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AGRICULTURE AND GOVERNMENTS IN AN INTERDEPENDENT WORLD

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Dartmouth

*Agricultural Growth in the EC and the Effect of the CAP***

INTRODUCTION

After its establishment, the EC experienced a rapid growth of farm output. Generally the EC Common Agriculture Policy (CAP), which became effective around 1960, with high price levels and export subsidies, is seen as the main cause for this. This paper analyses EC performance in agriculture output and labour productivity in comparative perspective. It examines evidence about relations between price levels and increases in output and labour productivity. The comparison includes four of the EC-6 countries (France, Germany FR, Italy, and the Netherlands), two countries which joined the EC-9 (Denmark and the UK), some EC aggregates, three traditional cheap exporters (Australia, Canada, and the USA), and two countries with higher protection (Japan and Sweden).

The analysis focuses on the period 1950-85. For economic analysis this period is usually divided into a period of rapid growth (1950-73) and a period of slow growth (1973-85). But agricultural growth should be separately considered for the EC-6, roughly the period 1960-73, and for the extended EC-9 after 1973.² Unfortunately 1973 is not a suitable benchmark year for calculating price trends since the terms of trade for agriculture were very favourable that year. Because of sensitivity for the choice of benchmark years, growth rates refer to three-year averages and several tables also show growth rates for overlapping sub-periods.

PRODUCTIVITY

Price level and productivity growth

Slow growth of demand for farm output and rapid technical change result in a rapid decline of required farm input. Alternative values of farm input, such as land, labour and fixed capital, may persistently be low. Low remuneration of these input factors does not result in an immediate reallocation, but it enhances a continuous decline of factors which are in surplus and have low marginal productivity. If the government raises output prices the decline in the stock of

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fixed inputs will be negatively affected, more variable inputs may be used and growth of productivity lag. From this perspective protection is not only bad for consumers but also for growth of productivity. But it is erroneous to draw the conclusion that lower prices are always good for increasing productivity, since prices are also likely to affect the pace of technical change. High prices and high levels of profitability are likely to induce the development of better techniques. Farmers may experiment more and take more interest in learning new skills. New techniques are partly embodied in conventional inputs and their introduction is therefore dependent on profitability. It seems that prices exercise a cumulative effect in two ways on productivity in the long run. One is by reducing redundant input, whose marginal productivity by definition is below average productivity; the other is through inducing technical change. It is most likely that the interaction of both factors results in a hill-shaped relationship between change in productivity and prices, with an optimal price leading to a maximum increase in productivity. At prices lower than the optimum the harm to technical progress will be more than the gain of accelerated reallocation of inputs; at higher prices the gain of technical progress would not outweigh the increased excessive use of input. Such a hill-shaped relationship is likely to differ between countries and to change over time depending on the basic condition of supply factors.

Suppose that in the farm sector of a country growth of productivity – and hence of income – lags, and that farmers push successfully for price protection to compensate for the relative decline in income. Higher prices will affect consumer welfare negatively, at least in the short run. In countries where prices are already higher than optimal, protection would result in a slowing down of productivity growth, increased resource cost and, probably, further pressure by farmers on governments for compensation through high prices. Thus the long-run cost to consumers (and tax payers) is more than appears from the initial rate of protection. The opposite is the case if prices are lower than optimal. If a country raises its farm prices by ten per cent resulting in a one per cent higher growth rate of productivity of which the gains are transferred to the consumers in the form of real price decreases, then the present value of food purchases over a 20 year period need not be more than without initial price support. Similarly price reduction in countries with market prices higher than optimal may enhance productivity which may partly or fully offset adverse effects of price decreases on farm income.

Gross value added from farms

This study is mainly based on gross value added from farms (GVAF) data. Table 17 shows that usually GVAF grew slower than final output. Exceptions are found mainly in the period after 1973 when prices of current inputs rose relative to output prices and use of inputs lagged. The data indicate that over the whole period since 1950, increased use of intermediate inputs contributed on average 0.8 per cent per year to growth of final output in the EC-6 compared to only 0.1 per cent in the USA. Remarkable is the relative decline of input use in Denmark and the UK.

In 1950 Europe and Japan had largely recovered from the disruptions of war. Serious shortages of farm inputs were solved and farm output levels per caput were close to prewar levels. In the 1950s Japan and the European countries that had been at war achieved a further recovery of farm output (Table 1). After 1960 production in Japan declined and only recovered in recent years. Most European countries experienced further growth in the 1960s and the 1970s and growth even accelerated in the 1980s. Exceptions are Italy where the growth rate declined over time, Denmark which experienced stagnation in the late 1960s and early 1970s, and Sweden which performed poorly in the 1960s.

