CAPITAL FORMATION IN AUSTRALIAN AGRICULTURE

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1. AUSTRALIAN AGRICULTURE—SOME RELEVANT FEATURES

Problems of agricultural capital formation are, to a large extent, conditioned by the general economic, social and institutional framework. Two features likely to have a bearing on rural capital formation are (i) the level of farm incomes and (ii) the instability of farm incomes.

While international and inter-regional income comparisons are fraught with conceptual difficulties—not to mention difficulties of measurement—all available evidence suggests that per capita farm incomes in Australia are high—relative both to per capita farm incomes in other countries and to per capita non-farm incomes in Australia. In crude statistical terms, farmers (including unpaid working relatives of operators) accounted for 8.25 per cent of the total Australian labour force in 1954, but they received 12.6 per cent of the national income in the last five years (i.e., from 1951-52 to 1955-56). In the thirties farm incomes were relatively lower but, compared to other countries, the farm/non-farm income ratio was still high.[1]

As a large part of agricultural capital formation is normally financed out of farm income Australian conditions should be favourable for agricultural capital formation. However, this picture becomes less rosy when we examine the various rural industries separately. While Australia has never experienced anything comparable to the depressed agricultural areas of some other advanced economies substantial income differentials exist between different regions and industries and these affect capital formation. Of the differentials the most important is

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[1] J. R. Bellerby, *et al., Agriculture and Industry: Relative Income* (London: Macmillan and Co. Ltd., 1956).

probably the discrepancy between incomes in the various forms of pastoral activity and those in the remaining rural industries such as dairying, fruit-growing, cane-growing and poultry farming.[2]

In the pre-war decade average incomes in the pastoral industry were approximately 50 per cent above those obtained in other rural industries (including wheatgrowing).[3] The relative position of graziers has improved further in the post-war years as the price of wool—by far the most important pastoral product—has risen substantially more than the prices of other farm products. The average net farm income of a group of 801 woolgrowers (selected at random throughout Australia) was £4,107 compared with a corresponding figure of £1,065 for 635 dairyfarmers in another survey. Broadly speaking, sheep are run in three zones in Australia, namely, the low rainfall zone, the wheat-sheep zone and the high rainfall zone. In the sheep industry survey mentioned above the average net farm income of pastoralists in the low rainfall zone was £11,163, in the wheat-sheep zone £3,552, and in the high rainfall zone £2,730.[4]

These income differentials affect capital formation as they are associated with differences in investment opportunities. The regions with very high farm incomes (i.e., the low rainfall zone) are those where investment opportunities are severely limited as a result of climatic factors. The low and irregular rainfall in these areas has limited stocking capacity to what can be reasonably carried through the frequent dry seasons. Although there are some possibilities for further investment in watering facilities and subdivisional fencing in these areas the low carrying capacity and nature of the land discourage heavy expenditures.[5]

[2] Cereal cropping is excluded from the list of other rural industries because it is now in most cases carried on in conjunction with wool and/or meat production. From the point of view of incomes wheat-sheep farms fall into an intermediate position between the high average incomes of the pastoralists and the incomes received in other sections of the rural economy. Exact information on the number or proportion of "non-pastoral" rural holdings is not available. Of the 247,000 rural holdings in Australia approximately 100,000 run sheep. Before obtaining the number of "non-pastoral" holdings specialised beef cattle producers have to be deducted. Probably more than half the rural holdings in Australia would belong to the "non-pastoral" group.

[3] See my unpublished M.S. thesis, "Some Economic Problems of New South Wales Agriculture", University of Wisconsin, 1950, pp. 10-20.

[4] The incomes for woolgrowers were derived from the 1954 Sheep Industry Survey, Bureau of Agricultural Economics (roneoed). They relate to the financial year 1952-53. As prices and seasonal conditions were favourable these figures may overstate the relative advantage enjoyed by woolgrowers—especially in the low rainfall zone. However, there is little doubt that long-range averages would show the same order of incomes though the differentials might be smaller. The figures for dairyfarmers were obtained from the 1953 Cost of Production Survey. The 635 farmers are from Victoria, New South Wales and Western Australia. Incomes are averages for the three-year period 1950-51 to 1952-53. The survey was restricted to specialised dairyfarmers and excluded suppliers of wholemilk for city consumption. The incomes of these dairyfarmers would probably be somewhat higher.

[5] One important avenue of investment in these areas—rabbit eradication—became much less urgent and necessary after the introduction of myxomatosis in 1950-51.

In the wheat-sheep and high rainfall zones on the other hand, carrying capacity can be raised substantially by investment in pasture improvement, subdivisional fencing and fodder conservation. Although no statistical information is available it is generally agreed among agricultural scientists that—with existing knowledge—the scope for improvement (and the scope for investment expenditure) is much higher in these two zones than in the low rainfall areas. The fact that the proportion of Australia's sheep numbers carried in the low rainfall zone has declined markedly in the last 20 years suggests that possibilities of development in these regions were considerably smaller than elsewhere—at least in the past.

