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# THE GROWING IMPORT DEPENDENCE OF PHILIPPINE EXPORTS

by

George L. Hicks

Field Work Report #22

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November 1967

Recent research on the Philippine economy has stressed the highly import dependent nature of much of Philippine manufacturing industry.[1] The manufacturing sector has expanded rapidly, but this expansion has largely taken the form of assembling and processing imported parts and materials rather than backward integration to domestic sources of supply.

One obvious consequence of this pattern of development is that the rate of growth of manufacturing is closely tied to the growth of imports which, in turn, is largely determined by the growth of exports.

The growth of exports, therefore, is a crucial determinant of the growth of the domestic manufacturing sector. The relevant variable in terms of foreign exchange availability is not the growth of exports *per se* but rather the growth of exports less the imported inputs used in the export sectors. All export industries are to some extent dependent on imports, and it is therefore of some importance to estimate the foreign exchange balance of the export sector.

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[1]See, for example, Gerardo P. Sicat, "Import Dependent Import Substitution" (Manila: University of the Philippines, I.E.D.R., Discussion Paper No. 65-6, August 1965), mimeographed.

This concept of "net exports" appears to have been completely ignored in the literature. Perhaps this is because it has always been tacitly assumed that the import dependence of exports was very low and thus could be safely forgotten. Although the hypothesis of insignificant import dependence is inherently plausible, it does seem worthwhile to attempt to estimate the import dependence of the various export industries. Such information, if available, would make it possible to estimate the foreign exchange availability for non-export industry needs of a given level and composition of exports. It would also have policy implications. Other things being equal, exports with a low level of import dependence are to be preferred to those which are highly import dependent.

The main purposes of this paper are to estimate the import dependence of the Philippine export sector over time and to study the factors that have led to a substantial increase in the level of this dependence over the period 1950-1966.

The estimating procedures are of necessity somewhat involved, and the reader who is interested in answers rather than methods may turn directly to Tables 7 and 9 where the results of the computations are summarized. But, given the hazardous and unexplored nature of the terrain, it has been thought advisable to document in some detail the estimating procedures and the nature and sources of the data.

Imports used by export industries are of two main types: capital goods (machinery and equipment) and raw materials. In order to estimate the imports used by the major export industries, the first step was to obtain data on the total inputs of capital goods and raw materials used by the export industries. This is shown in Tables 1 and 2. The input of capital goods in any one year is the depreciation incurred by the existing stock of capital equipment. Columns (2) through (6) of Table 1 show the actual depreciation that was written off for the various types of fixed assets for the year 1965. This is assumed to be equal to the inputs of capital goods. In contrast with the inputs of capital goods, the inputs of intermediate goods, or raw materials and fuels, are shown in Columns (2) through (6) of Table 2. The composition and coverage of these intermediate goods inputs are clear from a reading of the relevant columns of Table 2.[2]

These capital goods inputs and raw material inputs are total inputs of the products concerned, including imported inputs. Estimating the imported component of these inputs is the next major step in the analysis. Before this can be undertaken, however, it is necessary to digress somewhat and discuss the derivation of the depreciation estimates for mining and logging.

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[2] All the material in Tables 1 and 2, except that relating to mining and logging, was drawn from the worksheets of Dr. John Power and Miss Christina Crisostomo. The original source of the data is shown in footnotes to the two tables.

As actual depreciation values were not easily available for these industries, it was necessary to derive them from the value of fixed assets employed in mining and logging. The details of this procedure are shown in Table 3. Columns (1) to (5) of Table 3 give the actual recorded book value of fixed assets as of January 1, 1961. This is the depreciated value of these assets, and it is assumed to approximate their current market value at that time. Columns (6) to (9) show the estimated average life of these assets. These estimates are based largely on accounting practice, modified to some extent by the nature of the industry. Assets used in logging generally have a substantially shorter life than those used in mining. This is especially true of transport equipment which, in the logging industry, consists mainly of short-lived trucks and trailers; the mining industry, on the other hand, depends mainly on a combination of longer lasting trucks and railroad transport.[3]

Columns (10) to (13) give the estimated remaining life of these assets. If there has been a constant annual expenditure on assets in the past, then the average remaining life of the assets will be half the average life of the assets. If, however, the industry is a rapidly growing one, the

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[3]The reader may well think that the estimated life of machinery and other production equipment used in logging is too short. The estimate of five years is based on the average life of yarders which are the main equipment item used in logging. (The only other items of any significance are the chain saws.) The fixed yarder has an average life of 5-6 years and the moveable yarder, 3-4 years.

average remaining life of the assets will be more than half the total life. These considerations were the basis of the estimates of the remaining life of the assets. Investment in logging, for example, was growing very rapidly in 1961, and thus the remaining life of logging assets is assumed to be somewhat greater than half their total life.

