	4	na	1	11	22	16
1956	1	1	2	15	0	3	1	0	8	1	0	1	2	1	1	0	0	6	0	0	3	na	1	8	22	21
1957	1	1	2	16	0	2	1	0	6	2	0	1	2	1	1	0	0	6	0	0	4	na	1	6	23	23
1958	1	1	3	15	0	2	1	0	10	3	0	1	2	1	1	0	0	6	0	0	3	na	1	12	22	14
1959	1	1	1	15	0	2	1	0	9	1	0	1	2	1	1	0	0	6	0	0	3	na	1	10	22	18
1960	1	1	2	16	0	2	1	0	8	2	0	1	2	1	1	0	0	6	0	0	3	na	1	14	23	12
1961	1	1	2	16	0	2	1	0	9	2	0	1	2	1	1	0	0	6	0	0	3	na	1	14	23	13
1962	1	1	1	16	0	2	1	0	9	2	0	1	2	1	1	0	0	6	0	0	3	na	1	15	22	13
1963	1	1	1	15	0	2	1	0	8	2	0	1	2	1	1	0	0	6	0	0	4	na	1	14	22	15
1964	1	1	2	15	0	2	1	0	9	2	0	1	2	1	1	0	0	6	0	0	3	na	1	15	22	14
1965	1	1	2	16	0	1	1	0	9	2	0	1	2	1	1	0	0	6	0	0	3	na	1	12	23	17
1966	1	1	2	15	0	2	1	0	8	3	0	0	2	1	1	0	0	5	0	0	3	na	1	19	23	12
1967	2	1	1	18	0	2	1	0	7	1	0	1	3	1	1	0	0	7	0	0	3	na	1	12	24	14
1968	1	1	2	15	0	1	1	0	5	2	0	0	3	1	1	0	0	5	0	0	3	na	1	22	24	9
1969	2	1	2	17	0	1	1	0	7	1	0	1	3	1	1	0	0	6	1	0	3	na	1	14	22	14
1970	2	1	3	20	0	3	1	0	12	1	0	1	3	1	2	0	0	6	2	0	4	na	0	11	16	10
1971	1	1	4	18	1	2	1	0	10	1	0	1	3	2	2	0	0	6	1	0	5	na	0	10	16	14
1972	1	0	2	15	0	2	1	0	8	0	0	0	2	1	1	0	0	6	1	0	4	na	0	7	26	20
1973	1	0	2	16	0	1	1	0	6	1	0	0	2	1	1	0	1	5	1	0	3	na	0	12	19	25
1974	1	0	3	18	0	3	1	0	7	1	0	1	3	2	2	0	1	3	1	0	5	na	0	24	16	8
1975	1	1	5	9	0	2	1	0	8	1	0	1	3	1	2	0	1	3	2	0	10	na	0	23	18	7
1976	1	1	4	11	0	2	1	0	7	1	0	1	3	1	2	0	1	4	1	0	8	na	0	18	18	13
1977	1	1	4	15	1	3	1	0	7	1	0	1	3	1	2	0	1	4	1	0	7	na	0	12	18	16
1978	1	1	4	12	1	2	1	0	5	1	0	1	2	1	2	0	1	4	1	0	4	na	0	19	14	25
1979	1	0	3	26	1	2	2	0	4	1	0	0	2	1	2	0	1	4	1	0	3	0	0	18	14	13

	Apple	Banana	Barley	Beef	Cotton	Egg	Grape	Maize	Milk	Oat	Olive	Orange	Pigmeat	Potato	Poultry	Rapeseed	Rice	Sheepmeat	Sorghum	Soybean	Sugar	Sunflower	Tobacco	Wheat	Wool	Non-covered
1980	1	0	3	21	1	2	1	0	7	1	0	0	3	1	2	0	1	5	1	0	6	0	0	14	15	14
1981	1	0	4	16	1	2	1	0	7	2	0	0	3	1	2	0	1	4	1	0	7	0	0	20	14	10
1982	1	1	2	17	1	2	1	0	8	1	0	1	4	2	2	0	1	4	1	0	5	0	0	12	16	18
1983	1	0	5	14	1	1	1	0	6	1	0	1	3	1	2	0	1	3	2	0	3	0	0	26	14	13
1984	1	1	6	14	2	2	1	0	5	1	0	1	3	2	2	0	1	3	1	0	3	1	0	20	16	15
1985	1	1	5	15	2	2	2	0	5	1	0	1	3	1	3	0	0	3	1	0	3	0	0	18	18	14
1986	1	1	3	14	2	2	2	0	5	1	0	1	3	1	3	0	0	4	1	0	3	0	0	15	19	21
1987	1	1	2	14	2	2	2	0	5	1	0	1	3	1	2	0	1	3	1	0	3	0	0	9	16	31
1988	1	0	2	13	2	1	1	0	6	1	0	1	2	1	2	0	1	3	1	0	3	0	0	10	16	31
1989	1	1	3	13	2	2	1	0	6	1	0	1	3	1	3	0	1	3	1	0	3	0	0	13	19	23
1990	1	1	4	17	4	2	2	0	7	1	0	1	3	2	3	0	1	4	0	0	4	0	0	14	20	9
1991	1	1	3	19	4	2	2	0	7	1	0	1	3	2	4	0	1	4	1	0	3	0	0	7	14	19
1992	1	1	4	18	3	2	1	0	9	1	0	1	3	2	4	0	1	3	0	0	4	0	0	14	12	17
1993	1	1	4	16	3	2	2	0	9	1	0	1	3	1	4	0	1	3	1	0	4	0	0	13	10	20
1994	1	1	2	19	3	2	1	0	8	0	0	1	3	1	4	0	1	3	1	0	5	0	0	7	14	21
1995	1	1	5	15	3	1	2	0	9	1	0	1	2	1	3	1	1	3	1	0	4	0	0	14	9	20
1996	1	1	5	11	4	1	2	0	8	1	0	1	2	1	3	1	1	3	1	0	4	0	0	22	9	16
1997	1	1	5	11	4	1	1	0	8	1	0	1	3	2	4	1	1	3	1	0	5	0	0	14	10	22
1998	1	1	3	13	4	1	2	0	9	1	0	1	3	2	4	2	1	3	1	0	4	0	0	15	8	20
1999	1	1	2	14	5	1	3	0	8	0	0	1	2	1	3	3	1	3	1	0	3	0	0	15	7	23
2000	1	1	3	13	5	1	3	0	9	0	0	1	2	1	3	2	1	3	1	0	2	0	0	12	8	28
2001	1	1	4	15	3	1	3	0	8	0	0	1	2	1	3	1	1	4	1	0	2	0	0	14	7	25
2002	1	1	5	20	2	1	3	0	8	1	0	1	3	1	2	1	0	5	1	0	3	0	0	8	10	20
2003	1	1	7	16	2	1	4	0	7	1	0	1	2	1	2	2	1	4	1	0	3	0	0	19	8	15
2004	1	1	4	19	3	1	4	0	8	1	0	1	3	1	3	2	0	6	1	0	3	0	0	15	7	16
2005	1	1	5	21	2	1	3	0	9	1	0	1	3	1	3	1	0	5	1	0	3	0	0	14	6	16
2006	1	1	5	21	3	1	4	0	10	1	0	1	3	1	4	1	0	5	1	0	3	0	0	7	8	21
2007	1	1	4	19	2	1	3	0	9	0	0	1	2	1	5	1	0	5	1	0	3	0	0	10	7	22