The writer is also of the opinion—though here many would disagree—that investment requirements (per unit of product) are less in the more extensive rural industries such as sheep grazing than in those industries where farm incomes are relatively low such as dairying, fruit and vegetable production, poultry farming, etc. This is a point which cannot be settled without further research. The main contention here is that the use of overall averages for farm and non-farm incomes conceals the substantial income differentials existing within the farm sector which are associated with differences in investment opportunities. These differentials can be expected to have an important effect on the process of capital formation in Australian agriculture.

The instability of Australian farm incomes is another factor likely to affect capital formation. This instability is the result of both economic and climatic causes. While price instability is not peculiar to Australian agriculture, it seems likely that climatic variability in Australia is particularly marked. Erratic rainfall and disastrous drought are ever-recurring themes over most of the continent. Generally speaking, rainfall variability increases as average rainfall declines.[6] It is not surprising therefore that Australia—which Griffith Taylor described as the "hot arid" continent—should have particularly high effective rainfall variability. In addition, in large areas of Australia rainfall variability exceeds the world mean variability for any given amount of average rainfall.[7]

Statistical information showing income variability for any large number of individual farms is unfortunately not available. I have been able to compare only aggregate variations in farm incomes and not the sum of individual farm incomes. As shown in Table I total annual farm income in Australia in the last 17 years has been much more variable than in the United States and Canada. This suggests—though it does not necessarily prove—that individual farm income variations would also have been greater.

[6] Cf. V. Conrad, *Monthly Weather Review*, Vol. 69, p. 5 (1941).

[7] S. M. Wadham and G. L. Wood, *Land Utilisation in Australia* (2nd Edition; Melbourne: Melbourne University Press, 1950), p. 46.

TABLE I

Variability of Different Types of Incomes

Type of Income	Average Percentage Variation from Preceding Year	Period
Australian Farm Income	35·8	1938–39 to 1955–56
Realised Net Income of United States Farm Operators (including Government Payments)	13·8	1938 to 1955
Canadian Farm Income	18·5	1937 to 1954
Incomes of Australian Unincorporated Businesses and Professions	12·3	1938–39 to 1955–56
Australian Company Income	13·0	1938–39 to 1955–56

Sources: *Australian National Income and Expenditure*, 1955-56; The Parliament of the Commonwealth of Australia, Canberra. *The Farm Income Situation*, United States Department of Agriculture; *The Canada Year Book* and Bellerby, Unitd States Department of Agriculture; *The Canada Year Book* and Bellerby

Price and rainfall variability increase uncertainty and thus affect investment decisions. The effects of uncertainty on resource use, entrepreneurial decisions and goals have been described at length by D. Gale Johnson.[8] Briefly, uncertainty will encourage flexibility, the accumulation of financial reserves (at the expense of investment?), and diversification. It will also, for various reasons (e.g. capital rationing, risk aversion) reduce investment below the levels obtained in a less uncertain world.

2. ESTIMATES OF AGRICULTURAL INVESTMENT IN AUSTRALIA

In recent years two statistical estimates of capital formation in Australian agriculture have been published. The first—relating to the period 1861-1900—was undertaken by N. G. Butlin.[9] His estimates are necessarily subject to many reservations; the data available were crude and often inadequate. In addition one of the most important forms of agricultural capital formation in that period—namely clearing—is omitted. The broad temporal pattern of agricultural and pastoral investment shows low levels of capital formation in the 1860's, rapid increase in the second half of the seventies and of the eighties, contraction in the early eighties and during the years of drought and depression in the 1890's. For the period as a whole agricultural and pastoral investment exceeded all other private investment activities except residential construction.

[8] D. Gale Johnson, *Forward Prices for Agriculture* (Chicago: University of Chicago Press, 1947), especially Ch. IV.

[9] N. G. Butlin, *Private Capital Formation in Australia* 1861-1900, The Australian National University, Social Science Monograph No. 5, 1955.

The second estimate of farm investment relates to the years 1920-1947 and was undertaken by G. O. Gutman.[10] Gutman has published estimates for four different components of farm investment—permanent improvements (including farm buildings, fencing, clearing, etc.), farm machinery and implements, livestock and irrigation works. In the case of each one of these components numerous assumptions and indirect estimates were necessary which throw considerable doubt on the validity of the final estimates and seem to leave substantial margins for error. On the other hand there are good reasons for believing that Gutman's estimates are not too far off the mark.[11]

While complete reliance can hardly be placed on Gutman's estimates they probably provide us with a picture which is reasonably correct in its broad outlines. Table II gives Gutman's estimates for three of his four components of agricultural investment in groups of five years.[12]

The writer has made a rough attempt to continue these series until 1955, using Gutman's method of obtaining livestock investment and figures for investment in farm machinery and equipment published by Campbell.[13]

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[10] G. O. Gutman, "Investment and Production in Australian Agriculture", *Review of Marketing and Agricultural Economics,* Vol. 23, No. 4 (December, 1955), pp. 237-310.

[11] His time series of agricultural investments tends to show those movements which anyone familiar with the economic history of Australia in the inter-war years would expect. For instance Gutman's investment index is broadly parallel —with a one to two year lag—with an index of "real" farm prices—at least until the beginning of World War II when other factors such as shortages of manpower, materials and machinery became dominating.

