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# AGRICULTURE AND GOVERNMENTS IN AN INTERDEPENDENT WORLD

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*Policy Reforms and Agricultural Response: The Case of Chile\*\**

## INTRODUCTION

Within the last 30 years two major policy programmes affecting the agricultural sector occurred in Chile. In the first programme (1965-1970), for the first time in many years, the development of the agricultural sector was viewed as a *sine qua non* for the general development of the country. An increase in relative agricultural prices was considered a necessary ingredient of the policy package. This meant a departure from the historical bias of economic policy which since the 1930s had favoured the industrial import competing sector.

In the second reform (1975 to the present) although no specific plan for the agricultural sector was proposed, a liberalization programme of the entire economy was implemented. The programme involved relaxing trade restrictions, with the imposition of a low-uniform tariff to all economic sectors being the desired ultimate objective. It was thought that, given that the prevailing interventions had in general discriminated against agriculture, the new policy package would be enough to produce a large expansion in that sector.

So, in the first case the government was to continue intervening in the economy but with a long-term objective for agriculture, while in the second case the reform implied a complete elimination of government interventions in the economy. The other difference was that in the first case the reform was implemented within a democratic framework, while in the second a military government was in force. This meant that in the first case the government had to care more about the implications of its policy for different pressure groups in the economy, while in the second the power structure was more simplified.

The objective of this paper is to analyse these major reform experiences. In doing this a macroeconomic framework is adopted. We analyse the evolution of incentives given to agriculture considering a single aggregate relative price between agricultural and nonagricultural goods ( $P_a/P_n$ ). We try to explain the evolution of  $P_a/P_n$  by looking at specific agricultural tariffs or subsidies ( $t_a$ ), at nonagricultural tariffs ( $t$ ) and at the real exchange rate (RER) and its main determinants (terms of trade and excess of expenditure). This follows closely the methodology proposed by Krueger *et al.* (1984). Then the effects of  $P_a/P_n$  are analysed both for the agricultural and nonagricultural sector. For the nonagricul-

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\*\*This paper relies heavily upon findings of a research project sponsored by the World Bank (Hurtado *et al.*, 1987) in which both authors worked as research associates.

tural sector the main linkage comes from the effect on wages through the identity:

$$W/Pna = W/P + a*(Pa/Pna) \quad (1)$$

taken from Hurtado *et al.* (1987). In (1)  $W$  is the nominal wage paid to urban workers,  $P$  is the 'true' cost of living index (including agricultural and nonagricultural goods) and  $a$  is the share of agricultural goods in the urban consumer basket. (All variables measured in logarithms.<sup>1</sup>)

The particular way in which the agricultural pricing policy affects the nonagricultural sector depends upon other structural relationships that characterize the economy. So in the first case, the institutional set up imposed a rigidity in  $W/P$  and by that way a rise in  $Pa/Pna$  implied a rise in labour costs in the nonagricultural sector ( $W/Pna$ ) and hence a drop in nonagricultural investment.<sup>2</sup> On the other hand the second period was characterized by a strong liberalization in the labour market. Hence, for that period real wage flexibility implied that the trade-off was between  $Pa/Pna$  and  $W/P$ , without too much effect on nonagricultural investment. In short, the effect of agricultural pricing policy on the nonagricultural sector may be quite different depending upon the institutional set up prevailing in the labour market (among other factors).

For the agricultural sector it is assumed that a higher  $Pa/Pna$  implies a higher agricultural investment and output. However, as we will see this response is conditional upon two factors: expectations and structural transformations.

### THE FREI GOVERNMENT'S REFORM (1965-70)

Eduardo Frei was elected president of Chile in September 1964. According to his economic plan, ODEPLAN (1968), the main problems with the Chilean economy were: (1) the high rate of inflation; (2) the increasing balance of payments deficit; (3) the high unemployment rate; and (4) the insufficient rate of growth of the agricultural sector.

With respect to the agricultural sector, in particular, the plan considered the low rates of growth and investment to be responsible for the increasing trade deficit in agricultural products. This deficit, in turn, initiated an excessive spending of foreign exchange that compromised the capital accumulation in the other sectors of the economy. The analysts considered that the problems in agriculture were: (a) the uneven distribution of land holding; (b) the low level of instruction among agricultural workers; (c) the unfair allocation of credit that caused an insufficient use of technological inputs; and (d) the inappropriate use of the irrigation infrastructure. In light of these problems, the policy makers implemented an agrarian reform programme designed to improve the distribution of land holding. They also implemented institutional reforms to centralize in the Ministry of Agriculture the decisions concerning the sector. This reform was considered necessary to eliminate discriminations on the credit policy and to rationalize the use of the irrigation infrastructure.

