

# DANISH LONG-TERM EXPORT CONTRACTS AND AGRICULTURAL PRODUCTION

By J. CARTER MURPHY<sup>1</sup>

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a single wholesale butter price and a single price to bacon factories at any one time. From 1945 to 1947 factory prices were established by law and supported by subsidies, but after November of the latter year prices generally varied with the average return obtainable on foreign markets. The bacon quotation (*landsnoteringen*) was established after 1947 by a committee appointed by the Cooperative Bacon Factories' Association; the butter "accounting price" (*afregningsprisen*) was announced by the Dairy Industry's Butter Export Board (or its predecessor, the Ministry of Agriculture's Butter Export Board<sup>4</sup>). These quotations were the basis for preliminary settlements between the cooperative creameries and bacon factories, on the one hand, and the farmers, on the other, and were undoubtedly the product prices farmers considered in arriving at production decisions. Of necessity these quotations determined domestic wholesale prices, with the exception of the periods when legal ceilings were effective<sup>5</sup>.

Bacon and the other major pig products were exportable only by the Export Bacon Factories' Sales Association<sup>6</sup>, which was the residual buyer, at the national quotation, of bacon which could not be sold domestically. Private and cooperative dealers in butter might sell in certain foreign countries to which butter exports were from time to time "liberalized" as well as on the home market, but in the former instances they were required to pay a levy on sales which insured that no exports yielded independent sellers a higher unit return than the "accounting price" at which the Butter Export Board was the residual buyer. Proceeds from all sales by the Board, as well as those from levies, were assembled in the butter "pool."<sup>7</sup> During

4. The official agricultural export boards set up to administer export licensing under the Agricultural Export Law of 1932 ended with the termination of that law in 1950. The functions of the boards were taken up at that time by industry organized agencies.

5. Wartime price control and rationing of bacon ended on November 19, 1949. Bacon factories received subsidies to compensate for the difference between local prices and the national quotation as long as these controls lasted. Butter price ceilings ended in May, 1948, although butter rationing continued until November, 1950. Butter traders, too, were compensated for sales on the domestic market to bring the return on such sales up to that obtainable from export. Price controls were restored to local butter and bacon sales from June, 1951, to May, 1952, but compensation to processors and wholesalers had to be paid out of the working funds of the export organizations on this occasion since no aid was forthcoming from the government.

6. Before June, 1950, bacon was sold by the Association's predecessor organization, the Ministry of Agriculture's Bacon Export Board. Managers of bacon factories were free to dispose of pig products on the domestic market as they pleased, but they might not export bacon, porkers, frozen pigs, sows, or lard.

7. Although figures were not regularly published, the pool seems to have been about 53 million kroner in November, 1948; it grew to 80 million kroner by April, 1950, and, in spite of being drawn upon during the inflationary price squeeze of the summer of 1950, it was slightly over 80 million kroner in March, 1953.

periods when the pool's size was unchanging the accounting price was a reflection of the average butter prices obtained on export markets.

The first Anglo-Danish contract involving Danish delivery commitments and multi-year guarantees by the British was signed in the summer of 1946. The British Ministry of Food at that time agreed to pay 150 s. per cwt. (kr. 2.85 per kg.) for bacon, in place of the 130 s. then in effect<sup>8</sup>, and 220 s. (kr. 4.18 per kg.) for butter, replacing the current 190 s. price. In return for these price increases and pledges by the British to purchase agreed quantities of bacon at minimum prices through September, 1949<sup>9</sup>, Denmark pledged specific deliveries of both bacon and butter for the remainder of the current production year and for the whole of the production year October, 1946-September, 1947<sup>10</sup>. This contract was amended, however, by negotiations in the winter of 1947<sup>11</sup> to permit somewhat higher prices. The bacon price for February-September, 1947, was raised to 161 s. per cwt. (kr. 3.06 per kg.), and the guaranteed minimum price for the following

8. Between the summers of 1945 and 1946 there was a price agreement between the Danish and British governments calling for a scheduled reduction of the wartime Danish prices to those the British currently were paying Dominion suppliers. Without delivery commitments during this first post-war year, however, Denmark was free to sell butter and bacon elsewhere in food hungry Europe at prices above those Britain offered.

9. The Ministry of Food promised to take 90 per cent of Denmark's bacon "export surplus" in the production year October, 1947-September, 1948, and up to 100,000 long tons in 1948-49. The minimum bacon price assured in 1947-48 was 142s. 6d. per cwt., and that for 1948-49 was 120s. Both governments agreed that butter prices and quantities would be discussed in 1947-48 and 1948-49 before Denmark contracted to sell elsewhere.

10. The delivery promises for the whole of calendar 1946 were 40,000 long tons of bacon and 43,000 long tons of butter plus 90 per cent of any butter exports beyond 77,000 long tons. The commitment for the first nine months of 1947 was 90 per cent of the bacon exports and 62½ per cent of the butter exports up to 73,000 long tons plus 90 per cent of any additional butter exported. Among the non-price factors in these negotiations was the Danish desire for the traditional exports again to be distributed in England under the „Lur” brand. Among the price factors was the British demand that the krone be more realistically valued. Neither of these demands explicitly yielded fruit.