Secondly, Gutman has shown that his investment time series can be used to "explain" a very large proportion of the long term variations in net agricultural output. Gutman obtained a high correlation (.93) between annual variations of three-year moving averages of production and of investment indexes (the production series being lagged by one year). Gutman's final equation; $\Delta P = -1.83 + .26 \Delta I$ (where P = Production and I = Investment) may be interpreted as indicating that the marginal productivity of farm investment was 26 per cent during the period (at 1923-24 to 1927-28 prices). The negative constant in the equation implies that a substantial level of annual net investment was required during the period to prevent a decline in production. Gutman's explanation of this—that agricultural production as carried on during the period caused a deterioration of irreplaceable wasting assets—can also be corroborated. Evidence obtained in ecological studies has shown that there has been a distinct deterioration in native pasture species in many sections of the low rainfall zone which has been reflected in considerable reductions of livestock populations in these areas. A statistical study by Cornish suggests that there has been a serious decline of fertility over much of the Australian wheatbelt. These factors tend to give us more confidence in the validity of Gutman's estimates.

[12] The fourth component of Gutman's investment series—irrigation—has been omitted here because investment in irrigation works depends primarily on governmental decisions and is thus in a different category from the other components of farm investment.

[13] K. O. Campbell, "Current Agricultural Development", *Economic Record,* Vol. XXXII, No. 62 (May, 1956), p. 124. Campbell's estimates of farm equipment exclude commercial vehicles. To make the estimates comparable with Gutman's series for the earlier years an adjustment was made to Campbell's figures.

TABLE II

Estimated Net Agricultural Investment in Australia

(£A million; 1923-24 to 1927-28 Prices)

Years	Real Estate	Agricultural Machinery	Livestock	Total
1921–25	48	15	16	79
1926–30	206	19	— 6	219
1931–35	16	— 4	10	22
1936–40	78	24	6	108
1940–45	— 61	9	— 25	— 77
1946–50	n.a.	42	12	n.a.
1951–55	n.a.	91	14	n.a.

n.a.—Not available.

The figures suggest that agricultural capital formation in Australia has fluctuated widely in the last 30 years. In the twenties—especially the latter half—there was a substantial volume of agricultural investment. This was curtailed severely during the depression years of the early thirties, but there was still a small amount of net investment. According to Gutman's annual series of permanent improvements most of the net investment in improvements during this five-year period occurred in the years 1934 and 1935, whereas the increase in livestock numbers occurred prior to 1934 and may have been the result of the investment boom of the late twenties.

Although investment recovered somewhat in the late thirties it reached only half the level attained in the five-year period prior to the depression. The real prices for the major farm products remained considerably below those of the twenties. Towards the end of the period renewed weaknesses developed in wool and wheat prices.

Gutman's figures show a large volume of agricultural disinvestment during the war years. Only one-third of this was the result of livestock losses in the 1944-45 drought. In this respect there seems to have been a great contrast between the development of Australian agriculture and that of many other countries which were not actually invaded in the course of World War II. In the United States agricultural capital formation proceeded at record levels in the war years and the experience of the United Kingdom, Canada and others was probably similar. In the writer's opinion this contrast had a significant bearing on the failure of Australian agricultural output to increase during the forties. This failure has been attributed mainly to post-war price policies and the shortages of farm materials. However—in view of the close long-term relation between investment and output—the disinvestment of the war years might perhaps have been a more important factor.[14]

Information obtained in farm management surveys, statistics of the expansion of pasture improvement and of the expenditure incurred on new farm buildings and structures suggests that there has been an impressively large volume of agricultural investment between 1945 and 1955. It seems clear that agricultural capital formation in this period has been considerably greater than at any time since World War I. As in the twenties the peak of the investment boom was reached in the second five-year period after the war.

Evidence has accumulated that farm investment in 1955-56 declined substantially from the high levels reached after 1950. A survey undertaken by the writer in February, 1956 showed a decline in planned farm investment since November, 1954 ranging from 16 per cent in the case of pasture improvement to over 50 per cent in the case of plant purchases.[15] This survey dealt mainly with farmers' plans and covered only a small sample in a limited area, but other reports have confirmed the overall reduction in farmers' capital expenditure.[16] Since February, 1956 there has been a marked rise in wool prices and this should stimulate capital formation. On the other hand the favourable attitudes of farmers towards investment which has been notable in many farm surveys in the post-war period has probably been shaken somewhat by the continued decline in the purchasing power of farm products over the last three years and other signs of harsher economic conditions (such as, for instance, the increasing difficulty of obtaining credit).

3. SOME PROBLEMS OF POLICY

Two problems concerning Australian agricultural capital formation which have received attention in recent years are: (1) the adequacy of the present level of Australian agricultural investment and (2) methods which governments can use to stimulate farm investment.

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[14] It is beyond the scope of this paper to analyse the reasons for this contrast. Briefly, in the early war years Australian agriculture seemed to have no positive functions to fulfil, as surpluses and shipping difficulties loomed large. This was followed by the threat of invasion in 1942. In 1943 and succeeding years attempts were made to stimulate the production of some agricultural products but some of the major products such as wool remained in over-supply. There were no unemployed resources available by 1943 and the redirection of materials and manpower proved extraordinarily difficult. In addition drought and bushfires affected production and great quantities of materials for housing and fencing had to be channelled to firestricken areas. Cf. J. G. Crawford, *et al., Wartime Agriculture in Australia and New Zealand, 1939-50* (Stanford, California: Stanford University Press, 1954).

