

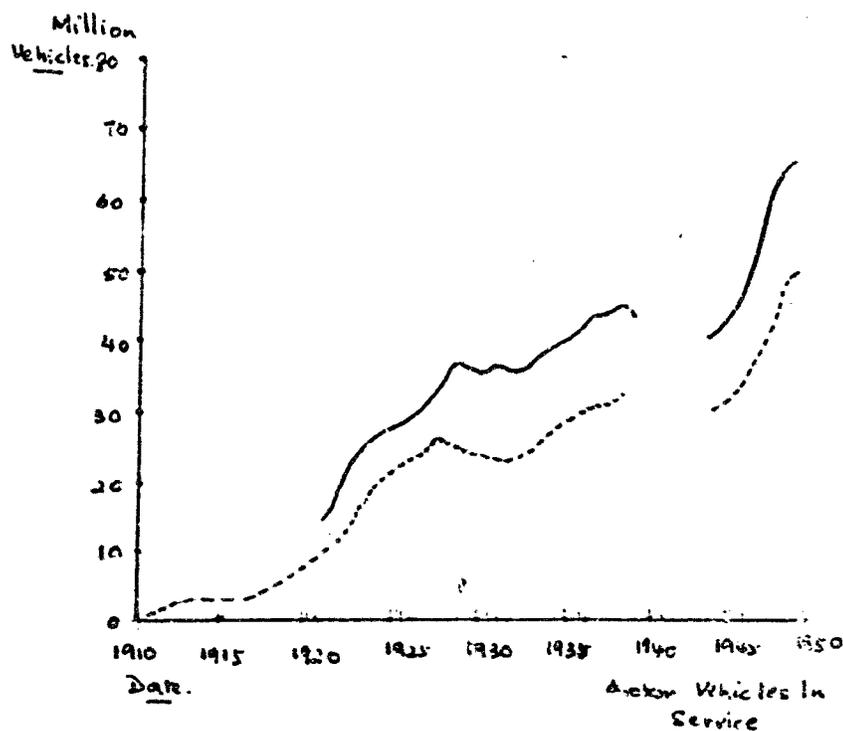
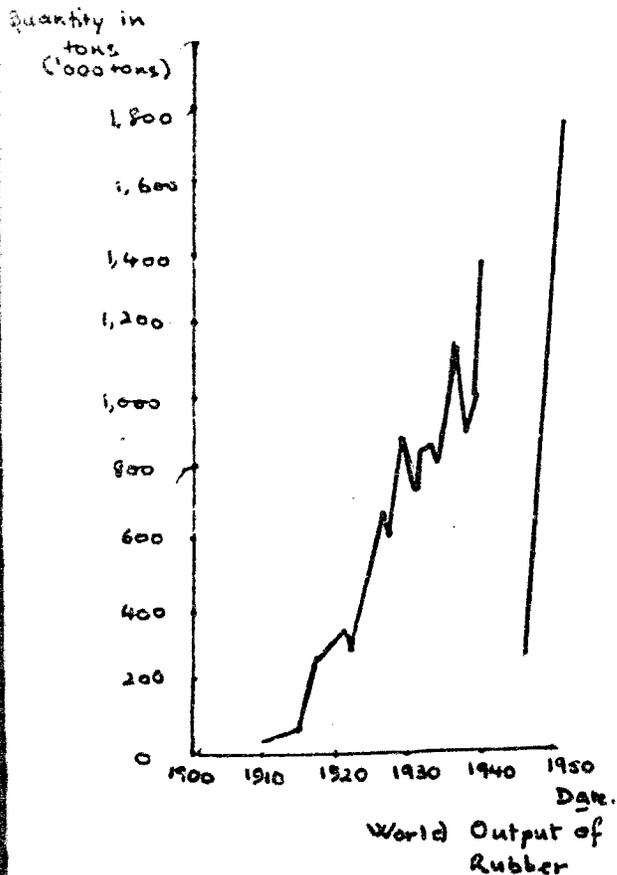
CHAPTER IV

DEMAND ANALYSIS

THE ELASTICITY OF NATURAL RUBBER CONSUMPTION.