11. Negotiations were reopened under the "revision clause" of the July protocol which stated that, "if the conditions which influence Danish agricultural production should undergo a very substantial change, . . . each of the governments . . . will be willing to consider to what extent a change in the price of any of the . . . commodities for the rest of the named period is justified." The changed conditions of the autumn and winter of 1946-47 were the rapid inflation of world prices and the large accumulation of kroner holdings by the Bank of England. An interesting element in these negotiations was the Danish demand for compensation because the U.K. had bid up the price of Argentine oilcake while product prices paid Denmark made its use in feeding unprofitable. The British paid 14 million kroner.

production year was raised to the same level; the butter price was raised to 242 s. per cwt. (kr. 4.60 per kg.)<sup>12</sup>.

In the autumn of 1947 the butter and bacon Export Boards were permitted for the first time to carry out the Ministry of Food negotiations for their respective products without the participation of Danish government representatives. The producer-dominated boards were on this occasion not only unwilling to accept the British price offers, but they refused to continue shipments on account until a price settlement could be reached, and butter and bacon were diverted to the continent. In February, however, the British yielded to a price increase of 33 per cent for butter (to 321 s. per cwt., kr. 6.12 per kg.) and 40 per cent for bacon (to 225 s. per cwt., kr. 4.28 per kg.) for the remainder of the production year<sup>13</sup>. The Danish pledge to deliver bacon, furthermore, was reduced to 80 per cent of exports and that for butter was fixed at 40,000 long tons.

In September, 1948, the first "typical" long-term contract for bacon was signed. According to it, the current price was projected forward for another year, the price of the succeeding year would be no higher and not more than 7½ per cent lower, and prices during the final two years of the four-year contract would be restricted in the annual negotiations to movements of 7½ per cent, upward or downward. The Danes pledged delivery to the Ministry of Food of not less than 90 per cent of the Danish export surplus, and the British agreed to accept all bacon delivered at the agreed price<sup>14</sup>. Discussions of a long-term contract for butter foundered on price and quantity provi-

12. Denmark agreed to "try" to export 75,000 long tons of bacon in the 1947-48 production year, and the government undertook to retain the arrangements by which pig producers were provided domestic grain on advantageous terms as well as to insure that producers actually received the full price increase for bacon. The British, on their part, agreed to pay 268s. per cwt. for such "extra" butter as Denmark could export before September by limiting the fat content of cheese and cream, 90 per cent of such extra exports to be delivered to the U. K.

13. All of the post-war Anglo-Danish agreements concerning Danish agricultural exports up to and including those of 1948, and again those of the spring of 1951, were signed as parts of broader trade agreements covering various aspects of trade. In these agreements the Danish government was continually seeking British pledges of more generous iron, coal, and steel deliveries and promises to permit freer convertibility of Danish sterling earnings. After allowing Danish agricultural leaders to carry forward their own negotiations in 1947, however, the Danish government made no serious effort to make export bargains dependent upon import ones, and Denmark was never outstandingly successful in obtaining British supply or convertibility promises.

14. The contract did not provide for contingencies in which agreement on price might not be reached. Likewise, nothing was specified as to the timing of the delivery of the bacon throughout the year. "Bacon" was to include pig-meat "suitable" for preparation of bacon for the U. K. market.

sions, and only a one-year contract for 60 per cent of the export surplus at the current price could be agreed upon.

Bacon negotiations for the second year of the 1948 bacon contract ended on a compromise. The Danes bargained to leave the price unchanged; the British wanted the full permissible  $7\frac{1}{2}$  per cent reduction. In the end the pricing period was shifted from the production to the calendar year, the price remaining unchanged for the remainder of 1949 and being reduced half of the permissible reduction for the entirety of 1950.

The six-year long-term contract for butter originated in 1949. It called for delivery to the U. K. in each production year, October, 1949—September, 1955, of 75 per cent of Denmark's total butter export, though not more than 115,000 long tons in any year<sup>15</sup>. The price for the first year was almost 16 per cent below the pre-existing price, and price movements in each subsequent year were to be limited to  $7\frac{1}{2}$  per cent, either way, from the preceding year's price<sup>16</sup>.

15. About 10 per cent more than total Danish butter exports in calendar 1948.

16. The first-year price was 271 s. 6 d. per cwt., which was kr. 5.17 per kg. The contract made no specifications as to butter quality other than it should be "Lur" brand. Neither did it specify any timing for butter deliveries throughout the year—an especial advantage for Denmark since the Export Board was left free to sell valuable winter butter in third countries and to fulfill contract obligations with less valuable spring and summer butter. It is interesting that there was no serious opposition to long-term contracts in Denmark at the time of the butter negotiations. Not only did farmers eagerly seek such a contract for butter in spite of low price offers, but *Dagbladet Børsen*, later the mouthpiece of vociferous criticism, admitted that "a several-year agreement has stimulated the production of bacon", and with regard to butter, "It must not be denied that, in so far as a favorable price basis can be found, an agreement for a longer period will offer considerable advantages". "Vigtige Smørforhandlinger", *Børsen*, May 30, 1949. Danish reaction to the terms of the contract mixed disappointment over the low price quotation with relief in a secure market outlook. See, for example, "Den nye Smøraftale blev et Chock for Landbruget", *Børsen*, June 28, 1949, and *30te Beretning om Landbrugsraadets Virksomhed* (Copenhagen: Landbrugsraadet, 1950), p. 84.