Appendix Table 9 (continued): (b) New Zealand

	Barley	Beef	Coarse grains	egg	Fruit & veg	Grape	Maize	Milk	Oat	Other crops	Pigmeat	Poultry	Sheep meat	Wheat	Wool	Non-covered
1955	na	18	1	2	4	0	na	33	na	0	2	1	16	1	22	0
1956	na	18	1	2	4	0	na	33	na	0	2	1	16	1	22	0
1957	na	18	1	2	4	0	na	34	na	0	2	1	16	1	22	0
1958	na	18	1	2	4	0	na	33	na	0	2	1	16	1	22	0
1959	na	18	1	2	4	0	na	33	na	0	2	1	16	1	22	0
1960	na	18	1	2	4	0	na	33	na	0	2	1	16	1	22	0
1961	na	18	1	2	4	0	na	34	na	0	2	1	16	1	22	0
1962	na	18	1	2	4	0	na	33	na	0	2	1	16	1	22	0
1963	na	18	1	2	4	0	na	34	na	0	2	1	16	1	22	0
1964	na	18	1	2	4	0	na	34	na	0	2	1	16	1	22	0
1965	na	18	1	2	4	0	na	33	na	0	2	1	16	1	22	0
1966	na	18	1	2	4	0	na	34	na	0	2	1	16	1	22	0
1967	na	19	1	2	3	0	na	34	na	0	2	1	17	1	19	0
1968	na	23	1	2	4	0	na	31	na	0	2	1	20	2	15	0
1969	na	24	1	2	4	0	na	28	na	0	2	1	19	2	17	0
1970	na	25	1	2	5	0	na	29	na	0	2	1	19	1	15	0
1971	na	22	2	2	5	0	na	33	na	1	2	1	17	2	15	0
1972	na	18	2	2	4	0	na	32	na	0	2	2	24	1	13	0
1973	na	17	2	3	5	0	na	25	na	0	2	2	20	2	22	0
1974	na	18	2	3	5	0	na	30	na	1	2	2	13	1	23	0
1975	na	24	2	4	4	0	na	32	na	1	2	1	13	1	16	0
1976	na	21	2	3	4	0	na	27	na	0	2	2	17	2	20	0
1977	na	18	2	3	5	0	na	27	na	0	2	2	15	1	25	0
1978	na	18	2	3	5	0	na	28	na	1	2	2	15	1	22	0
1979	1	16	2	3	7	0	1	21	0	1	2	3	18	1	25	0
1980	1	14	2	3	7	0	1	21	0	0	2	2	17	1	28	0
1981	1	13	2	3	8	0	1	22	0	0	2	3	19	1	23	0
1982	1	13	2	3	8	0	0	23	0	0	2	3	20	1	23	0
1983	2	13	2	2	8	1	0	23	0	0	2	2	21	1	22	0

	Barley	Beef	Coarse grains	egg	Fruit & veg	Grape	Maize	Milk	Oat	Other crops	Pigmeat	Poultry	Sheep meat	Wheat	Wool	Non-covered
1984	2	11	3	2	11	0	1	24	0	0	2	3	20	1	20	0
1985	1	14	2	2	9	1	1	22	0	0	2	3	20	1	21	0
1986	1	11	2	3	14	0	1	28	0	0	2	3	11	2	21	0
1987	1	15	2	2	13	0	0	20	0	0	2	4	16	1	23	0
1988	1	13	2	1	14	0	0	25	0	0	2	4	12	1	24	0
1989	1	16	2	1	13	0	1	28	0	0	2	4	15	1	15	0
1990	1	13	2	1	13	1	1	27	0	0	2	4	15	1	19	0
1991	1	18	2	2	18	0	1	23	0	0	2	2	16	1	14	0
1992	1	16	2	1	16	0	0	29	0	0	2	2	16	1	13	0
1993	1	16	2	1	14	0	0	33	0	0	2	2	17	1	10	0
1994	1	13	2	1	21	1	1	31	0	0	2	2	16	1	10	0
1995	1	12	2	1	22	1	1	29	0	0	2	2	13	1	14	0
1996	1	9	2	1	18	1	1	37	0	0	2	2	14	1	11	0
1997	1	11	2	1	15	1	0	37	0	0	2	2	17	1	10	0
1998	1	13	2	1	19	1	1	34	0	0	2	2	15	1	10	0
1999	1	13	1	1	20	1	1	35	0	0	1	2	15	1	8	0
2000	1	15	1	1	16	1	0	37	0	0	1	2	16	1	8	0
2001	1	15	1	1	13	1	0	41	0	0	1	2	16	1	7	0
2002	1	14	1	1	12	1	0	44	0	0	1	2	16	1	6	0
2003	1	12	1	1	15	1	0	37	0	0	1	2	18	1	8	0
2004	1	12	1	1	15	2	0	36	0	0	1	2	18	1	8	0
2005	1	12	1	1	15	2	0	36	0	0	1	2	18	1	8	0
2006	1	12	1	0	12	2	0	28	0	0	1	2	9	0	3	0
2007	1	10	1	0	10	2	0	35	0	0	1	2	9	1	2	0