In the 1950s the European countries still had about one per cent population growth per year. As a result of declining population growth and increasing output, GVAF per caput increased rapidly in recent years, except in Italy (Tables 2 and 3). The remarkable performance is not only observed for Europe's agricultural exporters, France, the Netherlands and Denmark; but also for Sweden and the traditional importers, Germany and the UK. Australia, Canada and the USA, also achieved growth of GVAF, but because of higher population growth rates their agricultural growth per caput was less than for the European countries. In Europe and Japan growth of GDP was quite important for increases in demand (Table 4). In 1950 their real income and food supply per caput were much lower than in Australia, Canada and the USA. Higher income elasticities and more rapid growth of real income per caput resulted in more rapid increases of food consumption per caput.

Land input and productivity

In the early 1950s in all countries, except Sweden, land input still increased in response to high output prices and government efforts to raise the productive capacity (Table 5). In two land abundant countries, Australia and Canada, the expansion of the agricultural area continued throughout the postwar period, but in most countries a turning point was reached in the 1950s. Reasons for the decline afterwards were the relative decrease in agricultural prices, mechanization in agriculture, migration of labour from areas with marginal productivity, and the strong demand for land for non-agricultural use fuelled by mass motorization and increases in real income. After 1973 several of these factors weakened, and the decline in agricultural land slowed down. In all countries, except Australia, land productivity (GVAF/hectare) increased at rates slightly higher than GVAF. The highest growth rates were realized in the Netherlands, the UK, and Germany FR (see Table 6).

Labour input and productivity

A good indicator for farm labour input is not readily available. Here we use total employment data for agriculture, forestry and fishing (AFF) published in OECD Labour Force Statistics which probably reflect trends in labour input fairly well. For consistency we have to use the corresponding gross value added (GVAA) per worker as an indicator of labour productivity. We assume that the estimated

growth rates are good proxies for labour input and productivity in the farm sector. This is probably the case since in most countries the share of agricultural services, forestry and fishing in GVAA is less than 10 per cent (see Table 7). Only in Canada, Japan and Sweden was it about 20, 40 and 50 per cent respectively over the past decade.

Table 8 shows for all countries a strong decline in labour input over the whole period 1950-85. Not very surprising is that countries with the highest growth of GVAF, the Netherlands, the UK and Australia, had a slower decline of the agricultural labour force than countries with slow growth, such as Italy, Sweden and Japan. For all countries, except Canada, the period 1960-73 shows the most rapid decline in the agricultural labour force, whereas in all countries, except Italy, the USA and Japan, the decline was slowest in 1980-84.

With few exceptions growth of labour productivity in agriculture was most rapid in the period 1960-73 (Table 9), because employment declined more and GVAF grew faster than in other periods. In the period 1973-84 the growth rate of labour productivity slowed down in most countries. There are two reasons for this. In the 1970s in all countries, except the Netherlands, Denmark, the USA and Sweden, the growth rate of GVAF fell back and in all countries the decline in agricultural employment was retarded. In 1980-84, the crisis period, the growth rate of GVAF increased again, but this did not result in increased labour productivity since the decline in employment was retarded further.

Since 1950 growth of labour productivity in Australia, Canada and the USA has been slower than in the other countries. The performance of the USA was only in the 1960s comparable to that in most EC countries, but in the 1970s and the 1980s it lagged behind. Japan performed very well because of a high growth rate of output in the 1950s and a strong decline of employment in 1960-73. After 1973, however, the decline in employment was strongly retarded, which coincided with a decline of growth in forestry and fishing. As a result labour productivity growth fell back behind European levels. Sweden's performance of AFF was somewhat similar to that of Japan, although the sub-sectoral growth trends were different. Interesting is the relatively poor performance of Denmark. Its decision in 1957 not to join the EC resulted in limited export possibilities and lower price levels. The UK performed better than Denmark in the 1950s and the 1960s, but worse afterwards. In the 1980s productivity growth in Denmark and the UK caught up with the other EC countries. Over the whole period, however, Denmark and the UK performed worse than the EC-6 countries, but better than Australia, Canada and the USA. Among the EC countries the difference between the Netherlands and Italy is most significant. Italy, which in 1951 had still 45 per cent of its employment in agriculture, could reallocate larger numbers to other sectors of the economy than any other EC country, while agricultural output grew relatively slowly. The Netherlands had only 14 per cent of its employment in agriculture, but it could increase its value added from farms more rapidly than other EC countries.

Since World War II the gap in real labour productivity in the farm sector between European countries and the traditional cheap exporters has narrowed significantly because of more rapid growth rates in Europe. Table 16 shows some rough comparative estimates for real final farm output per unit of farm labour input. Although labour input indicators exhibit considerable error margins it is

clear that there is still a considerable gap between the average EC productivity level and that of the USA, but the level in the most advanced areas, such as the Netherlands, is comparable with that in the USA.³

INTER-SECTORAL PRICE AND INCOME LEVELS

The intersectoral relative price level, called terms of trade, is calculated as the ratio of the implicit price indexes for GVAF and gross value added from the other sectors of the economy. The terms of trade for a sector indicates the relative price trend for factor income. It differs between countries as a result of price and productivity changes between countries and sectors. In all countries except Japan farmers experienced declines in their terms of trade; relatively mild in Canada, Sweden, France and the USA and very strong in Australia, and UK and the Netherlands (Table 10). Over the whole period the relative price of factor income in Japan increased at a compound rate of 1.2 per cent. Only after 1980 there was a small decline. There are considerable differences over time. In the 1950s terms of trade improved in Sweden and Japan, whereas they strongly declined in Australia, Canada, the USA, Denmark and the UK. In the EC-6 countries the terms of trade declined less, which reflects the adoption of a high price level at the start of the EC. In the 1960s the terms of trade in the UK and Denmark developed again worse than in the EC-6 countries. After 1970 the terms of trade further declined rapidly in the UK and the EC-6 countries, whereas the decline was less in Denmark. For most countries the terms of trade for GVAF and GVAA (shown in the tables 10 and 11) do not differ strongly, except for Japan and Sweden.