INTRODUCTION

Many Economists have stressed the correlative of rubber consumption to the development of the combustion engine of the automobile industry. The graphs provided show that the consumption of rubber only began to rise sharply when the internal combustion engine was developed. Consumption has always depended mainly on the automobile industry, natural rubber being used for making tyres. Other applications though important have so far been insufficient to affect the consumption noticeably.



From the above graphs, we can show that there is a noticeable correlation between the world output of rubber and total motor vehicles in service. The shape of the curves portrayed on both graphs resemble one another, for instance, there is a slight dip between 1930 and 1935 shown in both curves.

NATURE OF THE DEMAND SCHEDULE

Rubber is essentially used as a minor component in final goods. It is thus a derived demand. The demand curve is rather inelastic since the value of rubber input to the total value of the article produced would be so small that the price of natural rubber may be increased appreciably without causing any significant changes in the cost of the article concerned.

According to paragraph five of the Mundie Mission Report "the inelasticity of demand for manufacturers arises principally from the fact that the motor industry plays a large part in the absorption of rubber and the price of a car depends very little on the price of raw rubber for its tyres."

REDUCTION OF INELASTICITY

The development of synthetic rubber (polymeric elastomers) over the past two decades has probably reduced the inelasticity of the demand schedule for natural rubber, that is, it has increased the elasticity of substitution between natural and synthetic.

It is likely ^{that} the elasticity of substitution will very soon become almost infinite in view of the recent developments of the stereo-regular polymers, which are almost perfect substitutes for natural rubber. For instance, a synthetic cis. polyisoprene is virtually identical ~~to~~ both chemically and structurally to natural rubber. Furthermore, its technical properties approximate to those of the natural rubber product; which is achieved by the incorporation of certain non-rubber substances which correspond with those occurring naturally in tree rubber.

It is noteworthy that we should look into the relationship of such competition.

THE RELATIONSHIP OF SYNTHETIC AND NATURAL.

It is generally accepted that there is a usage zone where natural rubber is superior to synthetic in quality and will be used irrespective of the relative prices of the two products, and there is also a zone where synthetic rubber is superior in quality. Between these two zones is a zone where

relative price determines which of the two would be used. This relationship is explained by the diagram provided below.

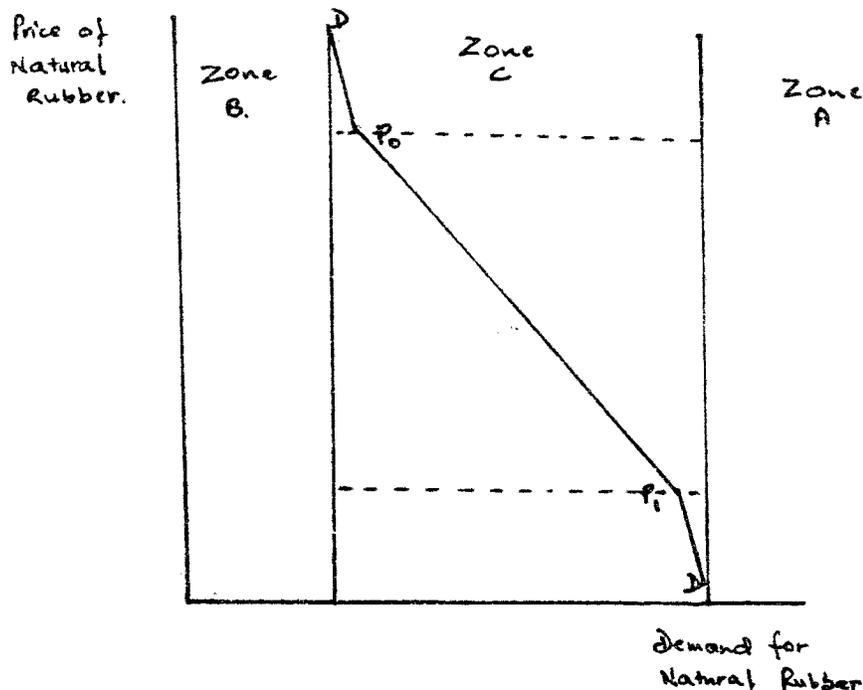


Figure 4. ZONAL RELATIONSHIP OF SYNTHETIC AND NATURAL.