Appendix Table 10: Consumer tax equivalents for covered agricultural products, Australia and New Zealand, 1955 to 2007
(a) Australia

	Apple	Banana	Barley	Beef	Cotton	Egg	Grape	Maize	Milk	Oat	Olive	Orange	Pigmeat	Potato	Poultry	Rapeseed	Rice	Sheepmeat	Sorghum	Soybean	Sugar	Sunflower	Tobacco	Wheat	Wool	All covered
1955	6	0	21	0	-16	51	15	0	13	0	0	25	0	-8	0	0	19	0	0	0	22	na	48	4	0	7
1956	6	0	14	0	-36	42	15	0	56	0	0	25	0	-8	0	0	20	0	0	0	30	na	46	4	0	12
1957	6	0	-1	0	-19	65	20	0	93	0	0	25	0	-8	0	0	24	0	0	0	18	na	46	2	0	17
1958	6	0	10	0	-33	65	19	0	21	0	0	25	0	-8	0	0	51	0	0	0	39	na	58	9	0	8
1959	6	0	27	0	2	54	41	0	37	0	0	25	0	-8	0	0	47	0	0	0	40	na	56	12	0	13
1960	6	0	38	0	-21	75	46	0	59	0	0	25	0	-8	0	0	39	0	0	0	57	na	29	13	0	15
1961	6	0	10	0	-48	54	57	0	58	0	0	25	0	-8	0	0	30	0	0	0	66	na	64	10	0	12
1962	6	0	14	0	-19	72	40	0	43	0	0	25	0	-8	0	0	35	0	0	0	53	na	57	17	0	13
1963	6	0	7	0	17	62	36	0	38	0	0	25	0	-8	0	0	49	0	0	0	-7	na	44	1	0	11
1964	6	0	4	0	28	111	42	0	39	0	0	25	0	-8	0	0	46	0	0	0	44	na	40	9	0	14
1965	6	0	4	0	40	159	51	0	48	0	0	25	0	-8	0	0	44	0	0	0	81	na	62	8	0	17
1966	6	0	7	0	43	115	54	0	56	0	0	25	0	-8	0	0	31	0	0	0	111	na	46	7	0	17
1967	6	0	18	0	30	159	51	0	110	0	0	25	0	-8	0	0	38	0	0	0	141	na	48	21	0	24
1968	6	0	22	0	40	231	72	0	127	0	0	25	0	-8	0	0	49	0	0	0	128	na	55	34	0	25
1969	6	0	24	0	28	189	84	0	107	0	0	25	0	-8	0	0	53	2	0	0	74	na	47	22	0	23
1970	6	0	-7	1	38	147	96	0	81	0	0	25	0	-8	0	0	86	2	0	0	58	na	47	26	10	27
1971	11	0	0	1	6	0	37	0	24	0	0	27	0	-8	0	0	46	2	0	0	14	na	250	22	15	13
1972	8	0	0	1	19	0	43	0	24	0	0	26	0	-8	0	0	15	1	0	0	8	na	250	12	2	10
1973	8	0	0	1	126	0	28	0	27	0	0	26	0	-6	0	0	6	1	0	0	7	na	250	-10	1	9
1974	12	0	0	3	16	0	30	0	26	0	0	25	0	-6	0	0	15	2	0	0	-14	na	250	-8	2	8
1975	9	0	0	3	40	0	36	0	40	0	0	23	0	-6	0	0	23	3	0	0	-13	na	250	-2	1	11
1976	9	0	0	2	20	0	29	0	35	0	0	21	0	-6	0	0	26	2	0	0	-9	na	113	3	1	9
1977	2	0	0	2	9	0	10	0	36	0	0	38	0	-8	0	0	26	2	0	0	-4	na	84	2	2	9
1978	2	0	0	1	11	0	12	0	34	0	0	41	0	-8	0	0	13	1	0	0	-3	na	76	-2	2	7
1979	5	0	0	1	8	0	8	0	34	0	0	41	0	-8	0	0	14	1	0	0	-2	0	88	-3	1	5

	Apple	Banana	Barley	Beef	Cotton	Egg	Grape	Maize	Milk	Oat	Olive	Orange	Pigmeat	Potato	Poultry	Rapeseed	Rice	Sheepmeat	Sorghum	Soybean	Sugar	Sunflower	Tobacco	Wheat	Wool	All covered
1980	2	4	0	1	6	0	15	0	19	0	0	47	0	-8	0	0	18	1	1	0	-8	0	77	2	1	5
1981	8	7	0	1	2	0	20	0	20	0	0	52	0	-8	0	0	8	1	1	0	-2	0	59	2	1	5
1982	2	7	0	2	7	0	25	0	32	0	0	34	0	-8	0	0	22	2	2	0	11	0	44	5	1	8
1983	2	5	0	2	5	0	26	0	38	0	0	34	0	-8	0	0	20	2	2	0	7	0	55	2	1	8
1984	3	1	0	1	2	0	18	0	52	0	0	24	0	-8	0	0	8	1	2	0	15	0	47	2	1	7
1985	1	1	0	1	1	0	17	0	49	0	0	18	0	-8	0	0	11	2	2	0	21	0	38	2	1	7
1986	1	1	0	0	5	35	16	0	120	0	0	19	0	-8	0	0	19	2	0	0	13	0	16	11	1	13
1987	1	1	0	0	2	10	21	0	115	0	0	10	0	0	0	0	17	1	0	0	13	0	37	0	1	12
1988	1	1	0	0	2	9	21	0	15	0	0	12	0	0	0	0	3	2	0	0	9	0	56	0	0	5
1989	2	1	0	0	0	8	17	0	109	0	0	6	0	0	0	0	3	2	0	0	6	0	41	1	1	11
1990	1	0	0	0	0	9	16	0	195	0	0	5	0	0	0	0	5	3	0	0	10	0	35	3	10	15
1991	0	0	0	0	0	8	15	0	34	0	0	3	0	0	0	0	2	0	0	0	7	0	36	1	6	7
1992	0	0	0	0	0	2	16	0	11	0	0	2	0	0	0	0	2	0	0	0	5	0	62	1	6	4
1993	0	0	0	0	0	3	11	0	94	0	0	2	0	0	0	0	1	0	0	0	4	0	60	1	4	14
1994	0	0	0	0	0	4	8	0	68	0	0	1	0	0	0	0	2	0	0	0	4	0	50	1	1	10
1995	0	0	0	0	0	2	7	0	19	0	0	1	0	0	0	0	2	0	0	0	4	0	40	1	2	5
1996	0	0	0	0	0	0	5	0	22	0	0	1	0	0	0	0	3	0	0	0	4	0	30	1	1	5
1997	0	0	0	0	0	0	5	0	23	0	0	0	0	0	0	0	2	0	0	0	0	0	20	1	1	5
1998	0	0	0	0	0	0	4	0	23	0	0	1	0	0	0	0	2	0	0	0	0	0	10	1	0	4
1999	0	0	0	0	0	0	4	0	25	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	4
2000	0	0	0	0	0	0	0	0	16	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	3
2001	0	0	0	0	0	0	0	0	13	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	2
2002	0	0	0	0	0	0	0	0	17	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	2
2003	0	0	0	0	0	0	0	0	16	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	2
2004	0	0	0	0	0	0	0	0	14	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	2
2005	0	0	0	0	0	0	0	0	15	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	2
2006	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0
2007	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0

