CHAPTER VI

AGRICULTURAL IMPORTS
This chapter analyses the pattern of US imports of agricultural products.

The US trade in agricultural products, over the period 1870-1930, reveals the following three tendencies:

I. Imports of crude materials of agricultural and animal origin - raw silk, crude rubber, hides and skins, and fats and oils - grew rapidly in the beginning, but there has been a lag in the growth of these imports since the 1930s. In some cases, there has been an absolute decline in the level of imports, and in others imports have not grown very fast.

II. There have been differences in the trade patterns of different products included in the group of agricultural products - reference is here being made to those products which were on the net export list of America in 1870. The United States has, over the period of our study, shifted from the position of a net exporter to a net importer of meat products whereas in the case of cereals like wheat, the initial export advantage has been maintained.

III. Imports of coffee, which are complementary in nature, have increased at a very rapid rate. In the case of supplementary imports, wool imports have increased, while sugar imports have declined in relation to production (which includes both the US mainland production and supplies from the territories).
We will present below a detailed analysis of the above mentioned tendencies in US trade in agricultural products, in three different sections.

I

IMPORTS OF CRUDE MATERIALS

The raw materials included in the group of imports of crude materials of animal and agricultural origin are characterized by two important features.

(a) Some of these crude materials are absorbed as inputs in the production of those industrial products for which demand is highly income elastic. With rise in income, the market for these industrial products is likely to grow at a fast rate and so demand for the raw material inputs will also increase rapidly.

(b) A few of these raw materials are very specific in their climatic requirements. Because of the unsuitability of the American climate for the production of these raw materials, their domestic production is totally non-existent. In the case of other raw materials, imports are supplementary to domestic production.

From the foregoing, it might generally be expected (assuming a completely elastic foreign supply) that a rise in demand for crude materials will stimulate increased imports from abroad. Specially in the case of products for which no domestic production exists, imports ought to become directly a
function of increase in domestic demand. In the case of other raw materials also, if increase in demand outstrips the growth of domestic output, increased imports must follow.

All this is on the assumption of perfectly elastic foreign supply of raw materials. However, for a number of reasons the foreign supply of crude materials may well be unreliable or highly inelastic, at least in the short run. Firstly, these products are highly dependent on natural factors like climate. Secondly, usually there is a long gestation lag between the growth in demand and growth in supply of these raw materials. During periods of high demand for raw materials, prices tend to shoot up rapidly because supply cannot be immediately increased to meet the growing demand. Particularly, during periods of war, supply is likely to become completely inelastic. Thirdly, because of the specificity of climatic conditions for raw materials, they can be produced in very limited areas of the world. Once production in these areas has been expanded to its limit, further increases in foreign supply become difficult. Moreover, on account of the limited number of countries which are suitable for the cultivation of a particular raw material, the possibility exists that the supply of raw material will be monopolistically restricted by the few countries producing it.

Under the circumstances of inelastic supply described above, there is a strong stimulus to the development of technical innovations whenever the demand for crude materials
increases. Technical progress is achieved through research. In general, research is a large scale activity and so it is profitable to undertake it whenever the market for the product is large enough to ensure substantial economies of scale. Even to apply the fruits of research, a growing market is required. In a stagnant market, there would be no inducement to install new machinery and factories where production with new techniques of production can take place. The element of high fixed costs in these innovations implies that they would be introduced only in a growing market where production on a large scale will lead to fall in costs of production and outweigh the high fixed costs. Thus the development of technical innovations, on the whole, is advantageous in a large and growing market. The stimulus to innovate will be strongest when demand grows for those raw materials whose domestic supply is inelastic and foreign supply is also unreliable or inelastic. Particularly during periods of war, when trade links overseas are cut off, the stimulus to innovate will be intense. The cutting off of supplies, during a period of war, also means the growth of a large market for the substitutes of natural resource materials, so large scale production of substitutes is encouraged and fall in costs attained.