The butter and bacon contracts ratified by both governments in the summer of 1949 were to be incorporated in the fall of that year in a new general trade agreement. But the devaluation of sterling by 30.5 per cent only a few days before the talks were to begin caused negotiations to be temporarily postponed. In October meetings U. K. representatives are said to have agreed, in response to direct questioning, that British coal prices to Denmark would not be raised pending further trade negotiations. (See *30te Beretning om Landbrugsraadets Virksomhed*, p. 107). Nevertheless, in the last week of October the coal price was raised some 8 per cent (the Minister of Fuel said he should follow business-like practices), and the British simultaneously announced that they could not recognize the "revision clause" of the 1948 trade agreement as an excuse for reopening discussion of butter and bacon prices agreed upon in the summer. In the end, the negotiated conditions of trade between the two countries remained essentially unchanged for twelve months following the devaluations, despite the Danish attempts to revise them.

In December, 1950, the bacon pricing period was restored to the production year, and a  $5\frac{1}{2}$  per cent price increase was agreed to for January-September, 1951. Butter Negotiators were unable to agree on price terms in September, 1950, and shipments continued only on an "on account" basis until the British conceded a retroactive  $7\frac{1}{2}$  per cent price rise the following April. The March-April meetings also resulted in a further 2 per cent increase in the contractual price of bacon, retroactive to first of January.

In view of steadily declining bacon production in the summer of 1951 Britain made a price offer which was outside the limits of the long-term agreement taking the form of an option between a straight price increase of 15 per cent, and an increase of  $12\frac{1}{2}$  per cent for 110,000 long tons with a premium some 28 per cent above the current price for deliveries beyond the base amount. Bacon negotiators accepted the dual-price arrangement<sup>17</sup>. The Danish butter negotiating team is reported also to have sought a price increase beyond the contractual limits. But it was compelled to settle for the  $7\frac{1}{2}$  per cent permissible increase (to 291 s. 10 d. per cwt., kr. 5.60 per kg) plus the removal of the upper limit (115,000 long tons) on the amount the British would guarantee to buy at the contract price.

Bacon negotiations in the summer of 1952 involved replacement or renewal of the 1948 contract which then faced expiration. The Danes sought another four-year contract with present favorable prices sustained; the British declared themselves favorable only to a one-year contract with a 10-15 per cent price reduction. The settlement yielded a two-year contract with first year prices down some 8 per cent (to 252 s. 6 d. per cwt., kr. 4.81 per kg.) from the average price paid under the dual-price arrangement of 1951-52. Denmark was again obligated to sell 90 per cent of its bacon exports, but the price "swing" applicable to the second year of the agreement was widened from  $7\frac{1}{2}$  per cent to 10 per cent<sup>18</sup>. The price of butter was raised  $7\frac{1}{2}$  per cent in 1952 to 337 s. per cwt. (kr. 6.42 per kg).

The 1952 bacon contract was replaced by a new three-year agreement (the last of the long-term contracts) in 1953. Danish bacon producers again accepted a substantial price decline— $7\frac{1}{2}$  percent—in return for the assured market, but perhaps more importantly, they had to accept a ceiling on the

17. They estimated they would ship more than the 130,000 long tons which would equalize the per unit return on the two offers. The price paid was 262 s. 5 d. per cwt. (kr. 5.00 per kg) for the first 110,000 long tons and 300 s. per cwt. thereafter. Shipments actually came to over 146,000 long tons during the year.

18. The new Conservative government in Britain insisted upon inserting a clause permitting the Ministry of Food to assign its rights to private importers. This clause was not implemented, however, either under this contract or that of 1953.

U. K. commitment to purchase, a turn events they long had tried to avoid<sup>19</sup>. The price swing applicable to succeeding years remained at 10 per cent. With regard to butter in this fifth year of the long-term agreement, the price again rose, but this time by only 2 per cent—the first rise of less than 7½ per cent since the six-year contract was begun.

In the second year of the final bacon contract the price remained unchanged, but the ceiling on deliveries was raised to 240,000 long tons in place of the 200,000 scheduled. At least equally important, the minimum delivery commitment for Denmark, which had been 90 per cent of exports since 1948, was changed to a specific commitment of 4,000 long tons per week. In the terminal-year negotiations under the butter contract the Danes rejected an offer to end that agreement and accepted a 3¾ per cent price reduction to 332 s. 1 d. per cwt. (kr. 6.32 per kg.)<sup>20</sup>. The basic agreement for butter was never modified, therefore, throughout its six-year duration except for the removal of the specific maximum purchase commitment in 1951.