Until 1964, agricultural prices had been controlled by the authority mainly as an instrument to stop inflation. It was believed then that high prices for

agricultural products would have no significant effects on output and that a high agricultural price would have an adverse effect on the distribution of income given the uneven distribution of land. The Frei administration, on the contrary, proposed as a deliberate policy the necessity of increasing agricultural relative prices. On one hand, the new authority believed that agricultural output was able to respond to better incentives and, on the other, that the agrarian reform should solve the problems regarding the income distribution. As we can see in columns (1) and (2) of Table 1, the agricultural/nonagricultural relative price ( $P_a/P_{na}$ ) was higher during Frei's government than in the past and, the rise went beyond the increment in international prices ( $P_a/P_{na}$ )\*, especially during 1966, 1969 and 1970. However it is interesting to note that this increase in  $P_a/P_{na}$  was not the result of higher direct protection to the sector ( $t_a$ ). In fact, the divisia index on column (3) shows that the nominal protection to agriculture helps to explain the wedge between domestic and world prices only during 1965 and to some extent during 1966. Columns (4) to (6) show the evolution of the nonagricultural tariff ( $t$ ), the real exchange rate (RER), and the absorption over GDP ( $A/GDP$ ). Our hypothesis is that the increase in RER and the drop in  $t$  were the causes for the rise in  $P_a/P_{na}$ . In fact,  $t$  dropped steadily and RER increased steadily throughout the period. However, it should be noted that the increase in RER was not due to the drop in  $t$  alone.  $A/GDP$  dropped around four percentage points helping also to raise RER. Furthermore, these two effects were able to offset the effect of better terms of trade (TT) on RER.

To analyse the effects of agricultural policy into the nonagricultural sector we start with identity 1: a higher  $P_a/P_{na}$  should imply either a decline in real wages or a rise in the cost of labour to nonagricultural entrepreneurs. Frei's support was mainly the working class so it was politically unfeasible for him to allow a drop in real wages. In fact, one of the first measures taken by his administration was to incite labour force unionization. As the workers became more organized, they began pressing for higher real wages. The government that played the role of referee when the disputes between labour unions and managers were unsolved mainly ended up favouring the workers. This generated new worker expectations and sooner or later they pressed again for higher wages. As a result, real wages rose 80 per cent during the period, a figure far beyond the government objectives (see column (7)). Hence, both increments in  $P_a/P_{na}$  and in  $W/P$  implied a strong increase in nonagricultural labour costs.<sup>3</sup> The government then reinforced the subsidized credit policy to nonagricultural entrepreneurs in order to reduce the negative effects of high costs of labour on capital accumulation. Column (8) shows that the credit given by the public sector, mainly at a negative real interest rate, rose about 75 per cent during the period. It should be noted also that this cheap credit programme was feasible mainly due to the incredibly high terms of trade enjoyed by the economy (column (9)) and the increase in foreign debt (column (10)).

As a result of the set of policies described above, the agricultural sector was able to reverse its past trend and started showing positive rates of growth, the only exception being 1969, a particularly dry season (see column (11)). On the other hand, the nonagricultural sector grew at a lower rate than before (4.1 per cent per year on average) and by the end of the period, real GNP was falling (see column (12)).

TABLE 1 *Frei government's reform*

Year	(1) Pa/Pna	(2) (Pa/Pna)*	(3) ta%	(4) t%	(5) RER	(6) A/GDP	(7) W	(8) $\lambda$	(9) TT	(10) NED	(11) Ya	(12) Yna
1960-64	100	100	17	94*	100	1.03	100	100	100	1316	-0.3	5.0
1965	117	115	19	94	109	0.99	115	122	278	1434	2.0	0.7
1966	120	96	22	76	115	0.99	129	133	202	1520	21.2	10.2
1967	116	114	-7	76	118	0.99	149	151	151	1718	3.0	3.4
1968	114	107	-11	76	128	0.99	150	142	161	1965	4.7	3.5
1969	125	106	-12	39	134	1.02	163	152	187	2262	-11.4	5.3
1970	135	108	1	39	144	0.99	179	174	170	2373	3.6	1.9