[15] F. H. Gruen, "Wool Prices, Credit Restrictions and Development", *Review of Marketing and Agricultural Economics*, Vol. 24, No. 2 (June, 1956), pp. 61-73.

[16] *Survey of Manufacturing Activity in Australia* (Melbourne: Department of Trade, October, 1956), reports that demand for farm machinery generally has dropped by 40 to 50 per cent during the preceding 12 months. Sales of superphosphate have also declined sharply.

Although Australia has witnessed a record level of investment in rural industries in recent years doubts have been expressed whether the volume of farm investment is adequate.[17] Theoretically farm investment would be at an optimum level if the marginal productivity of farm investment equalled that of investment in other sectors of the economy. Very little information is available which would allow us to judge the relative profitability of agricultural and non-agricultural investment in Australia. There are indications that many types of farm investment are exceedingly profitable at present price-cost relationships.[18] However, the criterion which is usually applied to the level of Australian farm investment is not profitability but the need for a more substantial and continuing rise in rural output than has occurred in the past. Such an expansion is regarded as important because of the recurrent balance of payments difficulites experienced in recent years. Quantitative import restrictions have been a regular feature of the Australian economy since 1952. Over 80 per cent of Australia's exports are of rural origin and while there are possibilities of increasing other types of exports it seems clear that any major increase in exports will have to rely heavily on rural industries. Lundberg and Hill have suggested that the Australian economy is facing a structural disequilibrium with long run stability in the average import propensity (at 18-20 per cent of Gross National Product) and a long run declining trend in the average export propensity.[19] From this point of view the level of agricultural investment may then be regarded as inadequate if it is accepted that investment is the major long-term determinant of farm output.

Is it correct to make this assumption? One group of agricultural economists—under the leadership of Professor T. W. Schultz—has recently stressed the importance of technical advance (in its broadest sense) in the growth of agricultural output. Studies by Schultz and his colleagues have shown that the growth of agricultural output in some countries has taken place without a corresponding expansion of input.[20] This is attributed to (i) the use of new techniques of production and (ii) improvements in the quality of the labour force.

While technical advances in agriculture can take many forms it seems likely that—in the Australian context—most technical advances involve substantial capital investment. The introduction of the myxomatosis virus is a conspicuous exception. On the other hand, the

[17] Cf. K. O. Campbell, "The Role of Prices and Investment in Agricultural Expansion", *The Australian Quarterly*, Vol. XXIV, No. 4 (December, 1952); J. G. Crawford, *Australian Agricultural Policy* (Joseph Fisher, Lecture in Commerce, University of Adelaide, October, 1952).

[18] See for example: J. L. Dillon, "Marginal Productivities of Resources in Two Farming Areas of N.S.W.", *Economic Monograph*, No. 188, Economic Society of Australia and New Zealand, New South Wales Branch, (May, 1956); "Economics of Pasture Improvement", Bureau of Agricultural Economics, mimeographed, November, 1956, and F. H. Gruen, "Financial Aspects of Pasture Improvement on Southern Wheat-Sheep Farms", *Reveiw of Marketing and Agricultural Economics*, Vol. 24, No. 4 (December, 1956).

[19] E. Lundberg and M. Hill, "Autralia's Long Term Balance of Payments Problems", *Economic Record*, Vol. XXXII, No. 62 (May, 1956).

[20] T. W. Schultz, "Reflections on Agricultural Production, Output and Supply", *Journal of Farm Economics*, Vol XXXVIII, No. 3 (August, 1956).

extension of pasture improvement and irrigation, the use of large scale mechanical methods of land clearing and the expansion of fodder conservation are avenues of technical advance which require considerable capital outlays. It is developments of this kind which are likely—in the opinion of experienced observers—to have a great impact on future agricultural progress in Australia. To stress the importance of farm investment as a determinant of output does not therefore necessarily conflict with the view that technical progress is largely responsible for the growth of farm production.

It is beyond the scope of this paper to estimate the expansion of exports needed to bridge the present and probable future gap in the Australian balance of payments. An economic model relating "to the situation as it might be in 1970" published by J. G. Crawford suggests that a $2\text{-}2\frac{1}{2}$ per cent annual rate of growth of farm production would supply the volume of exports needed to pay for likely import requirements in the next 15 years.[21] Such a rate of growth seems practical provided farm investment remains near the levels achieved in the early fifties. Since 1951 Australian agricultural output has increased at a compound rate of four per cent per annum. Part of this expansion is the result of non-recurring factors such as good seasonal conditions and the decimation of the rabbit population. However, a substantial part of the increase is the result of the high level of capital investment in the early fifties. In addition many of the investment projects completed in recent years—such as the record level of pasture sowings in 1953-55—have not yet been fully reflected in output increases. In the light of the probable future trend of the Australian balance of payments position, it seems important therefore to maintain farm investment at the high levels reached prior to 1955-56.