The last stage in the calculation is to estimate the depreciation of fixed assets. This is done by dividing the book value of the fixed assets by the estimated remaining life of the assets. This is performed in Columns (14) to (18) in Table 3. Although a number of rough assumptions have been used, it is thought that this method results in depreciation values comparable to the actual depreciation values available for the other industries. It is interesting to compare, for example, the depreciation estimates in the mining sector of Dr. Richard W. Hooley with our estimates.[4] The Hooley estimates, based on the actual depreciation allowances of the mining firms, showed total depreciation in 1959 of ₱16.6 million. This compares with our 1961 estimate of ₱19.3 million.[5]

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[4]See Richard W. Hooley, "Savings and Capital Formation in Mining 1951-1959' (University of the Philippines, Institute of Economic Development and Research), mimeographed.

[5]The coverage of firms is not identical because we have not excluded quarrying from mining. Mining assets, however, account for about 90 per cent of the combined value of assets in mining and quarrying.

Table 1

EXPORT INDUSTRIES: DEPRECIATION OF FIXED ASSETS
(1965)

| Industry | Number of Firms | Depreciation of Fixed Assets | | | | Total |
|---|---|---|---|---|---|---|
| | | Buildings and Structures (₱1,000) | Machinery and other Production Equipment (₱1,000) | Transportation Equipment (₱1,000) | Other Fixed Assets (₱1,000) | (₱1,000) |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Coconut Oil | 12 | 263.3 | 1239.2 | 218.4 | 172.5 | 1893.4 |
| Desiccated Coconut | 6 | 300.9 | 742.9 | 95.2 | 96.3 | 1235.3 |
| Sugar Mill and Sugar Refinery Products | 35 | 4942.4 | 17166.4 | 3661.0 | 2973.0 | 28742.8 |
| Lumber, rough surfaced, not worked | 136 | 672.6 | 3454.1 | 1218.9 | 663.5 | 6009.1 |
| Lumber, rough (produced in sawmills with logging operations) | 14 | 4769.5 | 5499.1 | 321.6 | 108.9 | 10699.1 |
| Total Lumber | 150 | 5442.1 | 8953.2 | 1542.5 | 772.4 | 16708.2 |

Table 1 (continued)

EXPORT INDUSTRIES: DEPRECIATION OF FIXED ASSETS
(1965)

| Industry | Number of Firms | Depreciation of Fixed Assets | | | | Total |
|---|---|---|---|---|---|---|
| | | Buildings and Structures (₱1,000) | Machinery and other Production Equipment (₱1,000) | Transportation Equipment (₱1,000) | Other Fixed Assets (₱1,000) | (₱1,000) |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Veneer and Plywood | 28 | 2,473.8 | 11,098.3 | 1,730.9 | 1,309.9 | 16,612.9 |
| Mining and Quarrying a/ | 101 | 873.0 | 14,271.4 | 1,073.5 | 3,134.0 | 19,351.9 |
| Logging (excl. sawmilling) a/ | 338 | 598.2 | 14,836.3 | 9,068.0 | 2,051.0 | 26,553.5 |

Source: The Republic of the Philippines, Department of Commerce and Industry, unpublished data from the Annual Survey of Manufactures, 1965 (Manila: Bureau of Census and Statistics).

a/ For derivation of depreciation estimates of mining and logging, see Table 3.