Combined with all this, there is one other factor which might also stimulate the development of technical innovations. Economic progress, over time, has been characterized by a revolution in transport technology - from sea to land i.e.,
a faster progress in land transportation than in sea transportation. Inland transport costs have thus generally fallen more rapidly than overseas transport costs. This factor induces substitution of imports of natural resource materials from overseas countries by domestic synthetic production. In the case of those raw materials for which the entire supply has to be procured from abroad, this factor, in particular, can tend strongly in favour of substitution of imports by domestic synthetic production.

The development of technical innovations thus implies the substitution of imports by domestic synthetic products. This tends to counteract the tendency for imports of crude materials to rise.

To summarize the argument developed above: in the case of raw materials for which domestic and foreign supplies are inelastic, increase in demand provides a strong stimulus to the development of technical innovations. Innovations make it possible to develop substitute products for natural resource materials. The revolution in transport technology has further strengthened the tendency towards the substitution of natural resource materials by synthetics. All this might tend to offset the tendency for imports of crude materials to rise.

In the United States of America, technical progress has been the major factor behind the lag in the growth of most of the crude material imports. We will now illustrate this by studying the pattern of import trade in raw silk and crude rubber,
We will also make a study of imports of fats and oils, and hides and skins - imports in these cases, being supplementary to domestic output.

**Raw Silk**

Raw silk is a material for which the domestic supply is completely inelastic in the United States. At the same time, it is highly income elastic product and so with rise in income, the market for it is likely to grow rapidly. In the United States, the average annual imports of unmanufactured silk (in million lbs.) rose from 13.82 in 1901-05, to 34.73 in 1916-20, and to 75.84 in 1926-30.\(^1\) In the following depression years, 1931-35, imports declined to 74.20 million lbs.\(^2\) Since then, however, imports have fallen drastically - to 68.34 million lbs. in 1936-40 and to 8.14 million lbs. in 1946-50.\(^3\)

The fall in imports of raw silk has been a result of the displacement of the natural fibre by domestic synthetic fibres like rayon, nylon, etc. These substitutions were induced by the combination of the following two factors: on the one hand, with rise in income, demand for silk grew rapidly; on the other hand, the domestic supply was inelastic and the foreign supply

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2. Ibid.

3. Ibid., p. 414.
was either only forthcoming at very high prices or became completely inelastic during some periods. The growth in demand for silk during and immediately after the First World War itself had encouraged the growth of the rayon industry in the US. The enormous increase in demand during the 1920s (reflected in increased imports of raw silk) led to high prices for raw silk, this, in particular, induced research in improving the technique of rayon production. The result has been an expansion in rayon production with the use of improved techniques of production. This can be specially noticed in the latter half of the 1930s when the economy was recovering from the depression of the early 1930s. The average annual production of packaged rayon and acetate yarns (in million lbs.) increased from 192.96 in 1931-35 to 314.9 in 1936-40. Meanwhile, the development of a new synthetic fibre - nylon - was also announced, with growing competition from rayon, silk weaving tended to decline. This has been a consequence of two facts: rayon prices are more stable than the prices for raw silk; moreover, in a large market, rayon weaving gained over silk weaving because the fibre is of uniform quality and so the use of automatic looms has been facilitated. Use of these looms in rayon has meant


lower processing costs than in the case of silk weaving. This means that the gains from standardization, that are achieved in a large market (because mechanization is more easily promoted), were reaped by rayon mills rather than by silk mills. The decline in silk weaving, therefore, meant a fall in the imports of raw silk during the late 1930s.

The most drastic decline in imports has taken place, however, since the year 1940. The reason for this has been the following: During this period, a rupture of trade relations with Japan - the supplier of raw silk - took place. This meant that foreign supply became inelastic and a vast market for synthetics was created. War also created a new demand for fibres for military purposes. The inelastic foreign supply and a large market at home induced large scale production of synthetic products. The average annual production of packaged rayon and acetate yarns increased to 522.1 million lbs. in 1941-45 and then to 206.96 million lbs. in 1946-50. Moreover, severe competition to silk was provided by the development of nylon fibre and the discovery of new synthetics like dexam etc. Thus even after the war was over, the competition from these