*Notes and Sources:* Column (1): Domestic agricultural/nonagricultural relative price obtained from Hurtado *et al.* (1987).  
 Column (2): International agricultural/nonagricultural relative prices, Pa\* was calculated as  $Pw^{0.54} Pc^{0.31} Pm^{0.15}$  where Pw, Pc, Pm correspond to the relevant border prices of wheat, cattle and milk respectively and were obtained from Hurtado *et al.* (1987). Pna\* corresponds to the USA wholesale price index.  
 Column (3): Agricultural nominal protection, calculated as  $(1+tw)^{0.54} (1+tc)^{0.31} (1+tm)^{0.15} - 1$  where tw, tc and tm correspond to the nominal protection on wheat, cattle and milk, respectively, and were obtained from Hurtado *et al.* (1987).  
 Column (4): Uniform equivalent tariff obtained from Hurtado *et al.* (1987).  
 Column (5): Real exchange rate defined as  $e \cdot Pna^*/Ph$  where e is the nominal exchange rate (pesos per dollar), Pna\* is the USA wholesale prices index and Ph is the domestic price of home goods. RER was obtained from Hurtado *et al.* (1987).  
 Column (6): Absorption over GDP, obtained from Banco Central (1983).  
 Column (7): Real wage index obtained from Hurtado *et al.* (1987).  
 Column (8): Index of total nonagricultural loans made by the Banco del Estado over nonagricultural capital, obtained from Hurtado *et al.* (1987).  
 Column (9): Terms of trade, defined as international export prices divided by international import prices, obtained from Hurtado *et al.* (1987).  
 Column (10): Net external debt in millions US dollars of 1976, obtained from Hurtado, *et al.* (1987).  
 Column (11): Rate of growth of agricultural GDP, obtained from Hurtado *et al.* (1987).  
 Column (12): Rate of growth of nonagricultural GDP, obtained from Hurtado *et al.* (1987).

Table 3 shows the evolution of the main agricultural products. Since the series are highly variable the simple calculation of the cumulative rate of growth may be misleading. Instead a least squares adjustment between the logarithm of each production and a time trend variable was performed. That calculation gives an idea of the 'long-run trend' rate of growth for each product. The estimation gives a rate of growth of 2.4 per cent for wheat, 5.9 for cattle, 5.1 for milk and 5.7 for fruit. Although cattle was unprotected throughout this period (see Hurtado *et al.*, 1987) slightly increasing border prices implied a higher domestic price and therefore an increase in its long-term rate of growth. This may have been reinforced by the high rate of protection given to milk (Hurtado *et al.*, 1987) because in Chile, there is a significant proportion of dual purpose cattle (beef and milk). The rate of growth of fruit is explained by a positive trend in international prices and by the positive protection given to the sector. Finally, the competition for land between fruit and wheat in the central region and between livestock and wheat in the southern part of the country helps to explain the low rate of growth exhibited by wheat.

Altogether, the response of agriculture can be considered as 'too low' if we think not only of the better prices faced by the sector but also of the amount of public resources involved in the plan.<sup>4</sup> We believe that the low reaction of the sector can be explained by two main factors: expectations and land reform. First, the authorities did not establish a rule for making the policies so it was not clear to the farmers how long it would last. As we saw, the high Pa/Pna together with the always increasing real wages was possible due only to the availability of foreign exchange coming from incredibly good terms of trade. Clearly this was not sustainable in the long run. Additionally, it has been documented that even within the government, the Ministries of Economy and Agriculture consistently disagreed with respect to agriculture pricing policy (Cleaves, 1974). Probably, these facts adversely influenced expectations. Hence a long-term output response coming from investment decisions (as in fruit) was not too large. Second, some of the best land was in the hands of the farmers in the land-reform sector who did not have the know-how nor the experience to run an agricultural business successfully. This may explain the low response in the crop sector, which was the main activity of land-reform farmers.

In summary, Frei implemented – with some success – a reform in the agricultural sector. Better agricultural prices were achieved mainly through a slight liberalization in the rest of the economy and through a reduction in the level of A/GDP. The response of agriculture although positive was limited. Expectations linked to the long run feasibility of the policy package and the influence of the land reform programme appears to be, in the main, responsible for this outcome. The main winners during these years were clearly the workers and to some extent the farmers, while the main losers were the nonagricultural capitalists, the savers and in general, the entire economy that was not able to capitalize on the favourable external situation.