In Australia, Canada and the USA agricultural price fluctuations were stronger than in the other countries. In 1973 their price levels were very high, and after 1980 they experienced a serious fall in their terms of trade as a result of the international agricultural crisis. After 1973 the terms of trade in Sweden decreased at about the same pace as in the EC.

Relative income per worker in AFF is defined as the ratio of value added per worker in AFF and in the rest of the economy. For most countries the level and trend of relative income for AFF is likely to be a good proxy for the farm sector. Table 12 shows that relative income per agricultural worker in the 1950s differed more between countries than in the 1980s. The highest levels are found in Australia, the Netherlands and the UK, and the lowest in Germany FR, Italy and Japan. Strong declines in the terms of trade (Table 11) played a dominant role in the decline of relative income in Denmark and Australia in the period 1950-70, and after 1973 in Australia, the USA, France and the UK. Over the whole period 1950-85 the modest declines in the terms of trade in Canada, the USA, Sweden, France and Italy resulted in improved relative income levels. In Japan favourable terms of trade were partly offset by the effect of relatively rapid increases of productivity in other sectors of the economy.

EFFECTS

Effects of differences in price levels

Indicators of relative price levels between countries were obtained from a comparative study of final output from farms at international prices (FAO, 1986; see Table 13).⁴ It appears that Japan and Sweden have relatively high, and Australia, Canada, and the USA low price levels. Low price levels are also found in Denmark and the UK before they entered the EC. The difference between the traditional cheap exporters and the other countries increased, partly as a result of the relative decline of the dollar exchange rate, which is hardly reflected in farm prices in other countries.

The increases in labour productivity in Table 9 show a relationship with price levels as expected. Low price levels in Australia, Canada and the USA correspond to productivity increases lower than in the EC. The same is suggested by the contrasting experiences of Denmark outside and the Netherlands inside the EC. High levels of protection in Japan and Sweden, on the contrary, did not result in high growth rates of productivity. Japan's experience is particularly interesting. At a moderate level of protection Japan's agricultural productivity grew rapidly in the 1950s. But productivity growth in industry was much faster and farmers pressed successfully for higher prices in order to maintain their relative incomes. The government gave in to such an extent that growth of productivity was retarded because of use of excessive amount of inputs. The latter is evidenced by very high rates of investment (see below), and the fact that, measured at Dutch (European) prices, net value added of field crops in Japan appears to be negative in 1980 and 1984 (Van der Meer and Yamada, 1988). There are strong indications that Japan's high level of protection has created a backlog of labour productivity increases.

Effects of R&D efforts

Table 14 shows striking differences in research and development (R&D) efforts between countries for 1979. High levels of expenditure per worker are found in Australia, Canada, the Netherlands and the UK. The lowest level is found in Italy, but levels in Sweden and Germany are rather low also. Expressed as a percentage of real final farm output at international prices (given in Table 13) Japan spends 14 times more than Italy. High again are Canada, Australia and the UK. Denmark, the USA and Sweden spend a small percentage. The EC-6 spends as much as the USA, but the EC-9 does better. For some countries R&D efforts can be related to productivity increases. The better performance of the UK compared to Denmark may be partly the result of higher expenditure on research. The relatively slow growth of output in Italy may be attributed to underspending. In the Netherlands and the UK, where incomes and productivity in agriculture are relatively high, expenditure on R&D seems to have contributed to high growth rates of output. Intriguing is the meagre response to R&D expenditure in Canada, Australia and Japan. Both Australia and Canada produce at low price levels which

narrow the scope for developing and introducing new techniques. Their climatic environments may also put limitations on borrowing technology and require them to develop more technology for themselves. Compared to the USA and Europe perhaps they face some diseconomies of scale. This may also partly be the case in Japan, but there price relations and institutions may form a major obstacle to introducing labour saving technologies. As a result the efficiency of expenditure on R&D may be low.

Effects of investment

Within the EC, GFCF on farms forms a high share of real final output in Germany FR and Italy, and is low in France, the Netherlands and the UK (Table 15). There seems to be a negative relationship between expenditure on R&D and GFCF. A remarkable fact is also that in all EC countries the rate of investment increased between 1970 and 1980; most strongly in Denmark which may reflect increased profitability of farming after entering the EC. Investment per worker is related to productivity levels, with relatively high levels for the Netherlands, Denmark and the UK (see also Table 16). In the USA, GFCF per worker is relatively high compared to the EC. As a share of real final output it was also higher than in the EC in 1970, but it fell back to a lower level in 1980. The rate for Japan in 1980 is extremely high, because the domestic price level of final output is three times higher than the international level, but at domestic prices the rate of GFCF of 32 per cent is already very high.