The 1953 bacon contract was amended once more in its final year to link the contractual price of bacon to the wholesale price on the British market<sup>21</sup>. Danish producers were given a guaranteed minimum price of 240 s. per cwt., supplemented by any amount by which the British price should exceed 270 s.<sup>22</sup> The maximum quantity provision was reduced from the 240,000 long tons of 1954-55 to 208,000 tons<sup>23</sup>, and the minimum delivery commitment was restored to 90 per cent of Denmark's exports.

19. In each production year Denmark was to send to the U. K., and the U. K. was to buy, 90 per cent of the Danish bacon export surplus, but the maximum obligation to sell or buy in 1953-54 was set at 230,000 long tons (the estimated shipments of 1952-53), and for each of the two succeeding years it was set at only 200,000 long tons. The price was 233 s. 6 d. per cwt. (kr. 4.45 per kg.).

20. In contrast to the Danish action, New Zealand terminated its long-term butter contract in 1955, one year before expiration. Danish producers might by termination have gained some of the profit the Ministry of Food had been earning on Danish butter since removal of British price control in May, 1954, but there was some fear among Danish producers that the British wholesale price might drop when the Ministry of Food liquidated its Danish butter holdings, and, furthermore, butter from Denmark, unlike that from New Zealand, would be subject to the U. K. tariff of 15 s. per cwt. when the contract lapsed.

21. British price control and rationing of meat and bacon had been lifted July, 1954.

22. Since the average price of the three grades of Danish bacon on the British market was 326 s. per cwt. at the time the contract took effect, the net price to Denmark at this time was 296 s., an increase over the previous year's price of 24.6 per cent. Danish bacon grading was resumed in 1952, although none of the British contracts specified bacon by grade.

23. This was still better than the 200,000 tons the long-term agreement allowed.



### III. Expectable Contract Results

A theoretical analysis of the impact which contracts have had on production must take account of two different kinds of effects: (1) effects on relative price-cost ratios, and (2) effects on the certainty with which production decisions have been made.

The first type of effect needs little discussion. When inflations or inflationary expectations occur which are not discounted in the contracts, stabilized butter and bacon prices have a tendency to retard production of these products and divert resources elsewhere. When deflationary changes occur contracts tend to foster production.

In regard to effects on certainty, the analysis is more complicated and inconclusive. I take the certainty with which producers reach decisions regarding the commitment of resources to be in part a function of the range through which they expect the profit margin on the use of those resources to vary during the period for which the factors are committed. If contracts reduce the amplitude of movement of price-cost relations during appropriate decision periods they probably contribute to producers' "certainty". The Anglo-Danish contracts, however, have reduced the movements of product-prices without directly stabilizing cost-prices. Whether this can be expected to have increased profit predictability depends on the pattern of "normal" relations between product- and cost-prices<sup>24</sup>. In considering some effects on certainty, it is useful to divide production decisions into those of the short-run and those of the long-run, following Marshall's usage.

Uncertainty arises in the short-run production decision relative to bacon largely because of the possibility that the pig-barley price ratio will move adversely for the producer during the ten months between breeding the sow and slaughtering the finished pig. An examination of 134 such ten-month periods between 1926 and 1937 suggests that the "normal" pattern of pig-barley price variations is such that stabilizing the price of pigs within limits of  $7\frac{1}{2}$  per cent gives producers greater certainty that a profitable current pig-barley price ratio can be used to predict a profitable pig venture<sup>25</sup>.

24. If it were "normal", for example, for cost-prices to move in the same direction and as flexibly as product prices, stabilizing the latter might destabilize profit margins.

25. Specifically, I compared the difference in pig prices between the first and eleventh months with the difference between the barley price of the first month and the average barley price for ten months. To the extent that feeding is heaviest in the final months of production my procedure probably underestimates variations in costs. The results, however, were as follows: (1) the bacon and barley prices moved in opposite directions as often as they moved together; and (2) limiting the price of bacon to movements of  $7\frac{1}{2}$  per cent had a stabilizing effect on the bacon-barley ratio in 92 of the 134 cases, no effect in 37 cases (mostly during the pig control period after 1934), and a destabilizing effect in only 4 cases—3 per cent of the total.

The production period for butter is less easy to identify than that for pigs. Dairy herds are built up and depleted chiefly through delaying or hastening the final disposal of producing and potentially producing animals. The decision concerning whether to feed or to dispose of an animal depends upon a comparison of its capitalized potential net earnings with its present disposal value, and uncertainty arises in the assessment of future net income, gross income being approximately 75 per cent from milk. To gain some idea of the significance of butter price stabilization to Danish milk producers, I have adjusted the income from milk calculated by Det Landøkonomiske Driftsbureau for the decade of the 1930's so as to limit change to no more than  $7\frac{1}{2}$  per cent per year and then have compared the net income from dairying obtained from this adjustment with the net income obtained from the actual market. The result of the procedure was that the adjusted income from dairying was somewhat more stable than the actual income earned<sup>26</sup>. Although far from ideal, these data suggest that milk producers, too, may properly have thought themselves able to make more certain decisions when long-term contracts were available. Furthermore, since the Anglo-Danish contract has not stabilized the price of milk, but only that of butter, the existence of alternative uses for milk has given the contract something of the aspect of a "floor" price for milk without being at the same time a "ceiling"<sup>27</sup>.