TABLE 2 *Military government's reform*

Year	(1) Pa/Pna	(2) (Pa/Pna)*	(3) ta(%)	(4) t(%)	(5) RER	(6) TT	(7) A/GDP	(9) Ya
1970	100	100	1	39	100	100	0.99	1.2*
1975	167	118	-14	95	170	47	1.02	4.8
1976	192	107	-8	33	220	51	0.97	-2.9
1977	176	80	44	20	205	44	1.02	10.4
1978	155	77	15	14	167	44	1.03	-4.9
1979	165	96	0	10	171	46	1.03	5.6
1980	160	94	8	10	162	42	1.04	3.6
1981	136	90	7	10	140	36	1.10	3.7
1982	120	82	7	10	123	32	1.02	-2.1
1983	138	75	8	18	143	34	0.97	-3.6
1984	120	63	35	25	159	32	1.01	7.1
1985	176	48	18	26	198	30	0.97	5.6
1986	227	51	33	20	205	32	0.96	8.7

*Note:* \*Corresponds to the average 60-74.

*Sources:* From 1970 to 1983: same source as Table 1.

From 1984 to 1986: Cols (1) to (5) were estimated by the authors following same methodology.

Cols. (6) to (9) obtained from Banco Central, 'Boletines Mensuales', various issues.



TABLE 3 *Agricultural sector: key variables*

	(1) Wheat (1000 tons)	(2) Cattle (1000 head)	(3) Milk (Million litres)	(4) Fruit exports (Index)
1960-4	1068	634	398	100
65	1116	540	416	158
66	1346	610	415	143
67	1204	638	439	121
68	1216	673	476	172
69	1214	883	519	141
1970	1307	707	526	173
71	1368	682	571	159
72	1195	494	506	139
73	747	499	442	133
74	939	707	523	151
75	1003	692	580	282
76	867	733	594	440
77	1219	733	608	507
78	893	709	557	740
79	995	771	519	765
1980	966	809	592	807
81	686	831	663	960
82	651	863	567	1191
83	586	854	502	1404
84	988	866	592	3084
85	1165	n.a.	588	n.a.
86	1626	n.a.	666	n.a.

*Notes and Sources:* n.a. = not available

Column (1): Wheat production from Hurtado *et al.* (1987).

Column (2): Cattle production includes numbers slaughtered plus change in cattle numbers. Figures were obtained from Hurtado, *et al.* (1987).

Column (3): Corresponds to quantity of milk received in the processing plants. Figures were obtained from Hurtado, *et al.* (1987).

Column (4): Fruit exports corresponds to a quantity index of exports. The index was obtained by dividing total exports (in current dollars) by a price index of fruit exports that uses relative activities size (in terms of acreage) as weights.

## THE MILITARY GOVERNMENT'S REFORM (1975 TO THE PRESENT)

Table 2 summarizes the relevant information for this period. We distinguish three phases:

### *The period 1975-79*

During this period agricultural relative prices increased sharply reaching their peak in 1976 when they were 92 per cent higher than in 1970. Later, towards 1979 they stabilized at a level around 60 per cent higher than in 1970. We observe that neither international prices ((Pa/Pna)\*) nor specific agricultural tariffs (ta) helped to explain these better incentives. Although international agricultural prices did increase around the mid seventies, we see that that increase explained

only about 8 per cent of the domestic price increases during 1976 and, in fact, towards the late seventies international agricultural prices were lower than in 1970. On the other hand, we see that the aggregate tariff on agricultural goods (ta) did not reflect the stated objective of setting a uniform constant tariff. Instead, a typical pattern of countercyclical policy was observed: high tariffs when international prices were lower and vice versa.

What helped to explain this increase in Pa/Pna was the implementation of the liberalization programme on the rest of the economy. The aggregate tariff for the whole economy (t) fell from 40 per cent in 1970 to 10 per cent in 1979. The effects of this lower import protection level were twofold: aside from the direct effect of lowering relative prices of nonagricultural import competing activities, it increased the RER.<sup>5</sup> The close relationship between the RER and Pa/Pna was striking. This should not be surprising considering that in the case of Chile almost 95 per cent of agricultural production consists of tradable goods while for the nonagricultural sector that figure is less than 50 per cent. However, empirical evidence suggests that this high increase in RER cannot be explained solely by the overall trade liberalization (see note 4). In fact, the RER was already higher in 1975 when t was higher than in 1970. We conclude that the drastic drop in the terms of trade (column (6)) and in the level of absorption over GDP (column (7)) were the other factors that helped to explain the increase in RER and therefore the increase in Pa/Pna.