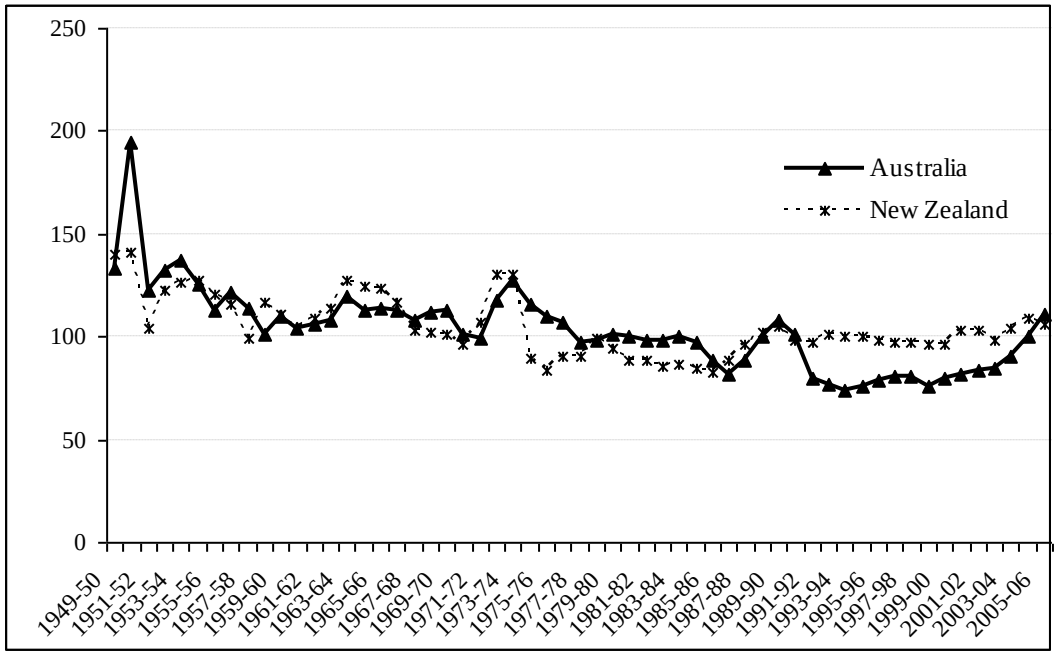
Appendix Table 10 (continued):
(b) New Zealand

	Barley	Beef	Coarse grains	egg	Fruit & veg	Grape	Maize	Milk	Oat	Other crops	Pigmeat	Poultry	Sheepmeat	Wheat	Wool	All covered
1955	na	0	4	59	0	120	na	0	na	0	2	31	0	11	0	3
1956	na	0	4	59	0	120	na	0	na	0	2	31	0	11	0	3
1957	na	0	4	59	0	120	na	0	na	0	2	31	0	11	0	3
1958	na	0	4	59	0	120	na	0	na	0	2	31	0	11	0	3
1959	na	0	4	59	0	120	na	0	na	0	2	31	0	11	0	3
1960	na	0	4	59	0	120	na	0	na	0	2	31	0	11	0	3
1961	na	0	4	59	0	120	na	0	na	0	2	31	0	11	0	3
1962	na	0	4	59	0	120	na	0	na	0	2	31	0	11	0	3
1963	na	0	4	59	0	120	na	0	na	0	2	31	0	11	0	3
1964	na	0	4	59	0	120	na	0	na	0	2	31	0	11	0	3
1965	na	0	4	59	0	134	na	0	na	0	2	31	0	11	0	3
1966	na	0	4	59	0	134	na	0	na	0	2	31	0	11	0	3
1967	na	0	4	59	0	134	na	0	na	0	22	31	0	11	0	4
1968	na	0	4	59	0	134	na	0	na	0	3	31	0	11	0	3
1969	na	0	4	59	0	134	na	0	na	0	-15	31	0	11	0	3
1970	na	5	4	59	0	134	na	-1	na	0	-18	31	5	11	5	5
1971	na	5	4	59	0	134	na	-1	na	0	15	31	5	11	5	5
1972	na	5	4	59	0	134	na	-1	na	0	3	31	5	11	5	5
1973	na	5	4	59	0	64	na	-1	na	0	2	31	5	11	5	6
1974	na	5	4	59	0	64	na	-1	na	0	25	31	5	11	5	7
1975	na	10	4	59	0	64	na	40	na	0	-17	31	19	11	11	26
1976	na	10	4	59	0	64	na	10	na	0	-32	31	19	11	11	12
1977	na	10	4	59	0	64	na	10	na	0	-13	31	19	11	11	12
1978	na	10	4	59	0	64	na	10	na	0	-24	31	19	11	11	12
1979	0	10	4	59	0	13	0	10	0	0	-13	31	19	11	11	12
1980	0	5	4	59	0	13	0	32	0	0	25	31	14	11	10	19
1981	0	17	4	59	0	13	0	10	0	0	27	31	14	11	10	13
1982	0	24	4	59	0	30	0	17	0	0	3	31	23	11	26	19
1983	0	19	4	59	0	30	0	18	0	0	8	31	55	11	30	23