7. Ibid., p. 429.

synthetics did not let silk weaving recover much. The synthetics increasingly gained over the natural fibre because (i) of the uniformity of quality and hence lower processing costs and (ii) short run price stability. This is reflected in the fall in per capita consumption of silk and rise in that of the synthetic fibre. The per capita consumption of silk declined from 0.36 pounds in 1940 to 0.07 pounds in 1950 whereas the per capita consumption of rayon and acetate rose from 3.60 pounds in 1940 to 8.79 pounds in 1950. The per capita consumption of other synthetic fibres also rose from 0.04 pounds in 1940 to 0.92 pounds in 1950. In total fibre consumption, the share of silk declined from 1.1 per cent in 1913 to 0.2 per cent in 1950, whereas acetate, rayon and other man-made fibres increased their share from 0.1 per cent to 21.8 per cent over the same period.

Thus displacement of the market for silk by domestic synthetic fibres has meant an absolute and drastic decline in the imports of raw silk into the United States.

Crude Rubber

The average annual imports of rubber (in million pounds) rose from 12.6 in 1970-74 to 433.4 in 1915-19, and to 643.6 in 1920-24. From a level of 1,065 million pounds in

9. Alderfer and Michl, p. 6, p. 403, Table 22-3.
10. Ibid.
11. Ibid., p. 404, Table 22-3.
12. Yearly average figures calculated from data (preferred series of the source) given in Potter and Christy, Jr., p. 4, p. 290.
1925-29 imports, however, increased to only 1,183.2 million pounds in 1926-29 and recovered to 1,607.2 million pounds in 1930-34.  

Apart from industrial demand, the first really big market for rubber in the US was created by the growth of a land transport system based on automobiles. The continued expansion of demand in the 1920s and the British price control scheme, the Stevenson Plan, led to high prices for rubber and a peak was reached in the year 1925. The price of rubber did fall after 1926 but, subsequently, the International Rubber Regulation Agreement was signed and this was, on the whole, more successful than the Stevenson Plan.  

rubber is also not produced in the US. Therefore, a market expansion for rubber combined with an inelastic domestic supply and high prices for foreign supply provided an incentive to undertake research in the development of new techniques of production. By 1931, Thiokol appeared on the market, and Du Pont announced the development of synthetic rubber under the trade name of Duprene, subsequently changed to Neoprene - a special purpose synthetic rubber. The depression meant a fall in the demand for rubber. In the recovery period

13. Ibid.


since 1933, however, consumption rose rapidly. (The average annual consumption of rubber fell from 872,607.8 long tons in 1925-29 to 496,526.2 long tons in 1930-34. However, during 1935-39 consumption increased to 670,589.8 long tons). In this period of growing demand, research in synthetic rubber production was increasingly encouraged - more so in general purpose rubber as research till 1933 had been concentrated on and was successful only for special purpose rubber. By 1939, Buna N and Buna S (general purpose rubber) were discovered mainly through the collaboration of Standard Oil of America and I.G. Farben in Germany. The Second World War meant a complete cessation of foreign supplies of natural rubber. A completely inelastic foreign and domestic supply, therefore, made it necessary to invest on a large scale in the development of substitutes. The cutting off of supplies also meant the creation of a large scale market for synthetic rubber in the US. Hence production was undertaken on a large scale with government subsidy, and the techniques of production which were discovered earlier were put to use. After the war, demand for rubber continued to expand and research was induced in the further


development of the technique of synthetic rubber production - like the development of (a) cold resistant Butyl rubber, (b) the black masterbatch technique, (c) the improved butadiene catalyst, (d) so called cold rubber, (e) high abrasion carbon blacks, and (f) oil-extended GR-2. The average annual synthetic rubber production, in total, rose from 294 thousand long tons in 1940-44 to 476 thousand long tons in 1950 and to 970 thousand long tons in 1960. The significant thing has been that since 1946 (except for 1949) the average annual price of the most nearly comparable grade of natural rubber has been higher than the price of general purpose synthetic rubber. The wholesale prices for natural and synthetic rubber in 1942 were 22.5 cents per pound and 50.0 cents per pound respectively. By 1945, the price of synthetic rubber had fallen to 12.5 cents per pound. In 1950, prices for natural and synthetic rubber were 41.3 cents per pound and 19.0 cents per pound respectively. Even though the price of special purpose synthetic rubber is higher than that of natural, it is superior in quality to the natural rubber. It is specially resistant to oil and grease.