This raises the problem of providing incentives for rural investment. There seems little doubt that the most effective incentive is supplied by high farm incomes. In the Australian environment where farm investment often implies a temporary drop in farm output and income, where soils are generally poor and improvement frequently involves a long range plan to lift fertility, no incentives are likely to be as effective as buoyant farm prices and the confidence in the future which they inspire. The prices of Australia's most important farm products are largely determined in world markets leaving little scope for local governmental action, though a more effective anti-inflationary policy would no doubt have beneficial effects.

The provision of accelerated depreciation for the purpose of income tax assessment has been regarded as the most important governmental incentive to farm investment in recent years. Since July, 1951 new farm purchases of plant, equipment and structures have been eligible for a depreciation rate of 20 per cent per annum. Certain other types of capital expenditure such as clearing, pasture improvement and pest extermination are allowed as a full deduction in the year in which they are incurred. How effective these incentives are is open to some doubt.

[21] J. G. Crawford, "The Tangled Skein of Trade Policy", *Overseas Trading* (Department of Trade, Canberra), Vol. 8, No. 4 (May, 1956).

It seems unlikely that a large volume of farm investment in recent years has been undertaken primarily to take advantage of the higher depreciation rates allowable for income tax purposes.[22] On the other hand the increased depreciation allowances have probably stimulated investment indirectly. Such an indirect influence could have been important in two ways. Firstly it may have affected the general attitude towards investment. Farmers—especially in the higher tax brackets—are becoming increasingly aware of the possibility of converting increases in income into non-taxable capital gains. One is frequently told in country areas that "it is no good leaving money in the bank because Artie Fadden takes it." While this attitude is becoming very widespread it has to be attributed in part to higher incomes and progressive tax rates.

Secondly, special depreciation allowances have reduced farmers' tax liabilities—in many cases substantially. As disposable income (after tax) is known to influence the level of investment, it seems very likely that the reduced tax payments resulting from the special depreciation allowances have stimulated capital formation in Australian agriculture. It is possible to make a rough estimate of this effect of depreciation allowances. In the absence of special depreciation allowances taxable farm income in 1954-55 would have been approximately £90 million (or 20 per cent) higher.[23] Allowing for the fact that a large proportion of this capital expenditure is incurred by farmers in the higher income brackets the saving in taxation is probably in the vicinity of £30-35 million. What proportion of this increase in disposable income is invested is difficult to judge. Pearse's study suggested that Western Australian wheat-sheep farmers invested approximately 14 per cent of additional net income (prior to tax deduction) in 1948-52. If as much as 25 per cent of the increase in disposable income was invested it would account for somewhat less than 5 per cent of gross investment in farm buildings and equipment and possibly 3 per cent of gross agricultural investment in 1954-55.[24]

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[22] Cf. Robert A. Pearse "An Empirical Micro-Study of some Factors Influencing Farm Net Investment", *Economic Record,* Vol. XXXI, No. 61 (November, 1955). Pearse found that special depreciation allowances were the least frequent reason given for investment decisions by a group of Western Australian wheat-sheep farmers. He concluded that "These allowances had a small direct effect on farm investment expenditure". A similar conclusion was reached in an unpublished study in New South Wales.

[23] This figure was obtained by applying accelerated and normal depreciation rates to the estimates of farm investment published by K. O. Campbell, *op. cit.*, p. 124. The writer has been informed of an unofficial estimate by an officer of the Commonwealth Statistician's office which is much lower. If a lower figure is used the indirect effect of accelerated depreciation allowances on investment will be less than the estimate given above.

[24] It should be pointed out that the accelerated depreciation allowances will—at some future date—work in an opposite direction. When investment levels drop taxable income will be higher than it would have been with normal depreciation allowances. Whether farm incomes in the long run will be higher as a result of special depreciation allowances will depend on relative incomes and tax rates in the two periods (i.e., when 20 per cent depreciation allowances are operative and when investments have been written off under accelerated depreciation while normal depreciation rates would still have been operative). For a detailed discussion of accelerated depreciation allowances as a stimulus to investment, see Richard Goode, *Quarterly Journal of Economics,* Vol. LXIX, No. 2 (May, 1955) and the references listed there.

There are no other major governmental schemes for stimulating agricultural investment. The Federal Government has attempted—by the use of selective import quotas and by other means—to improve the supply position of various items such as galvanised iron, fencing materials, farm machinery and fertiliser which are essential for some types of farm investment. The shortage of many of these production requisites was a major impediment in the early post-war years. No convincing explanations have been offered as to why Australian farmers should have been so much more severely affected by shortages in the post-war period than those of most other advanced economies. The acute inflationary pressures of the post-war years seem to have been one factor. The price to be paid for a low-cost steel industry (i.e., one which always works to capacity and is unable to cater for peak demands) may be another.

Australia has not used any of the methods of direct stimulation of farm investment which have become common overseas—such as, for instance, the special grants made in the United Kingdom for particular types of investment (e.g., drainage). Some Australian agricultural economists have felt that this approach might be copied to advantage if price incentives are seriously weakened.[25]

Williams has suggested that farm investment has been stimulated by the periodical re-negotiation of pastoral leases and the measures taken to settle ex-servicemen on the land.[26] The writer is sceptical about the effect of both these schemes. Williams stresses the effect soldier settlement may have had, by way of example, on neighbouring farmers. A full-scale examination of the effects of soldier settlement on investment and production has unfortunately not been undertaken so far. However, there has been considerable investment and a substantial increase in output on farms not affected by soldier settlement and no evidence has been produced to show that soldier settlers have acted as a stimulus towards the adoption of improved farm practices in any area. Compared with their neighbours, soldier settlers are handicapped by lower earnings and the need to make substantial debt repayments. They are also more likely to be forced to curtail investments as a result of temporary financial setbacks.