	Barley	Beef	Coarse grains	egg	Fruit & veg	Grape	Maize	Milk	Oat	Other crops	Pigmeat	Poultry	Sheepmeat	Wheat	Wool	All covered
1984	0	13	4	59	0	30	0	13	0	0	-12	31	59	11	19	17
1985	0	9	4	59	0	30	0	11	0	0	-23	31	52	11	10	13
1986	0	0	4	105	0	28	0	21	0	0	4	48	0	0	0	14
1987	0	0	0	58	0	28	0	5	0	0	1	360	0	0	0	15
1988	0	0	1	81	0	28	0	0	0	0	0	132	0	0	0	8
1989	0	0	2	92	0	5	0	0	0	0	0	81	0	0	0	7
1990	0	0	1	39	0	5	0	0	0	0	0	130	0	0	0	6
1991	0	0	1	44	0	5	0	0	0	0	0	135	0	0	0	4
1992	0	0	0	34	0	5	0	0	0	0	0	91	0	0	0	3
1993	0	0	0	32	0	5	0	0	0	0	0	68	0	0	0	3
1994	0	0	0	41	0	5	0	0	0	0	0	95	0	0	0	3
1995	0	0	0	62	0	5	0	0	0	0	0	127	0	0	0	4
1996	0	0	0	28	0	5	0	0	0	0	0	88	0	0	0	3
1997	0	0	0	50	0	5	0	0	0	0	0	79	0	0	0	3
1998	0	0	0	49	0	5	0	0	0	0	0	25	0	0	0	2
1999	0	0	0	62	0	5	0	0	0	0	0	33	0	0	0	2
2000	0	0	0	7	0	5	0	0	0	0	0	26	0	0	0	1
2001	0	0	0	36	0	5	0	0	0	0	0	-5	0	0	0	0
2002	0	0	0	8	0	5	0	0	0	0	0	66	0	0	0	2
2003	0	0	0	-4	0	5	0	0	0	0	0	129	0	0	0	4
2004	0	0	0	54	0	5	0	0	0	0	0	83	0	0	0	4
2005	0	0	0	53	0	5	0	0	0	0	0	107	0	0	0	4
2006	0	0	0	20	0	5	0	0	0	0	0	16	0	0	0	1
2007	0	0	0	10	0	5	0	0	0	0	0	9	0	0	0	1

Appendix Figure 1: International terms of trade, Australia and New Zealand, 1949-50 to 2005-06

(2004-05 =100 for Australia, June 2002 =100 for New Zealand)



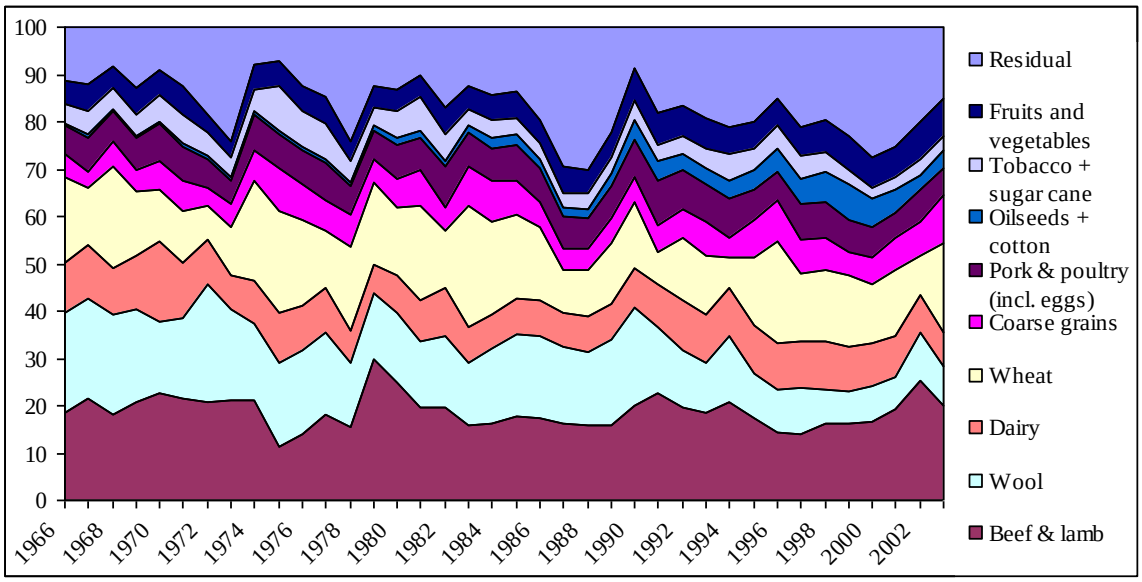
[a] Ratio of implicit price deflator for goods and services exports relative to imports

Source: ABARE (2007) and Statistics New Zealand (2006)