Effects of unemployment

A remarkable finding is that unemployment still exerts an important influence on agricultural employment. The alternative value of farm labour affects the pace of net reallocation of excess labour to other sectors. In periods of full employment farm workers can relatively easily take non-farm employment rates close to the going wage rate. This is not possible when there is considerable unemployment, because in such situations the shadow wage rate for excess farm labour is much lower than the going wage rate. Low shadow wage rates may explain the coincidence of a stagnation in the reallocation of farm labour and a relative decline of farm income, observed in the 1930s, and again in the traditional exporting countries in the late 1970s and 1980s. Also in the other countries, with the exception of France and Italy, the decline in farm labour stagnated after 1973. But here the decline in shadow wage rates of excess farm labour coincided with an increase in relative incomes, which further boosted agricultural output. In particular, the 1960s and the 1980s form an interesting contrast. The increase in output and the declining release of agricultural labour in the 1980s can at least partly be explained by the increase in unemployment and the ensuing decline of shadow wage rates of excess farm labour.

NOTES

¹The hill-shaped function consists of an increasing and a decreasing part over the relevant range of prices.

²The extensions of the EC, with Greece (1981) and Spain and Portugal (1986), had little or no effect on the overall picture and will be ignored here.

³Unpaid family labour in the USA and Sweden is not included in hours worked (see van der Meer and Yamada 1988).

⁴Relative price levels *vis-à-vis* the USA were estimated by dividing the Purchasing Power Parity (PPP) by the exchange rate.

Glossary

AFF	Total Agriculture (incl. Agriculture Services), Forestry and Fishery.
CAP	Common Agricultural Policy of the EC.
EC-6	Established in 1958, consisted of Belgium, France, Germany FR, Italy, Luxemburg, the Netherlands.
EC-9	Formed in 1973 and comprised EC-6, Denmark, Ireland and the UK.
GDP	Gross Domestic Product.
GFCF	Gross Fixed Capital Formation.
GVAA	Gross Value Added in Agriculture, Forestry and Fishing.
GVAF	Gross Value Added from Farms.
R&D	Research and development.

REFERENCES

- Eurostat, *Agricultural Statistics 1986*, Luxembourg, 1987 and previous issues.
- Eurostat, *Economic Accounts – Agriculture, Forestry*, Luxembourg, 1987 and previous issues.
- FAO, *Production Yearbook 1985*, Rome, 1986 and previous issues.
- FAO, *Inter-Country Comparisons of Agricultural Production Aggregates*, FAO Economic and Social Development Paper, no. 61, Rome, 1986.
- Van der Meer, C.L.J. and S. Yamada, *Comparison of Real Output, Input, Productivity and Effective Protection in Dutch and Japanese Agriculture for 1975, 1980, and 1984*, Research Memorandum of the Institute of Economic Research, University of Groningen, Groningen, (forthcoming).
- NBER, *Survey of Current Business*, Washington, July 1987 and previous issues.
- OECD, *Science and Technology Indicators: Resources Devoted to R&D*, Paris, 1984.
- OECD, *National Accounts Statistics 1973-1985*, Paris, 1987 and previous issues.
- OECD, *Labour Force Statistics 1965-1985*, Paris 1987 and previous issues.

	FRANCE	GERMANY	ITALY	NETHERLANDS	EC-6	DENMARK	UK	EC-9 ^s	AUSTRALIA	CANADA ¹	USA	JAPAN	SWEDEN
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TABLE

1. Gross value added from farms

													(compound growth rates)
1950-60	2.2	2.0	2.7	1.8	2.3	1.8	2.5	2.3	2.0	-	1.2	4.4	0.2
1960-73	1.7	2.8	1.3	3.9	1.8	0.9	2.6	2.0	2.6	1.5	1.2	-0.5	0.8
1973-84	1.4	1.8	1.7	4.4	1.7	2.9	2.6	1.9	2.5	1.4	1.7	0.4	1.6
1950-84	1.8	2.2	1.8	3.4	1.8	1.8	2.6	1.9	2.4	-	1.4	1.2	0.9
1960-70	1.6	2.5	1.9	3.5	1.9	0.4	2.6	2.5	3.3	2.2	1.4	-0.1	-0.1
1970-80	1.2	1.7	1.3	4.2	1.3	1.8	2.0	1.0	2.5	0.5	1.6	-0.3	1.5
1980-84	2.6	3.4	1.0	5.1	2.7	5.3	4.1	3.0	0.8	2.1	1.3	0.5	3.4