In order to extend the consideration of price-cost effects to longer-run investment decisions, I have assessed the effects of some assumed contracts during 1918/19-1945/46 on the net income of agriculture then. Limiting the changes in gross farm income, given by Det Landøkonomiske Driftsbureau, to  $7\frac{1}{2}$  per cent per year resulted in a reduction in the range of movement of the "family income from a debt-free holding"<sup>28</sup> to little more than half the movement of the actual family income<sup>29</sup>. This suggests that the net income from farming and farm investments becomes more predictable when shifts in farm gross income are limited. In addition, income receives some upward bias when only few farm products are obligated and to the extent that production flexibility exists, for farmers are able to exploit contracts

26. Whereas the highest annual net return in the unadjusted accounts was almost 200 per cent of the lowest and the average change in annual income per animal was kr. 21.40, in the adjusted accounts the highest net return was only 160 percent of the lowest and the average change in income per animal was kr. 15.60.

27. To the extent that meat prices fluctuate with feed prices, the market for meat nicely supplements a milk-product contract, for if cost prices rise, meat provides a hedge, and if cost prices fall, the milk-product contract becomes more profitable.

28. Gross farm income less operating cost other than family labor.

29. The mean annual change in the adjusted income was 30 per cent less than that of the actual income.

when they are favorable and avoid them through production shifts when they pinch.

Another area in which contracts may have contributed to longer-run certainty is in the assurance exporters gained that the United Kingdom would not impose restrictive quotas or duties on the Danish products while the purchase contracts were effective.

From several points of view, on the other hand, one must argue that contracts may have discouraged production expansion and even increased uncertainty. Perhaps the most important aspect of international commodity contracts which is frequently overlooked is the effect of selective commodity price stabilization on inter-product price relationships. In holding some prices stable when other prices are rising or falling, contracts create uncertainty on the part of producers as to what will be most profitable, or least unprofitable, to produce<sup>30</sup>. The long-run production adjustment to such a state must surely be uneconomic diversification. Furthermore, when what the contracts stabilize is an unsatisfactory price-cost relation, greater price-cost stability may be expected to reduce output, rather than expand it. It must also be remembered that price-stabilizing contracts can enhance the effects on income of certain types of disturbance, particularly those from the side of supply and sometimes from movements of international exchange rates. And much of the value of increased certainty may be capitalized into the value of land and realized through sale.

Summarizing the effects of Anglo-Danish contracts on the certainty of production decisions, I conclude that some increased certainty probably resulted, although its expansive effects on production<sup>31</sup> must be expected to have been partially offset by tendencies to diversification, occasional unfavorable price relationships, and realized changes in the capital values of farms.

#### IV. The Danish Experience

Such theoretical conclusions are difficult to verify in a satisfactory way. Production certainly did expand in the early years of the price-stabilizing arrangements, but, as we shall see, the effects of the long-term contracts are clouded by effects of changing harvests, varying international feed prices, currency devaluations, and complicated changes in expectations resulting from the outbreak of hostilities in Korea.

Some data relevant to an assessment of the effects of contracts on prices are given in Table 1. The question which is likely of most interest here is to

30. From the social point of view, the short-run effects of differentials in price rigidity are misallocation of resources and misdirection of consumption.

31. If, indeed, certainty is expansive!

*Table 1*  
*Annual Prices, Butter and Bacon, Farm Operating Costs, and Indexes of U. K.*  
*and Danish Wholesale Prices, 1945-1955<sup>a</sup>*

Year (1)	Producers' Quotation		Total Farm Operating Cost <sup>d</sup> (Kr. per hectare) (4)	Wholesale Price Index	
	Butter <sup>b</sup> (Kr. per kg.) (2)	Bacon <sup>c</sup> (Kr. per kg.) (3)		Denmark (1953=100) (5)	U. K. (1953=100) (6)
1945.....	4.33	2.68	762	62	52
1946.....	4.21	2.68	802	62	53
1947.....	5.04	3.18	872	68	58
1948.....	6.50	3.94	955	74	67
1949.....	6.24	4.07	1065	76	70
1950.....	5.71	3.91	1200	86	80
1951.....	5.59	4.24	1362	109	97
1952.....	6.18	4.47	1496	107	100
1953.....	6.62	4.12	1596	100	100
1954.....	6.66	4.01	1616	100	101
1955.....	6.75	4.10	1703	103	104
1956.....	6.58 <sup>e</sup>	4.52 <sup>e</sup>	....	107 <sup>f</sup>	107 <sup>f</sup>

<sup>a</sup> Source: *Statistisk Årbog*, 1945-1956.

<sup>b</sup> Accounting price, including subsidy, 1945-49. Butter Export Board's accounting price thereafter.

<sup>c</sup> Quotation of the Cooperative Bacon Factories' Association.