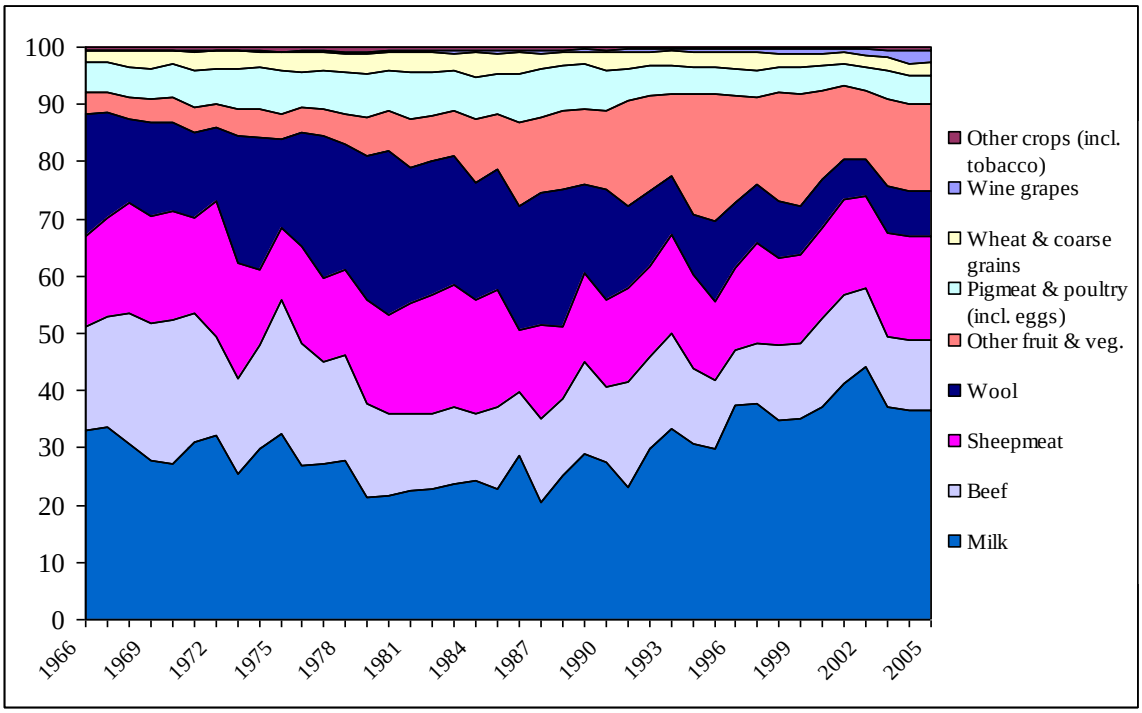
Appendix Figure 2: Industry shares of gross value of farm production at assisted prices, Australia and New Zealand, 1966 to 2003

(percent)

(a) Australia

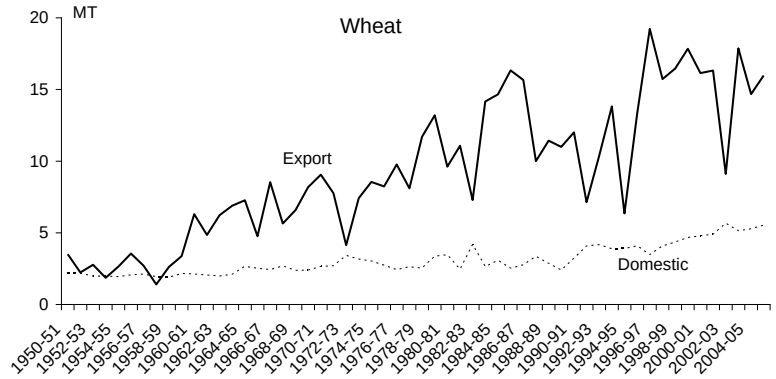


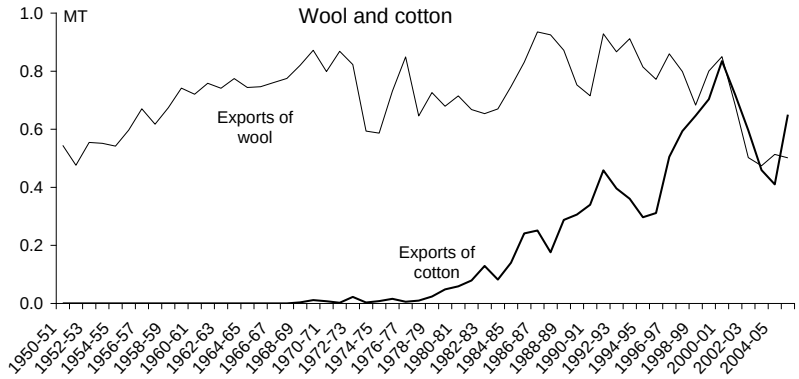
(b) New Zealand

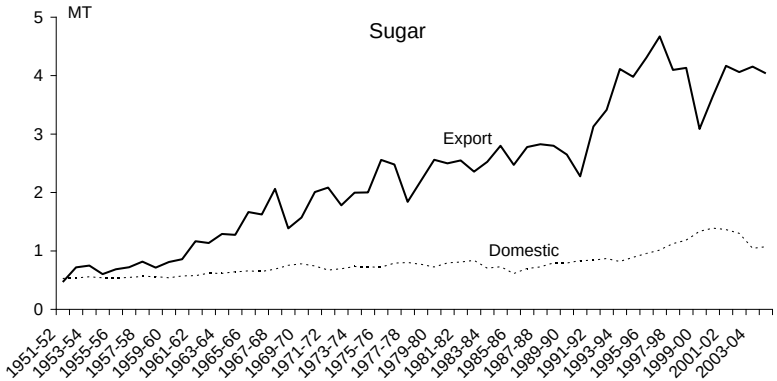


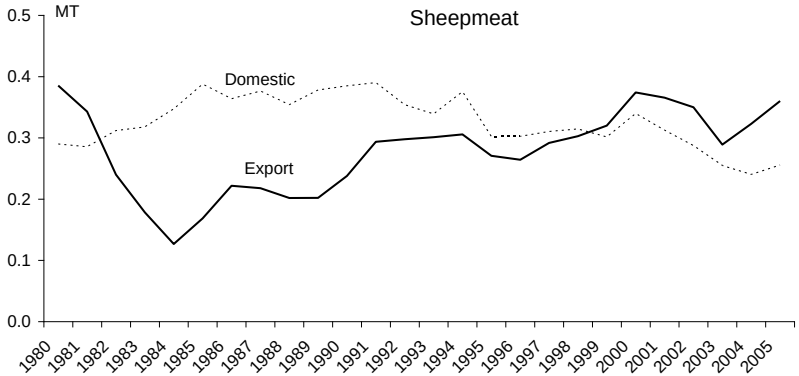
Source: Authors' spreadsheet, drawing on FAOSTAT.