2. Population

													(compound growth rates)
1950-60	0.9	1.1	0.6	1.3	0.9	0.7	0.4	0.8	2.3	2.6	1.7	1.2	0.7
1960-73	1.0	0.9	0.8	1.2	0.9	0.7	0.5	0.8	2.2	1.6	1.2	1.1	0.7
1973-84	0.5	-0.1	0.4	0.7	0.3	0.2	0.1	0.2	1.4	1.2	1.0	0.9	0.2

3. Gross value added from farms per caput

													(compound growth rates)
1950-60	1.3	1.0	1.8	0.5	1.4	1.1	2.1	1.5	-0.3	-	-0.5	3.2	-0.5
1960-73	0.7	1.9	0.6	2.6	0.9	0.2	2.0	1.2	0.4	-0.2	-0.0	-1.6	0.1
1973-84	0.9	1.9	1.3	3.7	1.5	2.7	2.5	1.7	1.1	0.2	0.7	-0.5	1.4
1980-84	2.0	3.5	0.7	4.6	2.5	5.3	4.0	2.8	-0.7	1.0	0.2	-0.2	3.3

4. Gross domestic product per caput

													(compound growth rates)
1950-60	3.3	6.8	5.4	3.3	5.3	2.8	2.1	-	1.6	1.3	1.5	8.2	3.0
1960-73	4.4	3.7	4.3	4.3	4.1	3.5	2.2	4.5	2.8	3.6	2.6	8.7	3.4
1973-84	1.8	2.1	1.7	1.1	1.7	1.9	1.2	1.9	1.1	1.2	1.4	3.3	1.5
1980-84	0.7	1.3	0.6	0.1	0.8	2.2	1.5	1.1	0.9	-0.5	1.3	3.6	1.7

5. Land input

													(compound growth rates)
1950-60	0.4	0.1	0.2	-0.0	0.3	-0.1	-0.1	0.2	4.9	0.2	-0.1	0.4	-0.6
1960-73	-0.5	-0.5	-1.0	-0.4	-0.6	-0.5	-0.2	-0.6	3.9	0.5	-0.9	-0.6	-1.1
1973-84	-0.3	-0.4	-0.1	-0.5	-0.4	-0.2	-0.1	-0.4	1.0	0.5	-0.2	-0.4	-0.2

	FRANCE	GERMANY	ITALY	NETHERLANDS	EC-6	DENMARK	UK	EC-9 ^b	AUSTRALIA	CANADA ¹	USA	JAPAN	SWEDEN
<i>6. Land productivity</i>													(compound growth rates)
1950-60	1.8	1.9	2.5	1.8	2.0	1.9	2.6	-	-2.7	-	1.3	4.0	0.8
1960-73	2.3	3.3	2.3	4.3	2.4	1.4	2.8	2.5	-1.3	1.0	2.1	0.1	1.9
1973-84	1.7	2.2	1.7	4.9	2.1	3.1	2.7	2.3	1.4	0.9	1.9	0.8	1.8
<i>7. Ratio gross value added from farms to total AFF</i>													(per cent)
1973	91	87	97	97	93	88	96	94	95	79	93	56	46
1985	91	92	95	96	93	89	98	92	93	77	89	67	53
<i>8. Employment in AFF</i>													(compound growth rates)
1950-60	-3.6	-3.1	-3.3	-2.2	-2.7	-2.0	-2.0	-	-0.6	-3.3	-2.8	-2.0	-1.7
1960-73	-4.4	-4.7	-5.0	-3.1	-4.7	-3.7	-3.5	-4.6	-0.8	-2.5	-4.3	-4.7	-5.5
1973-84	-3.3	-2.9	-3.3	-0.9	-2.8	-1.2	-1.1	-2.7	-0.3	0.2	-0.4	-2.9	-2.1
1950-84	-3.8	-3.7	-4.1	-2.1	-3.6	-2.4	-2.3	-	-0.6	-1.8	-2.6	-3.4	-3.3
1960-70	-4.1	-4.5	-5.2	-3.4	-4.7	-3.3	-3.6	-4.5	-1.1	-2.5	-5.5	-4.0	-5.9
1970-80	-3.9	-4.4	-3.2	-1.5	-3.5	-2.7	-1.8	-3.4	-0.3	-0.4	-0.2	-4.1	-2.6
1980-84	-3.1	-0.9	-4.2	-0.2	-2.6	-0.4	-0.9	-2.4	0.1	-0.1	-0.5	-2.9	-2.2
<i>9. Gross value added per worker in AFF</i>													(compound growth rates)
1950-60	6.5	5.3	6.9	4.2	6.1	3.8	4.3	-	2.6	3.0	4.2	6.1	2.7
1960-73	6.7	6.7	6.8	7.1	6.8	4.4	6.3	6.6	2.8	4.5	5.5	7.2	6.7
1973-84	4.7	4.6	5.1	5.7	4.6	4.4	3.6	4.6	3.5	1.1	1.8	2.2	2.5
1950-84	5.9	5.6	6.1	5.8	5.9	4.3	4.8	-	3.0	3.2	3.9	5.2	4.2
1960-70	6.4	6.1	7.7	7.2	7.0	3.8	6.1	6.7	4.2	5.4	6.7	5.7	7.4
1970-80	5.2	6.0	4.5	6.0	4.9	4.6	4.0	4.9	2.8	1.3	1.6	4.5	1.8
1980-84	5.9	4.1	5.5	6.0	5.0	5.5	5.1	5.1	1.2	2.6	1.9	3.9	5.9