From the diagram, zone B shows the zone of minimum natural rubber consumed because of its technical superiority. Zone A demarcates the maximum of natural rubber demanded at any point of time. If natural rubber took up the complete competitive requirements. Zone C shows the area of competition between synthetic and natural. The demand curve DD tends towards infinite inelasticity as the price of rubber falls because the elasticity of substitution between natural and synthetic tend towards zero as the price of natural falls. This is due to the technical superiority of synthetic.

Sections P_0 P_1 of DD is more elastic than the sections above P_0 or below P_1 . P_0 P_1 depicts the area of competition between two commodities. Above P_0 an increase in price will not result in an appreciable decrease in quantity demanded, because buyers may be influenced by technical limitations and other specifications.

It is reasonable to note that for technical reasons the relative rigidity of consumption within the short-run may not determine it wise to switch to synthetic. This may not be that any undue changes may entail very large costs to convert or change existing plants to more adaptable plants.

In the first case, changes from one product to another are not costless. There are handling, storage and labour difficulties. Changes in the manufacturing process

may involve a temporary halt in production and the substitution of one product for the other may involve quality changes in the final product which could necessitate extensive testing before the product could be marketed. The manufacturer will therefore, want to feel confident that the price differential between natural and synthetic rubber will be maintained for a sufficiently long time to more than outweigh the costs of conversion. In view of the past instability of the price of natural rubber such confidence may not be easily attained. Secondly, the major United States manufacturers' now themselves, own synthetic factories and it seems probable that the differential between the prices of natural and synthetic rubber would have to be considerable to induce them to convert back from their own product to natural rubber.

To a similar extent, to preserve the product name of commodities producers may be reluctant to switch over consumption in times of rising prices. It is because some goods may require specific superior technical qualities of natural rubber that switches to synthetic may not do. This may be exemplified by tyre production for large vehicles like trucks which require very specific technical qualities found in some natural rubber.

Other reasons like retaining consumer confidence in the product during high prices may entail similar reluctance to change.

However, a reverse situation occurs below P1. Here the demand for natural rubber is less elastic because of the technical superiority of synthetic and that heavy costs may result if conversion of plants to adapt other raw materials were adopted instead of the original usage.

SHIFT FACTORS FOR NATURAL RUBBER

Factors which shift the demand function for natural rubber may be outlined as due to:-

- 1) cyclical changes in demand.
- 2) technological changes.
- 3) changes in consumer - buying policies.
- 4) wars and other incidental causes.
- 5) Government policies in consuming countries.
- 6) Emergence of Sino-Soviet Bloc.

▷CYCLICAL CHANGES IN DEMAND

This controversial aspect of demand changes has been debated on by very prominent Economists. For instance, according to John H. Adler, in his article "First Stabilization Symposium" *Kyklos* XI, he contends that major cyclical changes in final demand are unlikely to occur but R. Nurkses in the epilogue of Adler's contribution contends otherwise.

The imposition here is that changes in demand may occur from changes in the general level of prosperity in consuming countries. Here account is always taken towards differences of economic advances and development. It is because of such developmental differences that we cannot just disregard economic repercussions of small changes in demand in advanced countries on less developed ones.

It should be noted, therefore, that relatively small and significant changes in demand in advanced countries may have considerable repercussions on the economy of the relatively less developed countries. It has been generally understood that small economies have a very great dependence on few export commodities and may, therefore, have a greater vulnerability to changes in demand for these commodities by major consumers.