Hence, although during this phase the agricultural sector enjoyed a substantial improvement in price incentives, only a fraction of the change in those incentives can be explained by the overall trade liberalization. Using 1970 as a base year and 1979 as the final year, and using the estimates of Hurtado *et al.* (1987), we conclude that no more than 40 per cent of the better incentives can be explained by the trade liberalization. The remaining fraction is explained by the adverse international conditions faced by the country in terms of prices and availability of foreign credit.

Although the average rate of growth of agricultural GDP (2.7%) was more than twice the average observed in the past (1.2% for the period 1960–1974), it can be considered as ‘too low’ given the dramatic increase in relative prices. At least, three reasons can be given for this result.

(i) *The agrarian reform effect.* At the beginning of the period of government, a large part of the best agricultural land was in the hands of small farmers who benefited from the agrarian reform process of Frei’s and Allende’s government. As a result of the severe reduction in government expenditures, technical and credit assistance to those farmers was cut. The lack of experience together with the lack of economic resources helped to explain the low output response observed.

(ii) *The credit restriction effect.* Agricultural operational credit was not subsidized any more. The liberalization of the capital market in the context of scarce foreign savings and high fiscal deficit caused a drastic increase in the real interest rate. This affected the traditional crop sector negatively. (Also many small and medium farmers found no opportunity for credit in the new private financial system.)

(iii) *The ‘expectation’ effect.* As shown above, the better incentives faced by

agriculture were linked to some extent, with the adverse economic environment of the country. As long as this situation may have been considered transitory by some, the low response should be taken as a rational reaction.

On the other hand, and quite differently from the Frei experience, the higher Pa/Pna did not have a negative effect on nonagricultural investment through higher labour costs. The reason for this was that the abolition of labour unions, the close control of wage adjustment by the government and the high unemployment levels implied a drastic drop in urban real wages. In other words, the 'losers' with these higher prices were not the nonagricultural entrepreneurs but the workers. It is in this sense that this period has been considered a period of 'agreement' between agricultural and nonagricultural capitalists with workers being the main losers (see Hurtado *et al.*, 1987, Chapter 8).

### *The period 1980–1983*

During this period the performance of the agricultural sector was fairly poor. On average, the growth rate was 0.3 per cent. Paradoxically, this period can be considered as the only sub-period during which the reform policy objectives of reduced government intervention and low uniform tariffs across the whole economy were achieved (see Table 2, columns (3) and (4)). The problems for agriculture started in 1981 and were linked to the simultaneous effect of lower agricultural prices and high outstanding debt. The RER fell steadily between 1979 and 1982 by approximately 28 per cent and so did Pa/Pna. This drop in the RER was linked to excess expenditure over GDP (see column (7)) which may have been further induced by the fixation of the nominal exchange rate in 1979.

The macroeconomic adjustment of 1982 was accomplished through an increase in real interest rates which together with the low Pa/Pna marked the collapse of the agricultural sector.

### *The period 1984 to the present*

The difficult situation faced by the agricultural sector instigated pressures for higher protection levels. The policy of uniform protection for all activities was revised and special protection was given to wheat, milk, sugar beet and other products. Agricultural relative prices almost doubled between 1984 and 1986. However, once again, the main source for this increase did not come from specific agricultural protection (ta) but from the strong increase in the RER which had to adjust to the lower terms of trade and the drop in the excess of expenditure.

Quite differently from the response observed during the first phase of the reform, the agricultural sector responded strongly this time with an average growth rate of more than 7 per cent. We think that the reasons for this are exactly the opposite of what happened in the period 1975–1979:

- i) Those farms distributed under the agrarian reform law which had trouble were sold back by their owners. Presumably, those farmers who survived the lack of assistance and the crisis of 1982 were among the most efficient ones.

- ii) The government intervened in the credit market and although it did not give subsidized credit, it opened credit lines to small and medium farmers. Additionally interest rates were much lower than before.<sup>6</sup>
- iii) The high foreign debt service that the country still faces, the fact that terms of trade have remained fairly low for many years and the confirmation that the government will not increase tariffs in the nonagricultural sector, make it reasonable to expect that a high RER and consequently a high level of Pa/Pna will persist for a long time.