	FRANCE	GERMANY	ITALY	NETHERLANDS	EC-6	DENMARK	UK	EC-9 ^s	AUSTRALIA	CANADA ¹	USA	JAPAN	SWEDEN
<i>10. Change in terms of trade for gross value added from farms</i>													(compound growth rates)
1950-60	-1.0	-0.9	-2.1	-1.3	-	-2.4	-3.9	-	-4.6	-4.7 ²	-3.5	0.9	0.9
1960-73	0.5	-2.7	-0.9	-3.0	-	-2.0	-2.8	-1.8	-1.9	2.0	1.9	2.8	-1.4
1973-84	-3.8	-3.6	-2.8	-4.0	-	-2.1	-4.2	-3.8	-4.8	-1.8	-3.7	-0.4	-2.6
1950-84	-1.4	-2.5	-1.8	-2.8	-	-2.1	-3.6	-	-3.6	-1.0 ²	1.5	1.2	-1.1
1960-70	-0.1	-2.0	-1.5	-2.3	-	-2.7	-3.3	-2.0	-3.6	-0.8	-1.0	3.4	-1.3
1970-80	-2.1	-3.7	-0.8	-5.4	-	-1.6	-3.2	-3.1	-1.0	3.4	2.1	0.0	-1.9
1980-84	-3.4	-4.4	-4.5	-1.5	-	-1.6	-4.4	-3.6	-7.3	-5.8	-6.6	-0.6	-3.8
<i>11. Change in terms of trade for gross value added AFF</i>													(compound growth rates)
1950-60	-1.8	-0.8	-2.7	-0.3	-	-2.3	-3.9	-	-5.0	-4.7	-3.7	-0.6	-0.8
1960-73	0.0	-2.2	-1.1	-4.1	-	-1.2	-2.7	-1.2	-1.3	1.3	1.8	1.2	-1.8
1973-84	-3.7	-3.6	-2.6	-4.3	-	-2.4	-4.4	-3.3	-5.2	-1.9	-3.4	-0.2	-0.7
1950-84	-1.7	-2.3	-2.0	-3.1	-	-1.9	-3.6	-	-3.7	-1.4	-1.5	0.3	-1.2
<i>12. Relative income per worker AFF/rest of the economy</i>													(per cent)
1950	-	36	-	97	-	78	90	-	161	44	43	29	52
1970	47	36	24	94	-	60	84	47	86	49	59	30	55
1973	61	40	27	93	-	80	97	54	98	71	93	39	56
1985	49	30	35	87	-	81	64	45	71	59	67	33	69
													(compound growth rates)
1950-60	2.2	0.3	1.4	0.5	-	-0.8	-1.4	-	-4.6	-3.0	-1.1	0.5	-0.5
1960-73	2.9	0.3	1.8	-1.1	-	0.6	1.4	1.6	-0.6	4.0	5.7	0.9	2.0
1973-84	-1.0	-1.3	2.9	0.1	-	0.9	-2.4	-0.6	-3.3	-0.6	-2.2	-1.0	1.0
1950-84	1.3	-0.3	2.1	-0.2	-	0.3	-0.7	-	-2.7	0.5	1.1	0.2	0.9
1960-70	1.8	0.0	1.5	-0.5	-	-1.1	1.0	1.4	-1.3	2.3	4.1	-0.7	1.7
1970-80	0.5	0.2	3.0	-2.1	-	1.9	-1.0	-0.0	0.0	3.3	3.0	0.8	1.0
1980-84	0.8	-3.2	2.7	3.4	-	2.3	-2.2	-0.1	-7.5	-3.5	-5.3	-0.0	2.5