<sup>d</sup> Data of Det Landøkonomiske Driftsbureau, excluding labor of employer and his family. Farm accounting years are from summer to summer and are shown here according to the date of the latter half of the accounting year. Thus, accounts for 1954/55 are shown here as for 1955.

<sup>e</sup> Mean monthly average, January-September.

<sup>f</sup> Mean monthly average, January-June.

what extent contracts imposed an effective price restraint during the inflation of 1950-52. Whereas the butter price paid by the British fell some 16 per cent for the production year 1949-50 and was raised only 7½ per cent annually for the next four years<sup>32</sup>, and whereas the bacon price was reduced (prior to devaluation in 1949) 3.7 per cent for the entirety of 1950, and was raised only 7½ per cent in the first nine months of 1951, Table 1 shows that the general index of wholesale prices, in the U. K. as well as in Denmark, rose by no less than 43 per cent between 1949 and 1952. Probably more

32. The low average quotation for calendar year 1951 shown here reflects the failure to arrive at agreement with the British until April and probably some influence on the Export Board of reimposition of domestic price controls in June.

important, the total costs of Danish farm operation per hectare, as given by Det Landøkonomiske Driftsbureau, rose steadily and, in each year through 1951/52, by more than 7½ per cent<sup>33</sup>. These developments suggest some price restraint being exercised by the long-term contracts. On the other hand, however, one cannot with certainty identify restraint with the contracts, for prices in other countries also showed only limited gains. Although wholesale butter prices in France rose 50 per cent between 1949 and 1952, in Germany the rise was only 22 per cent, in Switzerland it was 8 per cent, Belgium, 3 per cent, and in Canada, none at all<sup>34</sup>. The premium over the U. K. price which Denmark obtained from sale of butter on secondary markets rose from kr. 1.76 in 1949 to kr. 2.61 in 1950, but it declined to kr. 1.75 in 1951 and to kr. 1.58 in 1952<sup>35</sup>. Pig prices obtained on secondary markets likewise only improved 14 per cent and were, on the average, less each year than the U. K. price. The movements of prices in third countries, therefore, suggest that Danish prices might not have risen much more, had there been no long-term agreements. Nevertheless, taking into account (1) the developments in production (to be examined below), (2) the usual rather low elasticity of demand for the Danish products in Britain, (3) the fact that the butter price was raised by the full permissible increase in all these years, (4) that in 1951-52 the bacon contract was broken to permit higher prices, and (5) that price developments in third countries need to be discounted as measures of market strength because of the general reimposition of price and trading controls in 1951, I conclude that the contracts probably limited butter price rises in 1950, 1951, and 1952 and bacon price rises in 1950 and 1951.

Some material concerning effects on production is set out in Table 2. It will be seen that bacon production grew in every year after the 1946 long-term bacon contract, with the exception of the years 1948 and 1952. Butter production expanded in three but declined in three of the six years following 1949. The question with which we are concerned is to what extent these changes can be attributed to stimuli from the contracts alone.

33. Operating costs in 1946/47 were 8.7 per cent over those of the previous year, and subsequent percentage increases to 1951/52 were 9.5, 9.4, 12.7, 13.5, and 9.8, respectively. Total cost increases after 1947/48, with the exception of 1951/52, however, reflect in part expanding livestock operations and not always rising per unit costs.

34. Calculated from Food and Agriculture Organization of the United Nations, *Yearbook of Food and Agricultural Statistics*, Vol. VII (1953), Pt. I, Table 107.

35. The secondary market premium which persisted throughout the butter contract was not itself evidence of a very favorable alternative foregone by Denmark in contracting 75 per cent of its exports to Britain. For not only was demand in secondary markets probably inelastic, but these markets have been rather seasonal. Whatever increased sales to third countries could have been obtained would likely have taken place in winter months, and not so much at the expense of U. K. deliveries as at the expense of imported oilcake.

A hypothesis which explains relatively well the annual changes in pig stocks and, with a time lag, bacon production is that stocks expanded when the pig-barley ratio was above a level of about 6.5. Stocks were reduced when it was below that level or falling toward it. The low level of the ratio between July, 1945, and June, 1946, in this way accounts for the decline in the number of sows between summer censuses. The steady rise of the ratio throughout the fall and winter of 1946-47, until it was above what is here suggested as the critical level in December, January, and February, accounts for the slight increase in the number of sows and total pigs between the July counts of 1946 and 1947 and in the bacon production of the year 1947. Between July and December, 1947, the pig-barley price ratio fluctuated around 6.0, and it did not rise above 6.5 to stay until the following April. As a result the number of sows declined slightly in the July 1948 census and the total pig population declined over 20 per cent. Bacon production in 1948 was the smallest of any postwar year. When the pig price showed a large

*Table 2*  
*Annual Production, Butter and Bacon, Harvest Yields, and the Bacon-Barley, Butter-Oilcake Price Ratios, 1945-1955<sup>a</sup>*