The existence of terminating leases introduces uncertainty (*a*) as to the area available in future and (*b*) what particular part of a property will remain under the operator's control. Hence it is likely to have some adverse effects. These may be counteracted by regulations securing renewal of part of the lease only on condition of more intensive development. It is difficult to judge which of these factors is likely to dominate investment decisions.

4. INVESTMENT DECISIONS AT THE FARM LEVEL

Several studies have been undertaken in recent years which attempt to throw light on the factors influencing investment decisions. However, our knowledge in this important field is still very rudimentary.

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[25] For example, A. G. Lloyd, "Subsidising Approved Farm Practices", *Review of Marketing and Agricultural Economics*, Vol. 22, No. 2 (June, 1954).

[26] D. B. Williams, *Agricultural Policy in Australia*, 1955 (unpublished).

In Pearse's study an attempt was made to relate net investment to six factors, namely net income, age of operator, number of years spent as farm operator, size of debt, amount of debt repaid and amount spent on replacements. Of these factors income alone had a statistically significant relation to the level of investment. Farmers were also asked to give reasons for some individual items of capital expenditure but the data obtained in this manner does not give much information about farmers' motivations, or the way decisions for or against a certain type of expenditure are arrived at.

A study by Parish of 48 wheat-sheep farmers in northern New South Wales attempted to "gain some idea of the factors which influence farmers in adopting or not adopting a particular innovation, or innovations in general".[27] (Of the 19 innovations considered by Parish 12 would involve some capital expenditure.) Parish found that farmers tended either to adopt innovations consistently or to fail to do so consistently. In other words, farmers who adopted certain practices (other than certain mechanical innovations) tended to adopt other practices which were in no way technologically related. Parish argued from this that the pattern of adoption of innovations reflected mainly differences in entrepreneurial ability. He conceived enterpreneurial ability not solely in terms of inherent capacity; farmers' past experiences—especially attitudes shaped by depressions or booms—were regarded as exerting a strong influence on the exercise of the entrepreneurial function. This raises the question whether agricultural education or Schultz's "improvement in the quality of the labour force" could not, in the long run, have an important effect on investment activity. Too little is known about the relation of education and enterprise but it seems likely that long-term investment in more adequate educational facilities would yield substantial returns.

Another study which may throw light on investment decisions is the survey of expenditure patterns of pastoralists between 1949 and 1954 at present under way at the University of Sydney.[28]

5. EXTERNAL SOURCES OF FINANCE FOR DEVELOPMENT

While farm incomes have constituted the most important single source of funds for farm development, it is desirable to consider the other sources of finance available. Apart from government-financed irrigation works there has been a small number of large-scale development projects financed by private companies (e.g., the clearing and pasture improvement scheme in South Australia by the Australian Mutual Provident Society and the attempt to grow rice in the Northern Territory). This type of development is particularly suitable where—as a result of indivisibilities—large-scale capital expenditure is essential. However,

[27] Ross Parish, "Innovations and Enterprises in Wheat Farming", *Review of Marketing and Agricultural Economics*, Vol. 23, No. 3 (September, 1954).

[28] A preliminary report on part of this survey has been published. K. O. Campbell and R. W. Archer, *A Survey of the Expenditure Patterns of Graziers, 1949-54*, University of Sydney, Agricultural Economics Research Miscellaneous Paper No. 10.

even in these cases the intention is ultimately to subdivide the development area into a number of family farms. Funds for agricultural development will therefore still have to be channelled mainly through *individual* operators who are trying to improve their holdings. This raises the question of the adequacy of the lending institutions serving the rural industries.

The commercial banks (through their widespread branch and agency systems) are the most important external source of farm capital and supply approximately half the funds borrowed by the farming community. In addition, certain other rural lenders such as woolbrokers, merchants and storekeepers borrow from trading banks so that the banking system controls—directly or indirectly—a large proportion of total rural indebtedness. Other rural lenders of importance are hire purchase companies, insurance and trustee companies, solicitors in country towns and general and agricultural banks, established by the State and Federal Governments.

This diversity of lending institutions has been of considerable benefit. It has given the potential borrower a number of alternative sources of funds, not to mention the choice between different types of loans and methods of repayments. In addition the governmental lending institutions have enabled farmers to obtain finance for improved farm practices such as soil and fodder conservation, the purchase of better breeding animals, etc. In spite of these advantages there has been widespread and persistent criticism of the rural credit system in Australia.[29] Basically this criticism takes two forms:

(1) Insufficient funds are available for farm borrowers and
(2) lending institutions are too conscious of the security for their loan and pay too little attention to the profitability of the particular project for which funds are required.