	FRANCE	GERMANY	ITALY	NETHERLANDS	EC-6	DENMARK	UK	EC-9 ^s	AUSTRALIA	CANADA ¹	USA	JAPAN	SWEDEN
<i>13. Final output from farm in international prices</i>													(in mill. of international \$)
1970	10 030	7 557	7 396	2633	28 964	1 463	4 637	35 926	4 831	4 012	39 418	6 399	944
1980	29 415	19 295	39 542	9029	83 288	3 982	13 060	103 279	12 617	11 678	115 435	15 121	2 429
<i>Price level final output from farms</i>													(in % of USA level)
1970	115	123	135	112	122	97	103	116	85	81	100	216	138
1980	150	155	152	140	150	137	140	147	96	109	100	296	233
<i>14. Expenditure in research and development for agriculture (AFF) in 1979</i>													(in international \$)
per worker	101	74	19	321	69	94	307	91	529	516	189	90	61
in % of real final output 1980	0.64	0.60	0.26	1.00	0.56	0.50	1.54	0.75	1.67	2.60	0.57	3.64	0.54
<i>15. Gross fixed capital formation on farms</i>													(in US \$)
per worker													
1970	340	595	255	845	373	543	616	416 ^s	1100	–	1357	230	679
1980	1874	2469	1048	5713	1694	3713	3051	1793	–	–	5399	2064	3228
in % of real final output													
1970	13.0	21.5	20.0	11.7	16.6	10.2	11.2	16.9	9.3	18.5	20.6	36.8	16.9
1980	16.9	25.3	25.8	19.1	21.2	21.7	16.9	20.6	–	–	17.3	95.2	30.7
<i>16. Labour productivity index farm sector (Netherlands=100)</i>													(real final output per unit of labour)
per full-time labour unit ^t													
1970	45	50	26	100	41	74	70	44	163	79	121	9	55
1980	42	49	23	100	38	70	60	40	111	75	104	7	35
per hour													
1970	–	–	–	100	–	–	–	–	–	93	166	15	81
1975	57	47	–	100	–	–	63	–	–	78	139	14	74
1980	56	44	–	100	–	–	57	–	–	68	114	12	68

	FRANCE	GERMANY	ITALY	NETHERLANDS	EC-6	DENMARK	UK	EC-9 ⁵	AUSTRALIA	CANADA ¹	USA	JAPAN	SWEDEN
<i>17. Difference in growth rates final output and gross value added</i>													(per cent points)
1951-60	1.0	-0.1	0.7	2.0	0.1	0.1	-0.1	-	1.5	-	0.5	-0.2	0.4
1960-73	1.3	0.8	0.4	0.7	1.0	-0.1	-0.3	1.0	0.0	0.5	0.8	2.2	0.5
1973-84	0.4	-0.1	0.3	-0.8	0.1	-0.5	-1.0	0.0	-0.4	1.2	-0.9	0.5	0.3
1951-84	0.9	0.3	0.5	0.6	0.8	-0.2	-0.5	-	0.2	-	0.1	0.9	0.4

- Notes:*
- Data for EC-6 include Belgium and Luxemburg, and for EC-9 also Ireland
 - Growth rates calculated for three year averages, that is, 1960-70 refers to the averages of 1959/1960/1961 and 1969/1970/1971
 - In several cases data series do not start in 1949, but in 1950 or 1951
 - International \$ concept in 13 as defined by FAO (1986), it differs from international \$ concept by OECD (1984) used in 14

¹ Period ending 1984: the last three-year average is 1982/1983/1984

² 1950-62 refers to AFF

³ GFCF for Ireland estimated at 2.5 percent of other EC countries

⁴ Based on corrected final output in Table 13 per unit of labour input. Labour input for EC countries in adjusted Annual Work Units; the other countries are compared with the EC through the Netherlands on the base of labour input data in terms of employment (see van der Meer and Yamada, 1988).

⁵ Tables 2-12 refer to EC-9 minus Luxemburg and Ireland

Sources: EC, FAO, OECD listed under literature; national accounts for Australia, Canada, France, Sweden, and USA; Table 13 and 16 from van der Meer and Yamada (1988), partly based on FAO (1986) and Eurostat (1987); Table 14 Research and Development from OECD (1984) divided by labour input from OECD Labour Force Statistics; Table 17 Final Input from EC, NBER and FAO.

DISCUSSION OPENING - YUKO ARAYAMA

Professor van der Meer's work is an important contribution to the understanding of agricultural situations which have been suffering from an excessive burden of protection and enormous amounts of surplus commodities. It has tried to evaluate the effect of the CAP on productivity growth and efficiency in the EC agriculture. His analysis is very rich in empirical findings and will play a precious role for all classes of researchers.

Country-specific hill-shaped relationship

As it is argued, there is a country-specific hill-shaped relationship between price levels and productivity growth rates. The relationship may imply that the rate of productivity growth is low at a low price level due to lack of incentive for R&D and new investments, and that it is also low at a high price level due to a slow reduction of productive resources. At a certain intermediate level, the rate of productivity growth reaches its highest value.

It is important to note that this country-specific hill-shape is an *observed* relationship. There are at least three different price effects on the rate of productivity growth behind this observed relationship (see Figure 1). Overall technological changes which have brought about a major part of the rapid growth in agricultural production should be neutral to price level of each country. On the contrary, a country specific productivity growth can be induced through a higher domestic price level. This relationship is shown by an upward-sloping curve in the diagram. In addition, a higher price level should result in a lower rate of productivity growth since it retards the reduction in factors of production. The country-specific relationship takes hill-shape due to these three effects which are different in their signs and magnitudes.

EC agriculture seems to have achieved a better productivity growth compared with the traditional cheap exporters. However, the EC's good performance and the observed hill-shaped relationship do not necessarily justify the protection under the CAP. Protection could have increased productivity growth by accelerating induced technical change. But this effect is only one of the by-products which have been brought about by the protection and accompanied by slow adjustment in redundant inputs. Our economic intuition suggests that policy measures which could bring about a direct influence are preferable to those which have indirect influences.