Before summarizing the main results of this period it is worth analysing the changes that took place within the agricultural sector. Using the data presented in Table 3 and the same methodology explained in the previous section, we obtain long run rates of growth not significantly different from zero for wheat and milk, and 2.5 and 23.5 per cent for cattle and fruit respectively.<sup>7</sup> Until 1979 wheat production stagnated but this can be considered the result of substitution effects coming from the expansion in fruit and cattle. Then the period 1981–1983 affected negatively wheat production more than any other subsector. This reflects the strong dependence of this crop upon the cost of credit. By the same token, the response of wheat production to the new relative prices and the credit policy was outstanding. The stagnation in milk production on the other hand is explained by the fact that although this product is still protected, efforts were made to reduce its protection rate. It seems clear that Chile has no comparative advantage in producing milk and if production has not fallen it is due only to the fact that specific protection rates are still imposed.<sup>8</sup> The case of cattle is somewhat different. Trade restrictions related to foot-and-mouth disease helped, to some extent, to change the status of cattle from being an importable (during the 1960s) to being a non-tradable. As such, cattle production is subject to a typical cycle related to lagged income increases. The huge variations observed are lagged responses of the sector to the overall variance experienced by the economy during the second half of the 1970s and first part of the 1980s. Finally, it is clear that the most striking response is that of fruit exports. Fruit related investment appears to be highly sensitive to the real exchange rate (Hurtado et al., 1987, Chapter 3). The drastic increase in the real exchange rate observed during this period together with related deregulation (in ports for example) was enough to produce this big response. It is worth saying that this implied no cost for the government budget, for unlike past experience no subsidies were given.

### *Summary*

- 1 Relative agricultural prices have been substantially higher than during the 1960s. However, variation is observed.
- 2 The most important variables that helped to explain the better prices were: terms of trade, availability of foreign credit, tariffs in the rest of the economy. International conditions played an important role, even more important than the trade liberalization.
- 3 Only now does the agricultural sector appear to be responding in accordance with the expectations of the policy makers. This seems to be linked

to the agricultural credit policy and expectations concerning the international environment.

- 4 The objective of a uniform tariff level to all activities has not been achieved in the agricultural sector. This leaves open the question of what are the objectives of the specific protection to agriculture. In some cases, (like wheat), the stated objective has been not to protect the product in the long run but to avoid short run fluctuations which are linked to international price. But we have seen that the main source of fluctuation does not come from international agricultural prices but from fluctuations in the RER. So the objectives of specific protection of agriculture appear to be ill defined; we observe that high tariffs were given when the RER was high (1984–1986) and low tariffs when the RER was low (1980–1983), the final result being that the policy ended up being procyclical instead of countercyclical. However, for some products (sugar) the specific international component may be more variable than the domestic ingredient. In other cases (milk), the protection does not seem to have any sound justification, and it appears to be the result of pressures coming from milk producers.

## CONCLUSION

(1) In the case of Chile, the main changes in Pa/Pna are related to liberalization programmes in the nonagricultural sector and to the international environment (terms of trade and availability of foreign credit). Specific protection incentives have had little effect. This strongly suggests that price reforms concerning agriculture should be designed together with other macro policies. Also, it seems difficult to stabilize agricultural prices given the high variability observed in the terms of trade.

(2) The response of agriculture to better price incentives can be considerably high (the last years being the most outstanding example) but other factors are required also. We distinguished three important variables:

(i) Interest rates: the traditional crop sector appears to be highly sensitive to the cost (and availability) of credit. This aspect was neglected during most of the second reform.

(ii) Land tenure: a land reform programme which is not followed by appropriate technical assistance to the new farmers may severely constrain agricultural output. This was important during the first reform and the beginning of the second.

(iii) Long-term expectations: expansion in sectors like fruit plantations requires significant amounts of investment and hence permanent attractive incentives are foreseen. Expectations may be negatively influenced by domestic policies which are not consistent in the long run (as in the first reform), or by the fact that current incentives appear to be the result of a transitory international shock (as in the first part of the 2nd. reform).

(3) As a consequence of (1), specific protection of agriculture appears to be either ill-defined or to be the consequence of pressure groups in the agricultural sector.

(4) As a consequence of (iii), if terms of trade remain low and if liberalization in

the nonagricultural sector is maintained, we should expect a continued growth of agricultural exports, with the only restriction being the availability of international markets.

## NOTES

<sup>1</sup>This relationship assumes the existence of a representative urban worker having a Cobb-Douglas utility function in agricultural and nonagricultural goods. However, this assumption can be relaxed if we allow  $a$  to vary over time. If that is the case, it suffices to assume that the representative urban worker has a utility function weakly separable in agricultural and nonagricultural goods with each one of the sub-utility functions being linearly homogeneous in its components.