Table 2

EXPORT INDUSTRIES: COSTS OF PRODUCTION
(1965)

| Industry | Cost of Raw Materials, Containers Used, and Services | | | | Cost of Fuels Used (₱1,000) | Cost of Electricity Purchased (₱1,000) |
|---|---|---|---|---|---|---|
| | Raw Materials Used (₱1,000) | | Containers and Packing Materials Used (₱1,000) | Total (₱1,000) | | |
| (1) | (2) | | (3) | (4) | (5) | (6) |
| Coconut Oil (12 firms) | Copra, incl. parings and sweepings | 305,121.6 | 1,019.9 | 312,256.9 | 2,495.0 | 393.2 |
| | Corn bran | 2,040.6 | | | | |
| | Coconut oil, crude | 3,987.9 | | | | |
| | Other raw materials | 86.9 | | | | |
| | | 311,237.0 | | | | |
| Desiccated Coconut (6 firms) | Coconut, ripe nuts | 60,434.1 | 1,296.7 | 63,687.4 | 837.6 | 291.0 |
| | Copra, incl. parings and sweepings | 1,484.0 | | | | |
| | Refined sugar, sugar bricks, and sugar cubes | 27.1 | | | | |
| | Other raw materials | 445.5 | | | | |
| | | 62,390.7 | | | | |
| Sugar Mill and Sugar Refinery Products (35 firms) | Sugarcane | 268,368.2 | 19,848.7 | 354,038.6 | 8,407.9 | 950.4 |
| | Lime, Quicklime, Hydrated lime | 729.0 | | | | |
| | Lubricating oils and greases | 14.0 | | | | |
| | Raw cane sugar | 54,435.2 | | | | |
| | Molasses | 2,054.9 | | | | |
| | Caustic soda | 108.6 | | | | |
| | Other raw materials | 8,479.0 | | | | |
| | | 344,188.9 | | | | |

Table 2 (continued)

EXPORT INDUSTRIES: COSTS OF PRODUCTION
(1965)

| Industry | Cost of Raw Materials, Containers Used, and Services | | | | Cost of Fuels Used (₱1,000) | Cost of Electricity Purchased (₱1,000) |
|---|---|---|---|---|---|---|
| | Raw Materials Used (₱1,000) | | Containers and Packing Materials Used (₱1,000) | Total (₱1,000) | | |
| (1) | (2) | | (3) | (4) | (5) | (6) |
| Lumber, rough surfaced, not worked (136 firms) | Logs | 47,206.3 | 13.8 | 60,415.0 | 5,621.5 | 753.1 |
| | Flitches | 608.1 | | | | |
| | Lumber, rough, sawn to dimensions | 12,329.0 | | | | |
| | Other raw materials | 257.8 | | | | |
| | | 60,401.2 | | | | |
| Lumber, rough (produced in sawmills with logging operations) (14 firms) | Logs | 10,840.8 | 289.8 | 11,833.0 | 2,719.9 | |
| | Other raw materials | 702.4 | | | | |
| Total Lumber (150 firms) | | 11,543.2 | 303.6 | 72,248.0 | 8,341.4 | 753.1 |
| Veneer and Plywood (28 firms) | Logs | 55,861.3 | 1,309.8 | 71,955.1 | 4,743.1 | 578.0 |
| | Glues, Adhesives, Pastes, and Bonderizing Chemicals | 7,318.3 | | | | |
| | Inorganic Chemicals | 1,072.8 | | | | |
| | Flour, Wheat | 1,415.3 | | | | |
| | Other raw materials | 4,977.6 | | | | |
| | | 70,645.3 | | | | |

Table 2 (continued)

EXPORT INDUSTRIES: COSTS OF PRODUCTION
(1965)

| Industry | Cost of Raw Materials, Containers Used, and Services | | | | Cost of Fuels Used (₱1,000) | Cost of Electricity Purchased (₱1,000) |
|---|---|---|---|---|---|---|
| | Raw Materials Used (₱1,000) | | Containers and Packing Materials Used (₱1,000) | Total (₱1,000) | | |
| (1) | (2) | | (3) | (4) | (5) | (6) |
| Mining and Quarrying a/ (101 firms) | Crude Ores and Tailings | 1,722.0 | | 60,559.0 | 16,573.0 | 2,005.0 |
| | Explosives | 4,307.0 | | | | |
| | Timber and Lumber | 5,714.0 | | | | |
| | Steel Stock (Mill Shapes and Forms) | 4,862.0 | | | | |
| | All other supplies | 43,954.0 | | | | |
| | | 60,559.0 | | | | |
| Logging (excluding sawmilling) a/ (338 firms) | Felling and rough cutting of trees | 92,646.0 | | 100,770.0 | 15,167.0 | 208.0 |
| | Transportation (hauling of logs in forest) | 731.0 | | | | |
| | Firewood and fuel wood cutting in forest | 544.0 | | | | |
| | Logging contractor | 3,594.0 | | | | |
| | Other logging activities | 3,255.0 | | | | |
| | | 100,770.0 | | | | |

Source: Unpublished data from the Annual Survey of Manufactures, 1965 (Manila: Bureau of Census and Statistics).

a/Cost of production of mining and logging from the Economic Census of the Philippines, 1961. Vol. I, Part A, "Forestry and Logging," and Vol. 2, "Mining and Quarrying" (Manila: Bureau of Census and Statistics, 1965).