Dynamic versus static perspective

It is suggested that the burden of the CAP might be less from a dynamic perspective than from a static point of view, since the real price of agricultural commodities was decreased by the productivity growth induced by the CAP. Productivity growth induced by protection will benefit consumers, and the benefit will be greater in a dynamic perspective. But, at the same time, an initial cost for protection will also accumulate over time. It is plausible that the

additional burden to consumers does exceed the benefit from the induced technical change even in the long run.

Protection can sometimes be justified on the grounds of the infant- industry argument or existence of external diseconomy. Obviously, an infant-industry argument is not the case here. An infant-industry argument can be applicable to commodities which can grow fast enough so that initial burden becomes negligible in due course. But agriculture has no unlimited frontier any more. In fact many countries are suffering from overproduction of agricultural commodities, because of the low income elasticity of demand for them. This means that no merit from scale economies can be expected for agriculture. In addition, it is more likely that developed countries will keep protecting their agriculture. Consequently, the burden can accumulate over-time.

Effects of differences in price levels

According to the theory of induced productivity growth, higher price levels should correspond to higher productivity growth. However, the possible relationship between price level and productivity growth (for example, labour productivity) will be opposite to what we usually expect, when purchasing power parity (PPP) between the agricultural sector and non-agricultural sectors is the underlying motivation toward the existing protection. Since the price level is going to be raised in order to offset lower productivity, an observed high price level tends to be associated with poor labour productivity. For example, Japanese price support for rice production has been implementing income compensation as a part of its purposes. Therefore, the high price due to a high protection did not result in high productivity growth.

In so far as we compare the EC's agricultural performances with those of the traditional cheap exporters, the alleged inefficiency of the CAP for productivity growth might not be proven. But it does not mean that the CAP is efficient, either. If we take these into consideration, it would be most welcome if some general criteria for efficiency comparison which included dynamic aspects (such as induced productivity growth) were to be proposed.

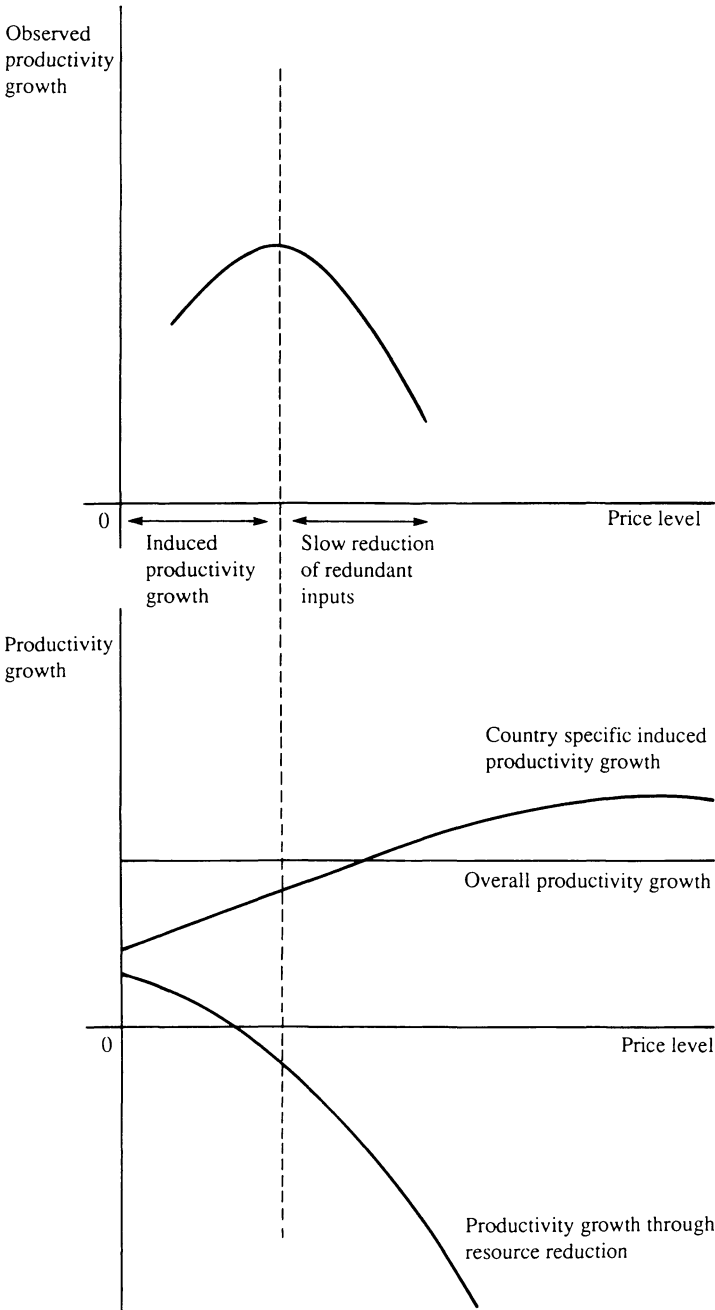


FIGURE 1. Country-specific hill-shaped relationship