The imposition of credit restrictions since 1953 as part of a general anti-inflationary policy has intensified these criticisms but their origin is much older.[30] It is difficult to obtain evidence which would substantiate this criticism. What goes on in the sanctum of a bank manager's office is usually not revealed to the prying eyes of agricultural economists; in any case there is often room for honest difference of opinion as to the creditworthiness of a particular project. The outsider —trying to account for the lack of borrowing for development—cannot be sure whether this is due mainly to the policies of lending institutions or the risk aversion of the borrower.

[29] For a fuller description and criticisms of the Australian rural credit system see *Rural Credit*, Fifth Report of the Rural Reconstruction Commission, The Government Printer, 1945, p. 86; J. N. Lewis, "Credit Facilities for Agriculture", *Quarterly Review of Agricultural Economics*, Vol. VIII, No. 4 (October, 1955) and P. C. Druce "Credit Policy for Rural Development", *Review of Marketing and Agricultural Economics*, Vol. 24, No. 4 (December, 1956).

[30] Most of the external finance obtained by farmers is used to purchase farms, meet death duties or overcome temporary financial difficulties. This makes it unlikely that the *direct* effect of credit restrictions on farm investment has been very great. For a study of the effect in one area see Gruen, "Wool Prices, Credit Restrictions and Development", *op. cit.*, *p.* 72.

Surveys of farmers' attitudes to borrowing have shown that many farmers are unwilling to incur heavy debts to carry out an improvement programme. To some extent this is a rational reaction to the great degree of prevailing technical and price uncertainty. A sudden change in economic fortune as a result of flood, drought, bushfire or a collapse in prices finds the heavily mortgaged farmer in a much more vulnerable position than his debt-free neighbour.

The lending institution too is influenced by this uncertainty. By increasing the risk of default it raises the cost of lending. If the price of lending is kept at a low level by law (as well as custom)—as is the case with the Australian commercial banks—the natural reaction will be to restrict lending to the most creditworthy applicants. Hence we get the second type of criticism referred to above, namely that lending institutions are too security conscious. A corollary of this is that farmers with low incomes and/or small equities in their farms are not adequately catered for by existing rural lending institutions. This has led to the large scale use of hire purchase for some types of capital expenditure by the poorer farmer. In a recent survey of 75 low income dairy farmers in New South Wales it was found that 50 per cent of the expenditure on new plant and cars was financed by hire purchase.[31]

The effective rate of interest on hire purchase varies but an average would probably be in the vicinity of 13 per cent—compared with 5-6 per cent for bank accommodation. Apart from its high cost hire purchase has a number of other disadvantages; it is not as flexible as the overdraft system and can be used to finance only certain types of investment. It would seem therefore that the needs of the smaller farmers, at least, are not effectively catered for by the existing rural credit structure.

6. CONCLUSION

Until comparatively recently capital formation in Australian agriculture has rarely occupied the attention of economists and policy makers. The foreign exchange crisis in 1952 and the realisation that the growth of agricultural production was not automatic has contributed to a welcome change in emphasis. The importance of agricultural investment is becoming more widely understood but the conditions conducive to a higher rate of investment are perhaps not so well appreciated. In the writer's opinion there is a danger that too much attention is focussed on *ad hoc* schemes designed to improve conditions of rural credit, tenure and tax liabilities while insufficient thought is devoted to long term measures which would stimulate investment and efficiency. Among these, plans to expand pure and especially applied research, improving the education of farmers and means of lessening production uncertainties deserve high priority.

[31] This survey was carried out by the New South Wales Department of Agriculture and has not yet been published. Borrowing from commercial banks was the next most important source of funds (23 per cent), followed by private loans (14 per cent) and savings (13 per cent).

DISCUSSION

J. N. Lewis—*Department of Trade*

Mr. Gruen always takes a keen enjoyment in demolishing preconceptions. This is fortunate for us, since in any science there is always room for and benefit from the contribution of individuals with a flair for setting people free from stereotyped thought patterns. In his paper today, Mr. Gruen has played this role very provocatively and has subjected to critical scrutiny a number of propositions rather fashionable amongst us, such as that War Service Land Settlement has been a major influence towards greater investment, that accelerated depreciation for tax purposes has also imparted a major stimulus, that farm credit facilities are deficient and the like. He even at one stage took up the question whether investment is a determinant of the growth of output, but fortunately put that one back undamaged.

For my part, I still find myself standing somewhat apart from him on his general conclusions. I agree that we must not neglect longer-term measures for enlarging investment opportunities, such as basic and applied research, but I can see no danger in also focussing our attention upon *ad hoc* schemes to make it easier for farmers to take advantage of existing opportunities. The achievement of an average rate of expansion of about two per cent annually will probably call for vigorous measures along the whole of the agricultural policy front and it is therefore to be regretted that, after pointing out in his opening remarks that the institutional framework conditions to a large extent the problems of agricultural capital formation, Mr. Gruen, in his conclusion, seeks to shift attention away from the institutional constraints, such as credit terms which are poorly tailored to agricultural requirements, or uncongenial land tenure and taxation conditions.

On the question of accelerated depreciation for tax purposes, Gruen's view is that the effectiveness of these incentives is open to some doubt. It is, of course, impossible to demonstrate in quantitative terms just what has been the effect of accelerated write-off provisions on investment levels, but I believe there is a case for presuming they do have a substantial effect. If, as he suggests, most farm investment is financed out of current income and if our credit authorities are content that this situation persists, then anything which allows more capital improvements to be financed out of a given before-tax income could be important.