Table 3

MINING AND LOGGING: BOOK VALUE, ESTIMATED LIFE AND DEPRECIATION OF FIXED ASSETS, 1961

| Industry | Book Value of Fixed Assets as of January 1, 1961 a/ | | | | | Estimated Life of Assets (Years) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Buildings and Structures (₱1,000) | Machinery and other production Equipment (₱1,000) | Transportation Equipment (₱1,000) | Other Fixed Assets (₱1,000) | Total (₱1,000) | Buildings and Structures | Machinery and other Production Equipment | Transportation Equipment | Other Fixed Assets |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Mining and Quarrying | 17,458 | 71,357 | 6,441 | 31,337 | 126,593 | 35 | 10 | 12 | 15 |
| Logging (excl. sawmilling) | 8,974 | 44,509 | 18,136 | 20,509 | 92,128 | 25 | 5 | 3 | 15 |

| Industry | Remaining Life of Assets (Years) b/ | | | | Depreciation of Fixed Assets c/ | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | Buildings and Structures | Machinery and other Production Equipment | Transportation Equipment | Other Fixed Assets | Buildings and Structures (₱1,000) | Machinery and Other Production Equipment (₱1,000) | Transportation Equipment (₱1,000) | Other Fixed Assets (₱1,000) | (₱1,000) |
| | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) | (18) |
| Mining and Quarrying | 20 | 5 | 6 | 10 | 873.0 | 14,271.4 | 1,073.5 | 3,134.0 | 19,351.9 |
| Logging (excl. sawmilling) | 15 | 3 | 2 | 10 | 598.2 | 14,836.3 | 9,068.0 | 2,051.0 | 26,553.5 |

Source: a/Economic Census of the Philippines, 1961, Vol. 1A and Vol. 2. (Manila: Bureau of Census and Statistics).

b/Estimated.

c/Depreciation Value = Book Value of Fixed Asset over the Remaining Life of the Asset.

Having described the derivation of depreciation estimates for mining and logging, it is now possible to move on to the next stage and derive the value of imported inputs from that of total inputs. Because the data in Tables 1 and 2 are the basic data on which subsequent estimates are based, we should say a few words about the reliability of these data. The sources from which the data were derived also gave information on the total value of production of the industries concerned, and they were found to be broadly consistent with values from other independent sources. It has not been possible to find independent estimates of most of the values in Tables 1 and 2, but in each case the total of depreciation of fixed assets, raw material, and fuel costs bears a reasonable relation to the value of production.[6] Moreover, the values of most of the components appear to be reasonable. This is especially true in the case of the intermediate inputs.[7]

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[6] An exception to this is coconut oil where the value of inputs is almost equal to the value of production. From independent evidence it can be shown that this is because of an overstatement in the value of copra inputs and an understatement of the value of production. For reasons that will become clear later in this paper, these errors have practically no effect on our results.

[7] One exception to this is that the value of sugarcane used by the mills has been understated by about 45 per cent. It follows from the 60:40 sharing ratio between the growers and millers that cane represents about 60 per cent of the value of sugar, not the (approximate) 40 per cent shown here. This discrepancy is modified a little by the inclusion of other sugar products in the total value of production.

The most serious difficulties arise from the use of accounting depreciation values to indicate actual depreciation of fixed assets. Accounting depreciation values may generally be expected to overstate actual depreciation, but they are roughly consistent with what is known of the volume and value of fixed assets in these industries. Furthermore, as will be shown later in this paper, even very large errors in many of the components have very little effect on the final estimates.

The next step was to estimate the imported component of export industry inputs. Tables 4 and 5 show the results of these estimates. Table 4 uses the information in Tables 1 and 2 and, by applying an estimate of the import coefficients, derives values for the imported inputs of fixed assets. The estimates of the import components are given in the sources to Table 4. These are, to a large extent, informed guesses rather than calculations based on hard data.[8] Among the less controversial estimates are those of a 10 per cent import component for buildings and structures, 85 per cent for machinery and other production equipment, and 70 per cent

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[8] In making these estimates I received substantial assistance from Dr. Gerardo P. Sicat. The results, for what they are worth, are something like average guesses.