Year (1)	Butter Production (1000 metric tons) (2)	Bacon Production <sup>b</sup> (1000 metric tons) (3)	Ratio, Bacon Price to Barley Price (4)	Ratio, Butter Price to Oilcake Price (5)	Harvest Yield Per Hectare (in Feeding Units <sup>c</sup> ) (7)
1945.....	132.1	185.8	5.13	.....	40.1
1946.....	140.7	203.0	5.53	9.35	41.6
1947.....	125.2	210.8	6.11	9.15	32.6
1948.....	120.4	178.7	7.46	10.26	38.9
1949.....	155.9	276.5	9.86	13.35	43.3
1950.....	179.1	355.5	7.70	10.26	42.5
1951.....	168.1	395.3	6.58	8.62	42.7
1952.....	154.3	380.7	7.41	8.78	44.7
1953.....	172.7	478.4	8.94	10.87	47.4
1954.....	181.0	524.4	8.34	10.19	41.4
1955.....	164.3	531.8	8.38	....	42.8

<sup>a</sup> Sources: Cols. (2), (3), and (6) from *Statistisk Årbog*, 1946-56. Col. (4) calculated from Col. (3), Table 1, and free-market barley price (Copenhagen Exchange) given in *Statistisk Årbog*, 1946-56. Col. (5), data for years 1949-54, from *Statistiske Efterretninger*, January annual review issues, 1952-55; earlier years calculated from Col. (2), Table 1, and price of cottonseed cake given in *Beretning om Landbrugsraadets Virksomhed*, 1946-48.

<sup>b</sup> Pigs and pig meat marketed, by slaughtered weight.

<sup>c</sup> One feeding unit equals the feed value of 100 kg. barley.

and sustained rise over the barley price in the latter half of 1948 and the entirety of 1949, however, pig production underwent a dramatic increase. Between July, 1948, and July, 1949, pig stocks grew 85 per cent, and the number of sows grew 75 per cent. Pork production in 1949 was 54 per cent greater than in 1948, and in 1950 it was 28 per cent greater again. Pig stocks continued their rise throughout 1950 when the price ratio levelled off between 7.5 and 8.0, having tumbled during the first three months after devaluation of the krone from a peak of 11.1. Pig stocks declined at the summer census of 1951, and bacon production was down in 1952. The failure to feed sows through the spring and summer of 1951 appears to be due to the extremely high price of barley<sup>36</sup> which drove the pig-barley price ratio down from 7.0 in February to 6.6 in March and 6.2 in May. The slight rise in the ratio in the late summer months of 1951 (to 7.0 in September) stimulated only a little expansion in stocks which faded when the ratio fell to 6.4 in November, and it was not until the following spring that the stock of sows again began to grow substantially. A pig-barley ratio of 6.6 in February and 6.5 in March was adequate to start the expansion, and in April the ratio was nearly 7.0. Pig populations expanded steadily throughout 1952, 1953, and 1954 with only the slightest seasonal setbacks, and bacon production mushroomed accordingly. The pig-barley ratio was constantly above 7.3.

It therefore appears possible to explain much of the variation in bacon output in terms of the partial picture of price-cost relations expressed in the ratio of pig to barley prices. Since the effect of any contract-induced increase in certainty would be expected to enhance price-induced decisions, such an outcome is consistent with theoretical results, but taking account of price developments belies the easy conclusion that the expansion of recent years is due solely to market security. The bacon contracts, however, probably expanded production when costs fell and retarded it when costs rose, apart from any changes in certainty. The fixed bacon price in the spring and summer months of 1948, 1949, and 1952, for example, caused the pig-barley price ratio to rise sharply when barley prices declined, and production rose correspondingly. The failure to raise the contract bacon price by more than 7½ per cent in the first nine months of 1951 brought about a substantial production cut-back.

Variations in butter production during the period of the six-year contract are, for the most part, explicable in terms of price and harvest conditions. The second year of the contract, however, yielded an expansive movement that might be attributable to contract effects on certainty. The low stocks of dairy cattle in the spring and summer of 1948 and the low level of output

36. The subsidy to pig producers through allocation to them of part of the domestic grain crop at ceiling prices had ended in 1949.

in that year were probably the result of (1) the disastrous harvests of 1947 and 1948 and (2) the extraordinarily high price which oilcake reached in the intervening winter-spring. In the latter part of 1948, however, dairy herds began an expansion that carried through three years. The growth between the summer stock censuses of 1948 and 1949 and between 1949 and 1950 can be accounted for by the decline in the price of grain and oilcake, relative to butter, which made winter feeding more feasible and by the improvement in grazing in 1949. The reduction of cattle herds in the spring of 1950 is understandable in terms of falling butter-feed price ratios and a rapidly rising meat price—after removal of the meat price ceiling the previous November. The failure of producers to reduce their herds in the autumn of 1950, however, is not readily explicable in terms of current prices. In September and October of 1950 the butter-barley and butter-oilcake ratios were little better than they were in the same months of 1946 when there had been a marked reduction of herds<sup>37</sup>. Furthermore, in 1950 the price of meat was almost 50 per cent higher than in 1946 and declining. Dairy herds, nonetheless, grew slightly between the summer censuses of 1950 and 1951. Dairy developments during this period give some corroboration to the hypothesis that long-term contracts tended to expand production, although the existence of international feed rationing in 1946 and domestic feed rationing in both 1946 and 1950 makes comparison of production conditions difficult. Remarkably low butter-feed ratios, together with high meat prices, finally led to a broad reduction of herds in late 1951 and in 1952<sup>38</sup>. Then an improvement of price conditions in 1952-54 renewed the expansion of production<sup>39</sup>.