18. Solo, a. 17, p. 73.
21. Ibid.
22. Ibid.
Since the price of rubber is usually a small proportion of total cost in such items as tank linings, oil hoses, pipe rings etc., the higher price of the raw material is more than offset by the lengthened life of the product. 23

Further, in contrast to natural rubber prices, synthetic rubber prices have shown a greater degree of stability. 24 This is to be expected because of the fact that the supply of natural rubber is characterized by lengthy gestation lags. The supplier finds it difficult to adjust the free capacity to demand because of this lag and unpredictability of demand. Rubber is thus characterized by extraordinary instability of prices. The synthetic product, on the other hand, is a man-made industrial product and so a greater control over its production and prices can be achieved than in the case of the natural product.

The growth of synthetic rubber production has meant an encroachment on the market for natural rubber by synthetic rubber. This accounts for the fact that the growth rate of rubber imports has been kept below what it would otherwise have been in a large and growing market.

Fats and Oils

Though the largest single use of fats and oils has been their consumption as food, they are also important raw materials for industrial purposes. Imports of these have been supplementary to domestic production. Over the period under study, these imports have declined absolutely and also in relation to domestic production. Total imports of fats and oils were 30 per cent of domestic output in 1935-39 and only 9.5 per cent in 1940.25 Soap fats and oils, which comprise a large percentage of total fats and oil imports, declined from 1,194 million pounds to 221 million pounds over the years 1935-39 to 1949.26 In terms of a ratio to domestic production, they declined from 103.4 per cent to 36.5 per cent over the same years.27

Decline in imports has resulted from two factors:

(a) Domestic production (in million pounds) itself increased from 7,339 in 1935-39 to 11,286 in 1949.28 This was a result of higher pork production in the US so that land supplies were drastically increased as a by-product. Moreover, production

25. Humphrey, n. 16, p. 273, Table 39.
26. Ibid.
27. Ibid.
28. Ibid.
of a new product - soybean oil - increased ninefold over this period.\textsuperscript{29}

(b) In the case of soap fats and oils to some extent imports have declined because of the development of substitute detergents which are not produced from fats and oils but from petroleum products or coal-tar derivatives.\textsuperscript{30} Similarly, some rubber-based paints have displaced the use of drying oils - another important item amongst the imports of fats and oils.\textsuperscript{31}

So in the case of fats and oils also, at least in their industrial uses, the substitutes produced by the chemical industries have to some extent affected the import trends.

open and skins

The average annual imports of hides and skins (in millions of dollars) rose from 25.2 in 1931-35 to 208.4 in 1916-20.\textsuperscript{32} The value of imports since then declined absolutely to 67.6 million dollars in 1941-45 and to 92.6 million dollars in 1946-50.\textsuperscript{33} Decline in imports has been a result of three factors:

\begin{itemize}
  \item \textsuperscript{29} Ibid., p. 270.
  \item \textsuperscript{30} Ibid.
  \item \textsuperscript{31} Ibid., p. 271.
  \item \textsuperscript{32} Yearly average figures calculated from data given in U.S. Bureau of the Census, No. 1, p. 549.
  \item \textsuperscript{33} Ibid.
\end{itemize}
(a) Hides and skins are used as inputs in the leather industry and about eighty per cent of the output of this industry is used in the manufacture of shoes. The principal factor determining the size of the shoe industry has been the size of the population - the rate of growth of which has declined over time - while the income effect has been small. Annual production of leather shoes, excluding the years of depression and war, has remained about two and a half pairs per capita. The slight increase in per capita shoe production between 1927 and 1940 was in non-leather shoes. So compared to other industries, shoe industry has not been a rapidly growing industry. Apart from this, substitutes for leather in shoe production have been developed.

(b) Development of substitute materials has taken place rapidly in other uses of leather - in luggage and handbags. This has also meant a slow increase in the demand for hides and skins, and has therefore affected the import trends.

(c) With rise in income, increased marketings of cattle and calves have taken place. As a result of this, the domestic production of hides has increased as a by-product.