1) REFERENCE TO A LOCAL EXAMPLE

This can be locally exemplified by Malaya's predominant dependence on rubber and tin. Thus any substantial changes to synthetic or lowering of natural rubber consumption by the major consumer - economies may greatly affect the working of our whole economic system. Repercussions may tend towards the breaking down of our whole economic framework; grossly affect our means of payments, therefore, affecting to a very great extent the Balance of Payments and the Terms of Trade of our Economy; generate unemployment and lowering the standard of living of the general economy; our fiscal policy and foreign investment. All these repercussions boil down to a situation of economic depression almost amounting to an economic disposition.

2) TECHNOLOGICAL CHANGES

In this dynamic international economic system, new products are continually being introduced into the market. The creation of such products mean that there is an increased absorption of some raw material. Therefore, in cases of innovations which requires substantial quantities of rubber in its production such technological changes may have a considerable effect on the consumption of rubber. The future relationship may mean a bigger consumption of natural rubber leading to a significant shift of the demand curve to the right.

A look into the historical setting of rubber consumption will prove my point. From more narrowed initial uses of rubber as toys and minor articles like erasers and the like, the consumption have tend to be little, as compared to later inventions like the introduction of the vehicle industry into the rubber industry. The making of tyres is a form of destabilizing inventory change in the world's rubber consumption.

3) CHANGES IN CONSUMER-BUYING POLICIES

It is because there are large buyers in certain fields that any changes in consumer-buying will have very great effects on the whole rubber industry. It may be noted here that there are five of the biggest rubber goods manufacturers who consumed nearly two-thirds of the total world production.

According to J. Wilson in "The Singapore Rubber Market" the U.S. rubber, Goodyear, Goodrich, Firestone, and Dunlop account for the consumption of nearly 40 percent of natural rubber sold in the world. (11)

Although there are no published figures, it is estimated that these four major U.S. rubber companies purchase about 65 to 70 percent of the natural rubber entering the U.S. and taking into account their overseassubsidiaries and affiliated companies, about 40 percent of all natural rubber sold in the world. The impact on the market of these four major consumers is, therefore, of great significance.

Their demand of rubber has been largely determined by their estimated factory requirements, although price considerations may vary within 10 percent of their buying policy.

When demand increases manufacturers for example, hold more stocks and add to the demand pressure in bidding up the price. Conversely, it can be pictured that when demand is slackening stock holding becomes a source of loss and therefore, a general reluctance to hold stocks to the already existent declining demand may push prices further down. These may be outlined as forces arising from psychological situations.

4) WARS AND OTHER INCIDENTAL CAUSES

This can be referred to as "non-economic causation". For example, during the Korean War, rubber prices shot up to well over \$2.00 per lb.. A main contributing factor was the United States purchases for strategic stockpiling on account of the Korean War. Increased demand came from immediate needs of armament production and the United States strategic stockpile build-up.

The existence itself of the stockpile has from time to time a disturbing influence on the market.

(11) J. Wilson Op. cit. Page 13 (1958).

Rumours of changes in rotation policy and even of releases of rubber from the stockpile, have a depressing effect particularly at a time when the market is weak and uncertain.

Fluctuations in demand may also arise from alternating intensification and relaxation of tension in the cold war.

5) CHANGES IN GOVERNMENT POLICIES

Atmosphere of uncertainty and changing political policies concerning the intensity of stockpile and defensive and aggressive operations may create undue fluctuations in demand. This factor may seem more psychological, and relies solely on the "whims and fancies" of political aspirants.

6) EMERGENCE OF THE SINO-SOVIET BLOC

The emergence of this powerful new buyer and seller adds to the uncertainty in the rubber market. Russia and China in the late '50's became heavy bulk buyers in the rubber industry and revived the market from its period of mild recession. By mid-1959, the price of rubber had risen to about \$1.00 per lb..

All these factors shift the demand function for natural rubber. A more practical viewpoint is exemplified by the following paragraphs which portray the expanding need for rubber, its geographical distribution of usage and the decade doubling of consumption.

Predictions of rubber consumption are usually limited to short term estimates made to guide the industry in planning production schedules.

The planning of production schedules can be based on annual estimates of demand; but a long time is required for a major increase in natural rubber production.