Farm family income per hectare of land, before payment of interest on mortgages, has been more stable in the first decade since the Second World War than it was in either of the successive decades between the World Wars. The mean annual per cent change in net income from a debt-free holding<sup>40</sup> during 1945/46-1954/55 has been only 9.7 per cent, and the maximum annual change has been 29.2 per cent<sup>41</sup>. In the corresponding period following the First World War the mean annual change was 24.2 per cent, and the maxi-

37. The butter-oilcake price ratio was 9.73 in October, 1950, and 9.43 in October, 1946.

38. Exports fell even more than production due to an increase in domestic consumption associated both with the low butter price and the end of butter rationing.

39. Butter production, however, has never regained its 1935-39 level. There has been a rather steady substitution of pigs for cattle in Danish agriculture since the end of the Second World War.

40. Calculated from data of Det Landøkonomiske Driftsbureau given in Det Statistiske Departement, *Statistisk Årbog*, 1946-56.

41. The maximum change was the increase in income which occurred between 1947/48 and 1948/49; in the succeeding year average farm family income per hectare of land grew another 19.2 per cent.



imum variation was 57.4; from 1928/29-1937/38 the mean change was 20.6 and the maximum 51.2. To the extent that long-term contracts restrained price rises in 1950-52, years in which farm family incomes were growing, they acted as income stabilizers, through not in the direction producers could appreciate.

Perhaps the most striking result of the limited price rises permitted butter during the inflation associated with the Korean hostilities is the stimulus given diversification in the dairy industry. Whereas in 1935-39 few Danish creameries were equipped for cheese production and only one-half of one per cent of Danish milk was sold for production of preserved milk, these lines have developed rapidly in the postwar period, and pressure on profit margins in butter during and after 1950 strongly accelerated the movement. While milk production contracted 7.5 per cent from 1950 to 1952 the absolute quantity of milk diverted to cheese grew 46 per cent and that to preserved milk, 33 per cent. Whereas butter took four-fifths of Denmark's milk output in 1935-39, in 1955 it used just less than two-thirds, and whereas Denmark ranked sixth among the world's exporters of cheese in 1946-50, in 1953-54 it ranked third. This evidence tends to confirm the conclusion that selective price stabilization encourages product diversification.

Another set of events of 1951-52 which revealed some of the advantages Danish farmers reaped from the contracts was the broadscale tightening of import restrictions which Britain undertook in those years. Butter and bacon escaped restriction, although experience from the 1930's would have given farmers little reason to expect it.

The value of landed real estate tended to rise relative to that of purely residential properties after 1948. The ratio of the average value of 100 hectares of landed property to one hectare of residential property, calculated from the total purchase value of properties exchanged, rose from .72 in 1948 to .90 in 1951 and .96 in 1953<sup>42</sup>. The ratio was still .88 in 1955, which was some 16 per cent higher than in 1946. These changes are, of course, understandable—they correlate fairly closely with changes in the average real income earned by farm proprietors—but they point up the tendency for any income or "certainty" gains in agriculture to be partly capitalized into land values, in lieu of expanding production. Capital gains realized from sale of farms may be applied to production elsewhere, or not applied at all.

42. Calculated from "Areal" and "Købesum for jord og bygninger" in the tables "Købesummens berigtigelse for bebyggede ejendomme solgt i almindelig fri handel", in *Statistisk Årbog*, 1948-56.

## V. Summary

On the basis of this review it appears that in all years except 1950 and 1951, and for butter, 1952, the long-term contracts probably served agricultural producers advantageously<sup>43</sup>. Historical price-cost relations lead one to believe that the contracts increased the certainty with which producers were able to arrive at many production decisions, and the absence of any absolute delivery commitment in most of the agreements gave producers some option of producing or not producing the contracted commodities. Furthermore, the assurance the arrangements gave of freedom from import restrictions in the principal market abroad was probably of some value, especially during the Korean War crisis. The review of the Danish experience shows that the expansion of production in 1949-51 can be attributed to non-contract market developments as well as to inauguration of the 1948 and 1949 long-term agreements. The experience, therefore, is not inconsistent with the theoretically justifiable hypothesis that the contracts fostered production when price relationships were favorable, but neither does it give positive support. Farm family incomes, on the average, gained some stability from the arrangements, though at the expense of income growth, and the price-stabilizing contracts probably retarded production in 1951-52 when large cost increases finally took their toll. Furthermore, the price-cost squeeze on butter gave an unmistakable stimulus to the already emerging tendency to diversify outlets for milk, and some part of the increased attractiveness for resources which agriculture developed during the period was absorbed in realized capital gains and not necessarily directed toward increased farm production.

43. This is not to say they necessarily served Denmark advantageously. Any statement concerning the national welfare would have to take into account additional variables.