34. Alderfer and Michl, n. 6, p. 456.
35. Humphrey, n. 16, p. 263.
36. Alderfer and Michl, n. 6, p. 469.
37. Ibid.
II

We will here deal with the second observation made earlier in this chapter: emergence of differences in the pattern of external trade, over time, amongst the various agricultural products. Our main conclusion is that this has been largely due to the fact that significant differences exist among different agricultural products so far as the income elasticity of demand for these products is concerned. With increase in income, over a period of time, this factor leads to differences in the consumption and trade patterns of different agricultural products.

MEAT PRODUCTS AND WHEAT

In the beginning, the United States was a net exporter of meat products and also cereals like wheat. However, it can be seen that, over a period of time, she has lost her initial advantage in beef and other such products, whereas this advantage has been maintained in the case of wheat. This could be related to the fact that as compared to wheat, beef is a more income elastic product, and so, with rise in income, cereals generally tend to be substituted by meat and other animal products. In the United States, per capita consumption of fruits, dairy products, meat, fish and poultry, during the period 1920-50, has been higher than that of the cereals. In fact per capita consumption of fruits, dairy products, meat etc., has
shown an increasing trend whereas that of cereals has shown a declining trend. Consumption of foods of animal origin has grown faster than the population. Per capita meat consumption, other than poultry, was 15 per cent higher in 1936 than in 1910. All the increase was in beef and veal; pork consumption remaining about the same. Chicken-meat consumption increased more than one-half in this period, turkeys over three times after 1929. Total annual (average) meat consumption (in bil. lbs., dressed weight) rose from 11,60 in 1930-34 to 21.16 in 1945-49. Because of this increase in domestic consumption, a cessation of large exports of cattle and beef has taken place. On the contrary, there has been an increase in their imports. The average annual exports of cattle, beef, and veal (in million pounds dressed weight) rose from 68,00 in 1970-74 to 225,00 million in 1980-84. Exports have declined drastically since then—reaching the level of 77.40 million pounds in 1940-44 and recovering only to 225,00 million pounds in 1945-49. Imports (in million pounds dressed weight equivalent), on the other hand, rose from 16,06 in 1970-74 to

40. Ibid.
41. Yearly average figures calculated from data (preferred series of the source), Potter and Christy Jr., n. 4, p. 213.
42. Ibid., p. 220.
43. Ibid.
370,40 in 1940-44, and declined somewhat to 232,20 in 1945-49. 24

The trade in wheat presents a contrasting picture. Because of the low income elasticity of wheat, its consumption has failed to grow at the same rate as the increase in domestic output which has increased enormously through an improvement in agricultural productivity. 45 Thus because of a slower growth of consumption in relation to output the net export position in wheat has been maintained. 46

III

Here we will study the import trends of two products — coffee and wool.

COFFEE

Imports of coffee are complementary to domestic farm production for this product is not produced in the United States. Coffee is characterized by a fairly high income elasticity of demand. Therefore, rise in domestic income has meant increased domestic consumption. This has led to substantial imports of coffee into the United States. Imports rose from

44. Ibid., p. 218.

45. This is evident from Table 8 given at the end of Chapter II, p. 85.

46. See Table 8 and Figure 4 given at the end of Chapter II, pp. 85, 87.
235 million lbs. in 1970 to 728 million lbs. in 1980 and to 2,459 million lbs. in 1960. 47

WOOL

Wool imports (excluding the imports of carpet wool) have throughout been supplementary to domestic output and have shown a rising tendency. The average annual imports (less re-exports) of apparel wool (in 1,000 lbs.) rose from 153,233 in 1951-55 to 569,453 in 1946-50. 48 In between, because of the wartime demand, imports had risen to even higher levels than this—reaching a level of 669,237 thousand lbs. in 1941-45. 49 While, over these years, the domestic consumption of wool increased (the influence of synthetics on wool consumption came only after 1950), there was a decline in the domestic production. So imports as a percentage of domestic output increased and this happened in spite of the higher tariffs on raw wool imports. The average annual imports rose from about 64.75 per cent of output in 1921-25 to about 206.34 per cent of output in 1946-50. 50