Rubber trees are only tappable at the age of five to seven years to attain maximum yield about 13 years after planting. A period of around 20 years is needed to amortize the investment and the initiation of plantation investment involves a great risk. Rubber production involves a supposition that the industry will still be profitable some 30 years after the date of its initiation.

GEOGRAPHICAL DISTRIBUTION OF USAGE

In 1959, as shown in Table 4-1, the United States used 44.2 per cent of rubber consumed throughout the world.

A total of 34.3 percent of the rubber was used in Europe. Out of the 34.3 percent of total rubber consumed in Europe, England and France's consumption of natural rubber was some 69.6 percent and 68.1 percent respectively of the total raw rubber consumption.

TABLE 4-1

RUBBER CONSUMPTION IN 1959 BY COUNTRY IN PERCENT OF ESTIMATED TOTAL WORLD USAGE.

COUNTRY	PERCENT	COUNTRY	PERCENT.
United States	44.2	Australia	1.5
United Kingdom	7.1	Brazil	1.4
France	5.4	Canada	2.8
Germany	5.9	India	1.2
Netherlands	0.8	Japan	5.2
Eastern Europe	8.5	China	4.0
Other Europe	6.6	Others	5.4

SOURCE: Loren G. Polhamus (1962) op. cit. page 376.

Tyres, tubes and tyre accessories accounted for over half of the rubber used throughout the world including 70.1 percent of all rubber used in Canada and 63.0 percent of that used in the United States. The usage of rubber for other purposes was also highly important and the United States alone used over ten times as much rubber in non-tyre products in 1959 as was used throughout the world for all purposes in 1900.

The disparity in usage between that in the U.S, and that in the rest of the world encourages the belief that

there are great opportunities for expansion in the use of rubber.

EXPANDING USAGE OF RUBBER

Phelps (12) in 1957 found that the rate of increase for all other countries is now somewhat greater than that for the U.S., the comparative figures for the period 1950-1955 being 6.4 percent compared with 4 percent increase annually. Phelps believed that this situation could be expected to continue with even greater differences in the years to come. He concluded that rubber consumption will continue to increase rapidly for sometime to come - barring a lack of supply, which is unlikely, or a world depression - and the rate of increase will be greater elsewhere than in the U.S..

(12) DECADE DOUBLING OF CONSUMPTION

TABLE 4-2

WORLD ANNUAL CONSUMPTION OF RUBBER AT TEN YEAR INTERVALS AND INCREASE IN ANNUAL RATE OF CONSUMPTION FOR EACH DECADE.

YEAR	CONSUMPTION (LONG TONS)	INCREASE LONG TONS	DECADE PERCENT
1900	52,500	-	-
1910	100,000	47,500	90.5
1920	297,500	197,500	197.5
1930	710,000	412,500	138.7
1940	1,152,500	442,500	62.3
1950	2,302,500	1,150,000	99.8

SOURCE: Loren G. Polhamus (1962) op. cit. page 379, Table XIX.

(12)

Loren G. Polhamus. op.cit. page 378.

Since 1900, the annual consumption of rubber has roughly doubled during each decade. Percentage increases in world consumption of rubber at ten year intervals seem to show significant increases in decade consumption. Had there been an exact doubling of consumption during each decade the consumption in 1950 would have been 1,680,000 long tons. The actual consumption in that year of 2,302,500 long tons substantially exceeds the calculated decade doubling of consumption. The 1959(13) consumption of 3,677,500 tons exceeds the calculated decade doubling rate (2,360,000 tons) for 1960 but is only about 60 percent increase over the actual consumption in 1950.

Any projection of decade doubling consumption past 1960 would quickly lead to unbelievably large figures outside the realm of possibility. There is no indication, however, that any saturation point is being reached in the consumption of rubber and a substantial increase in the rate of consumption is forecast by responsible authorities. The so called Paley (14) Commission set consumption at around five million long tons in 1975.

(13) Loren G. Polhamus (1962) op. cit. page 379.

(14) Loren G. Polhamus (1962) op. cit. page 381.