Appendix Figure 3: Volumes of domestic and export sales of selected agricultural products, Australia, 1950-51 to 2005-06
(million metric tons or million litres)

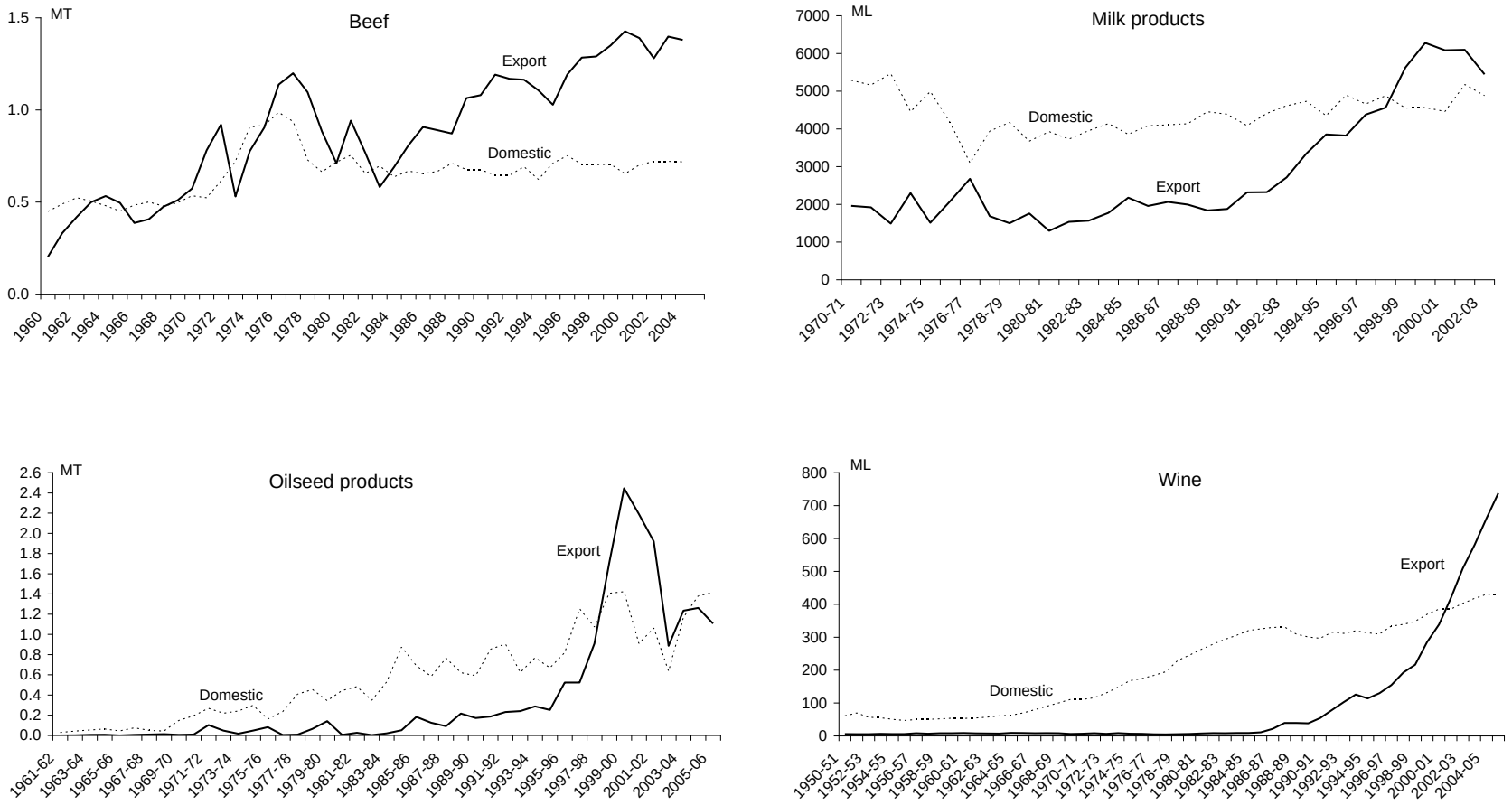








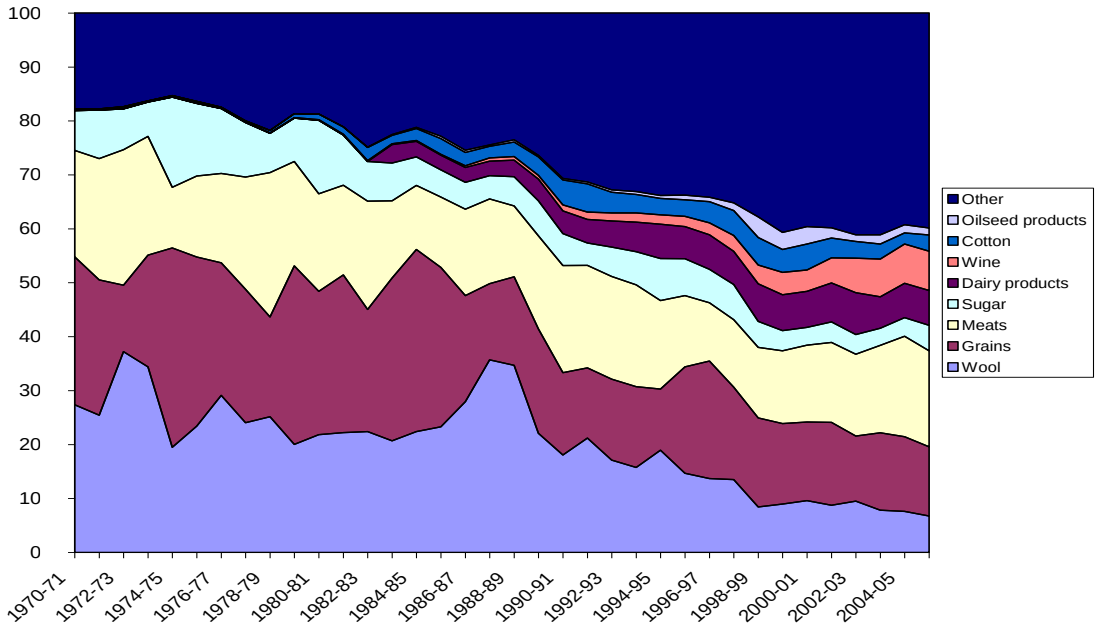
Appendix Figure 3 (continued): Volume of domestic and export sales of selected agricultural crops, Australia, 1950-51 to 2005-06