It may be useful, even if not quite correct, to consider the effect of accelerated depreciation as somewhat analogous to a price reduction for capital goods. This viewpoint is not altogether unreasonable since I suspect a good many farmers tend to work out the "effective" cost of capital improvements by deducting the tax saving from the purchase price and either to ignore or to discount heavily the effects on their subsequent tax liabilities.

The virtual price reduction will be greater the higher the marginal tax rate and the greater the difference between the normal and the special depreciation rate. It will be substantial in the case of those capital improvements which are allowable 100 per cent deductions and quite large enough to be significant for items subject to special 20 per cent depreciation (especially the longer-lived assets). Moreover, quick write-off reduces risk premiums.

I certainly would not claim that the special depreciations are sufficient inducement in themselves, but I believe they have more influence than Mr. Gruen acknowledges. They could, of course, be made more effective if more than 100 per cent could be written off, that is, if a system of investment allowances were introduced similar to that which has been used from time to time in the United Kingdom. Even if accelerated depreciation had not been a major stimulant in Australia, therefore, it would not follow that we should devote less attention to tax incentives to investment.

In my view the suggestion that War Service Land Settlement has been an insignificant factor in postwar investment overlooks the fact that many of the holdings settled were developed from unproductive Crown lands and from lands previously used at only a fraction of their capacity. Furthermore, major developmental projects of this type pointed the way to similar investment opportunities for private firms and individuals. It is fair to say that Coonalpyn Downs and the Esperance district project may never have come into being but for the example of WSLS developmental authorities on Kangaroo Island and in the Mount Many Peaks and South Stirling districts of Western Australia.

I have confined my comments largely to the policy aspects, but this is by no means because the remainder of Mr. Gruen's paper is less successful in stirring up issues for discussion.

D. R. Munro—*Bureau of Agricultural Economics*

The continuing need for a high level of farm investment is widely accepted by agricultural economists. Most long-run measures for expansion of agricultural production are likely to be capital-demanding.

Mr. Gruen could not be expected in the time allotted to provide a detailed discussion of the investment requirements of particular rural industries. However, some discussion of this aspect would have been welcome because of its close connection with what, I feel, is one of the most important contributions of his paper. This is his contention that increasing income differentials between pastoralists on the one hand and the remaining group of rural producers on the other can have important effects on the process of capital formation.

The use of overall aggregates to trace trends in farm investment may conceal important changes taking place in the capital structure of Australian agriculture. Attention is often directed to the height of *total* farm incomes and to the height of *total* farm investment. The fact that only some farm incomes may be high and consequently that only some farm investment may also be high is often neglected. This neglect can and, I feel does, lead to a lack of appreciation of the basic problems of those individual rural industries where returns may not be high.

It could be argued that since a freely operating price system is the appropriate mechanism for the efficient allocation of resources the existence of wide income differentials may call for some fundamental adjustments in the structure of Australian rural industries. This conclusion would follow from the ordinary criterion of economic efficiency that new investment funds should flow to those industries where marginal returns are highest; but it overlooks the point that some industries are more adversely affected than others by such national problems as inflation and balance of payments difficulties and by the means adopted to overcome them. Equilibrium analysis upon which the conclusion rests, must try to account for disequilibrating factors. It may well be that in the absence of such problems returns on a given amount of investment in some present low income farms may be higher than in alternative outlets. Moreover, the price system is not the freely operating mechanism that is often implied and in one important field it is scarcely allowed to work out its effects at all. This field is the balance of payments. For example a continued deficit is prevented from affecting either the level of money incomes and employment, at least seriously, or the rate of exchange. Under such conditions, distortions in the relative profitability of investment can be expected. Thus, investment in some rural industries may in fact appear relatively unprofitable at present cost-price relationships. On the other hand, the appropriate criterion of profitability from the national viewpoint can scarcely be regarded as *present* cost-price relationships since these are indeed one of the basic causes of Australia's balance of payments problem. In fact, it appears that this problem may prove insurmountable without some change in Australian costs relative to those overseas; and any criterion for judging relative profitability of alernative investment opportunities from the national viewpoint should make some allowance for such possible changes. Appropriate measures could then be adopted to see that new investment is profitable from the individual farmer's short-term viewpoint.

Mr. Gruen tends to underestimate the effect of some government measures in stimulating agricultural investment and considers that the effect on investment of special depreciation allowances has probably been small. I cannot agree with him on this point; but I do feel that if special depreciation allowances are to be criticised, the essential criticism of them as a major incentive to farm investment is not that they may have been ineffective but that they provide uneven assistance. Farmers who have little income available for investment after meeting necessary living expenses gain little assistance from such allowances; and these farmers probably have the greatest need for assistance in order to break through those barriers to increased efficiency imposed by the lack of capital resources. Although Mr. Gruen at least implies that we have adopted "broad sweep" measures when something more is required, I feel that if he had developed this criticism of depreciation allowances, he would have been able to integrate it with his valuable contribution on the effects of increasing income differentials between broad sectors of rural industry.