<sup>2</sup>At least in the short run when fixed coefficients in the production function may hold.

<sup>3</sup>Note however that since  $a$  is around 0.5, and the rise in  $Pa/Pna$  is about 35 per cent, the increase in  $W/P$  was much more important than the increase in  $Pa/Pna$ .

<sup>4</sup>According to Hurtado *et al.* (1987), Chapter 3, table 3C-4, public investment in agriculture during 1964–1970 increased by more than 100 per cent with respect to previous years (1960–1964).

<sup>5</sup>The elasticity of the RER with respect to  $t$  has been estimated at a level that ranges from 0.55 (Sjaastad, 1981) to 0.28 in absolute value (Hurtado *et al.*, 1987).

<sup>6</sup>The reasons for this fall in the rate of interest are beyond the scope of this study. However, it seems that the main factors underlying this evolution were the reduction in international interest rates and modifications in financial regulations.

<sup>7</sup>One should take these estimates very cautiously. As was explained, this second reform experience is comprised of three different subperiods so that a 'long run' growth rate is difficult to interpret.

<sup>8</sup>Milk producers have complained that they have to face 'unfair' competition from the subsidized products coming from the European Community. This is true, but since those subsidies have remained throughout the years it is natural to ask why the country should continue to protect the milk sector.

## REFERENCES

- Banco Central de Chile, 1983, *Indicadores Economicos y Sociales 1960–1982*, Direccion de Politica Financiera, Banco Central de Chile, Santiago.
- Banco Central de Chile, *Boletines Mensuales*, Direccion de Politica Financiera, Banco Central de Chile, various issues.
- Cleaves, P., 1974, *Bureaucratic Politics and Administration in Chile*, University of California Press.
- Hurtado, H., Muchnik, E. and Valdés, A., 1984, *A Comparative Study of the Political Economy of Agricultural Pricing Policies: The Case of Chile*, World Bank, Washington, DC.
- Krueger, A., Schiff, M. and Valdés, A., 1984, *A Comparative Study of the Political Economy of Agricultural Pricing Policies: A Framework for the Country Studies*, World Bank, Washington, DC.
- ODEPLAN, 1968, *Plan de Desarrollo 1965–80*, Oficina de Planificacion Nacional, Republica de Chile, Santiago.
- Sjaastad, L. A., 1981, 'La Proteccion y el Volumen de Comercio en Chile: La Evidencia', *Cuadernos de Economia*, No. 54–55, Universidad Catolica de Chile.

## DISCUSSION OPENING – LOVELL S. JARVIS

Pablo Barahona and Jorge Quiroz have prepared an interesting paper regarding the aggregate price response of the Chilean agricultural sector during the last 30 years. They conclude, based on a larger study by Hurtado, Muchnik, and Valdes to which the authors contributed as research associates, that the price response demonstrated by the agricultural sector has varied significantly over the period. They argue that this variation depended on several factors: (1) the degree to which producers during different subperiods expected that existing prices would prevail in the future, that is, the expected permanency of government policy; (2) the structural changes brought about by land reform, which affected land ownership and thus the quality of agricultural management; and (3) the availability and terms at which agricultural credit was offered.

There has been little work on price policy in Chilean agriculture since 1965, despite dramatic variations in both real agricultural prices and agricultural output. This paper, and the broader research on which it is based, forges new ground in this area. The authors' work involves some innovative modelling, both of the factors which have affected the relative agricultural/nonagricultural price – principally the real exchange rate, international prices, the degree of domestic protection and domestic absorption, and regarding the sector's price response itself. The general conclusions of the paper, mentioned above, seem quite reasonable. Nonetheless, it is disappointing that more of their research was not presented. The authors provide a number of key economic data series and discuss the factors which they believe lie behind the trends shown in such series, but do not present the formal model by which price response was measured, nor the statistical results which they obtained. As a result, it is difficult to judge whether their conclusions are fully supported by their work.

With this caveat, I shall confine my comments to one main point. I am sceptical that agricultural prices were as high during the post-1974 period as their series show, and thus am concerned that their results concerning the variability of price response over the period may be biased. The quality of Chile's agricultural price data for much of the period covered is poor. Different government agencies, such as the Ministry of Agriculture, the National Institute of Statistics, and the Ministry of Planning, have published data which are contradictory and which sometimes appear at odds both with declarations by producers and their representative organizations and with the behaviour of the sector (Jarvis, 1986). Thus, although I am certain that the authors have exercised the utmost care in their treatment of the available data, it may be that their price series inadequately captures the changes in the price incentives facing farmers over the period of study.