Source: Compiled from data from ABARE (2007 and earlier years), inspired by Productivity Commission (2005, Figure 11)

Appendix Figure 4a: Commodity composition of agricultural and processed food exports, Australia, 1970-71 to 2005-06

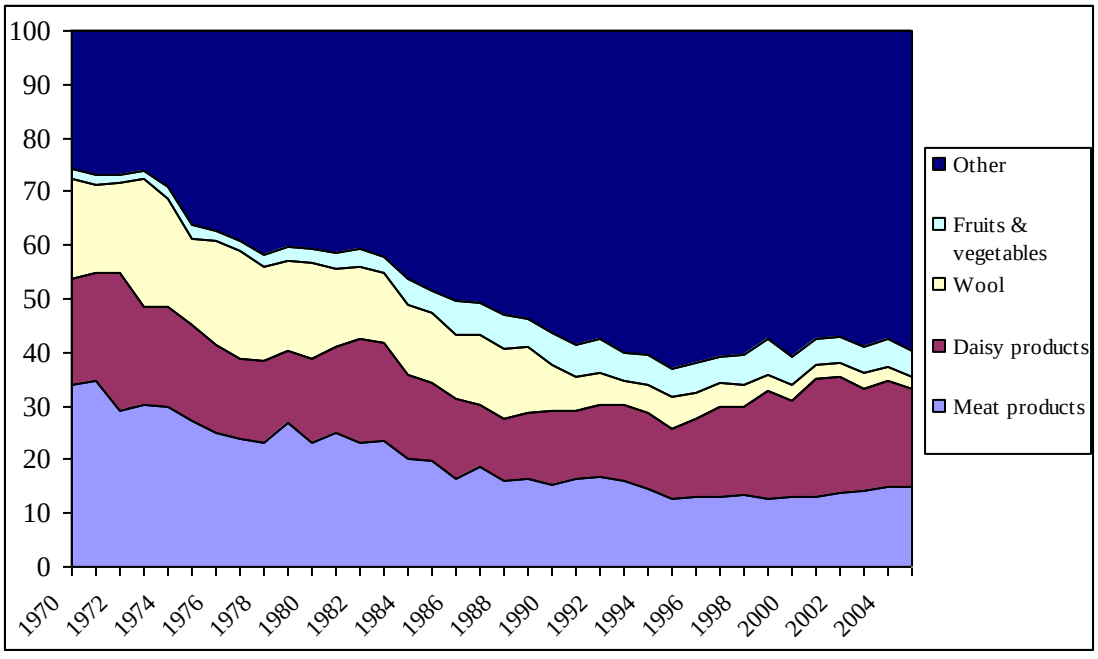
(percent)



Source: Compiled from data from ABARE (2007 and earlier years)

Appendix Figure 4b: Composition of merchandise exports, New Zealand, 1970 to 2005

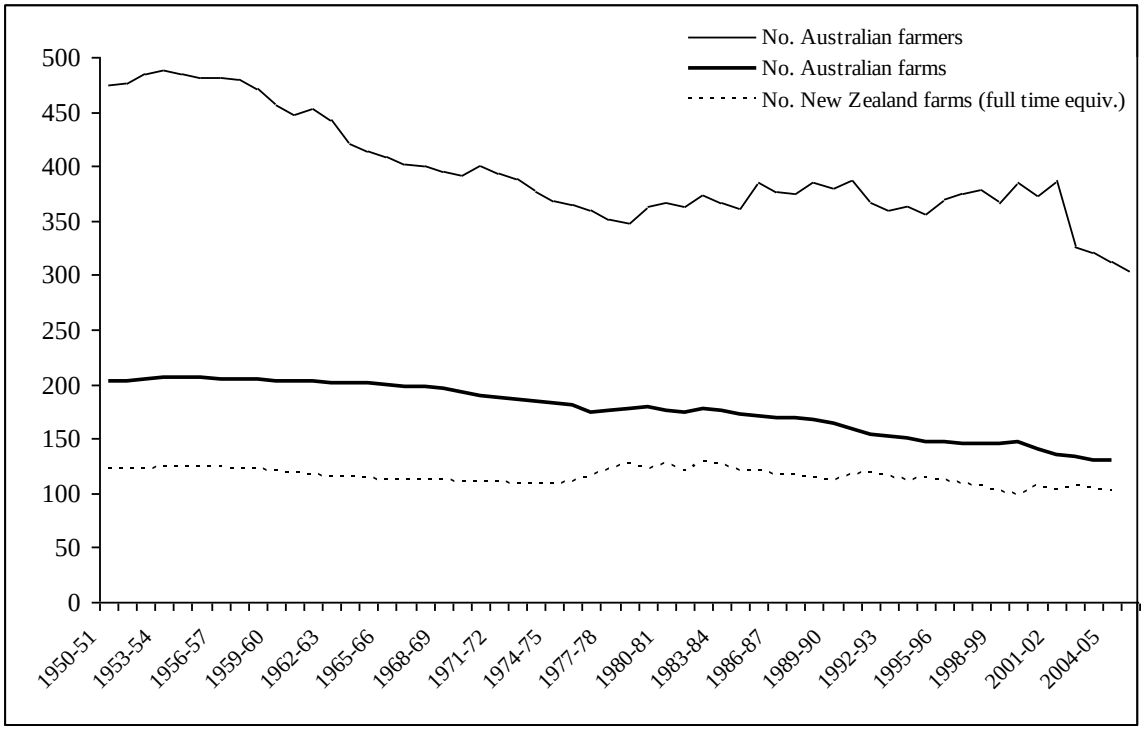
(percent)



Source: Statistics New Zealand (2006)

Appendix Figure 5: Number of farms and of farmers, Australia and New Zealand, 1950-51 to 2005-06

(thousands)



Source: Compiled from data taken from ABARE and from NZ Treasury (2007)