49. Ibid.

50. Percentage figures calculated from ibid.
The decline in domestic wool production after the early 1930s can be related to the shift in the composition of output of animal products in America. Meat production, in the US, has become more profitable than wool production. This shift was largely induced by the rise in income in the US. In contrast to other animal products, wool is a frontier product. It involves low cost of transport and is not perishable in nature. Thus, when there is plenty of free land and even if transport is not developed much, sheep raising is a profitable use of land. Over time, however, increase in income leads to a rapid growth in demand for other animal products—dairy and meat products. Further, the developments in transportation make their production commercially profitable in response to a growing demand. Because beef has been in insistent demand in the US, beef cattle have fetched higher prices than sheep. Beef cattle, for example, (in dollars per 100 pounds, live weight) fetched (at Chicago) 12.91 in 1916-20, 11.82 in 1926-30, 14.41 in 1941-45, and 25.20 in 1946-50.\footnote{Statistical Abstract 1955 (Washington, D.C., 1955), p. 697.} The sheep (in dollars per 100 pounds, live weight), on the other hand, fetched (at Chicago) 10.35 in 1916-20, 6.57 in 1926-30, 6.45 in 1941-45, and 9.85 in 1946-50.\footnote{Ibid.} This has meant that in total livestock output the proportion of cattle has increased while the ratio of sheep...
to this output has declined. From the middle of the 1930s itself, the number of cattle had outstripped the number of sheep. The average annual number of stock sheep (1,000 head) declined from about 40,706 in 1926-30 to about 289,57 in 1946-50 whereas the number of cattle (1,000 head) increased from about 89,191 to about 76,850 over the same period. As a consequence of the decline in the number of sheep, wool production has also declined. On the plains even though sheep raising has been promoted as a by-product of general farming, this has been done primarily with a view to get mutton rather than to secure wool. This can be deduced from the fact that mixed breeding type of sheep (whereby both mutton and wool can be secured) have been encouraged. It is only in some hilly areas and in the Southwest of America that pasture land is unsuitable for cattle and exclusively advantageous for sheep raising. In other parts of America, rise in income and development of transportation have meant that cattle raising has become more advantageous than sheep raising. It is because of this that American wool production has become a declining industry. Therefore, over the period 1870-1980, with growth in wool consumption, America increasingly became dependent on imports from abroad.

CONCLUSION

The above analysis of the trends in the agricultural imports of the United States fits very well with our main thesis.

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53. Yearly average figures calculated from data given in U.S. Bureau of the Census, n. 1, p. 239.
that demand factors had a vital role to play in the change in trade structure of America. Increase in income, in a large and homogeneous market, implies an increase in demand for highly income elastic manufactured products. This, in turn, means an increase in demand for raw materials used as inputs in manufacturing these products. While market expansion for income elastic manufactured goods means increased demand for raw materials, it also has implications for technical progress. Given the inelasticity of supply of crude materials at home and abroad - at least in the short run - innovations will become the important determinants of their trade pattern when demand for them increases. This is fully borne out by the import trends of raw silk and crude rubber, and also fats and oils - when used for industrial purposes. With increased income, demand will grow at a slow rate for products which are not highly income elastic, and so demand for crude materials used as inputs in such goods will also increase at a slow rate. The import trends of hides and skins illustrate this case of a slow rate of growth of demand.

Further, in the case of the agricultural products consumed mainly as food items, increase in income in an industrial economy means that demand will increase at a higher rate for the relatively high income elastic products than for the low income elastic products like cereals. This demand factor has been the vital factor responsible for differences noticed in the trade patterns of various agricultural products in the
United States. The increasing imports of coffee, the loss of export advantage in meat products on the one hand and the maintenance of export advantage in the case of wheat, fully support our argument. Even in the case of animal products, demand factors have influenced their domestic production and trade pattern. With rise in income, increasing demand for dairy and meat products has meant higher prices for beef cattle than for sheep. This has meant that cattle raising has become more profitable than sheep raising, and so the wool industry has declined, and increased imports of wool have followed.

All this shows the high degree of relationship between import trends in crude materials and other agricultural imports and demand factors.