The relative price series for agricultural and nonagricultural goods within Chile, shown in column (1) of the authors' Table 1 and 2, suggests that farmers experienced improved prices during both the Frei Administration and the Military Government, but that those during the post-1974 period were extraordinarily favourable. The apparent improvement is especially evident if the data in Table 2 are scaled to the same base (1960–4 = 100) as that used in Table 1.

Agricultural producers apparently faced a relative agricultural/nonagricultu-

ral price which, compared with that in the 1960–4 period, averaged 21 per cent higher during the Frei Administration (1965–70), and 117 per cent higher during the Military Government (1975–86). The latter increase is of a magnitude which stretches the imagination. Nonetheless, the average growth rate of agricultural value added during the Frei Administration was 3.4 per cent per year while that during the Military Government was 2.9 per cent. In both periods the sectoral growth rate exceeded that for the 25 years prior to 1965, which was about 2 per cent per year, but it seems hard to understand how the relative price could have improved so dramatically during the post-1975 period and yet have produced a growth rate which was lower than that during 1965–70.

To press the price issue further, the relative price averaged nearly the same (115 per cent versus 123 per cent, respectively, above the 1960–4 average) during the first subperiod of the Military Government, 1975–82, and the second, 1983–6, yet the growth rate during the first of these subperiods was only 1.5 per cent per year, while that during the second period was 7.1 per cent per year.

Relative prices also apparently remained very high during the crisis years 1982–3, when declining international agricultural prices and a declining real exchange rate placed great pressure on the bulk of Chilean farmers. The relative price series shows that the relative price remained nearly 70 per cent and 30 per cent higher than during the 1960–4 and 1965–70 periods, respectively. Interest rates were high during this period, but lower than they had been during the years 1975–8. The public and private pronouncements of agricultural producers during the period 1978–82 indicated that the sector suffered from low prices and, as the authors' data show, agricultural production declined steadily over this period, from a positive to a negative rate of growth. (The fruit sector continued to grow rapidly, but it accounted for less than 10 per cent of sectoral output.)

Were prices as high as shown relative to the pre-1974 period, it seems reasonable that production should have continued to grow during this period, particularly as real agricultural wages in the period cited remained substantially below those in the pre-1965 period (Jarvis, 1986). Import tariffs had also fallen, allowing access to cheaper imported capital goods. I find it difficult to explain the decline in agricultural production unless the relative price was in fact lower than shown during the period in question, or unless – due to the decline in the real exchange rate during this subperiod and the previous decline in import tariffs – the relative agricultural/nonagricultural price fails to capture the deterioration in the price relationship farmers faced.

It is precisely these variations in sectoral price response that the authors wish to explain with their model, via the effect of changes in land reform and government credit and technical assistance policies. I agree with their assessment that these factors had an important effect. Interest rates on agricultural credit rose greatly after 1974 and credit and technical assistance policies were additionally biased against small farmers, including the land reform beneficiaries during 1975–80, which slowed agricultural growth (Cox, 1985; Gomez, 1986; Jarvis, 1986 and 1988). However, I doubt that overall growth during the first 10 years of the Military Government would have been so low if agricultural prices were really as high as the author's price series show. Perhaps, however, the authors are correct; I am now doubly interested to read the larger study to which they have contributed.



REFERENCES

- Cox, Maximiliano, 1985, 'Políticas y evolución del sector agro-rural en el periodo 1974-82', in Cox, M. (ed.), *Agricultura chilena, 1974-82: políticas, evolución y campesinado*, Desarrollo Campesino, Santiago.
- Gomez, Sergio, 1986, 'Polemicas recientes sobre el sector agrario', Programa FLACSO, Documento de trabajo, no. 300, Facultad Latinoamericana de Ciencias Sociales, Santiago.
- Jarvis, Lovell S., 1986, *Chilean Agriculture Under Military Rule: From Reform to Reaction, 1973-80*. Institute of International Studies, University of California at Berkeley.
- Jarvis, Lovell S., 1988, 'The Unraveling of Chile's Agrarian Reform, 1973-6', in Thiesenhusen W. (ed.), *Agricultural Structure and Land Reform in Latin America*, Allen and Unwin.