Table 4

EXPORT INDUSTRIES: ANNUAL ESTIMATED IMPORTED COMPONENT OF DEPRECIATION OF ASSETS

| Industry | Number of Firms | Fixed Assets a/ | | | | Total |
|---|---|---|---|---|---|---|
| | | Buildings and Structures (₱1,000) | Machinery and Other Production Equipment (₱1,000) | Transportation Equipment (₱1,000) | Other Fixed Assets (₱1,000) | (₱1,000) |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Coconut Oil | 12 | 26.4 | 1,053.3 | 152.9 | 51.8 | 1,284.4 |
| Desiccated Coconut | 6 | 30.1 | 631.5 | 66.7 | 28.9 | 757.2 |
| Sugar Mill and Sugar Refinery Products | 35 | 494.3 | 14,591.5 | 2,562.7 | 891.9 | 18,540.4 |
| Lumber, rough surfaced, not worked | 136 | 67.7 | 2,942.7 | 853.2 | 199.1 | 4,062.7 |
| Lumber, rough (produced in sawmills with logging operations) | 14 | 477.0 | 4,674.3 | 255.1 | 32.7 | 5,439.1 |
| Total Lumber | 150 | 544.7 | 7,617.0 | 1,108.3 | 231.8 | 9,501.8 |

Table 4 (continued)

EXPORT INDUSTRIES: ANNUAL ESTIMATED IMPORTED COMPONENT OF DEPRECIATION OF ASSETS

| Industry | Number of Firms | Fixed Assets a/ | | | | Total |
|---|---|---|---|---|---|---|
| | | Buildings and Structures (₱1,000) | Machinery and Other Production Equipment (₱1,000) | Transportation Equipment (₱1,000) | Other Fixed Assets (₱1,000) | (₱1,000) |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Veneer and Plywood | 28 | 247.4 | 9,433.6 | 1,211.6 | 393.0 | 11,285.6 |
| Mining and Quarrying | 101 | 87.3 | 12,130.7 | 751.5 | 940.5 | 13,910.0 |
| Logging (excl. sawmilling) | 338 | 59.8 | 12,610.6 | 6,347.6 | 615.3 | 19,633.3 |

Sources: Based on Tables 1, 2, and 3 using the following assumptions:

a/It was assumed that the imported component of Fixed Assets was as follows: 10 percent for Depreciation of Buildings and Structures; 85 percent for Machinery and other Production Equipment; 70 percent for Transportation Equipment; and 30 percent for Other Fixed Assets.

for transportation equipment.[9] The 30 per cent estimate for other fixed assets is a sheer guess; but because the item is a very small one, the consequences of even a very large error are virtually negligible.

The estimated import component of raw materials (see Table 5) is based on the percentage of the product used that is imported and the nature of the domestic production process. The detailed estimates are enumerated in Note "a' of Table 5. The value of many of the products is very small, and even a large error in our estimate would be of little significance. Among the important products are the difficult items simply labelled Other Raw Materials or All Other Supplies.

For mining, the category, All Other Supplies, includes as major items mill machinery and spares and mine machinery and spares. It also includes chemicals, large quantities of which are needed for the flotation process. An import component of 50 per cent was assumed for this item. For sugar production an import component of 50 per cent was assumed for the item Other Raw Materials, and it is thought to be composed largely of

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[9] The domestic component of machinery and equipment is primarily composed of installation of the equipment, repairs, and the purchase of some locally produced machinery parts. Transport equipment involves a larger domestic component because of the more extensive assembling involved, the manufacture of body parts of some public utilities, some local tires, and repairs.

Table 5

EXPORT INDUSTRIES: ANNUAL ESTIMATED IMPORTED COMPONENT OF RAW MATERIALS USED, FUELS AND ELECTRICITY PURCHASED

| Industry | Imported Component of Raw Materials [a] | Value (₱1,000) | Total (₱1,000) | Imported Component of Fuel and Electricity [b] | |
|---|---|---|---|---|---|
| | | | | Fuels Used (₱1,000) | Electricity Purchased (₱1,000) |
| (1) | (2) | (3) | (4) | (5) | (6) |
| Coconut Oil (12 firms) | Raw Materials Used Other Raw Materials | 26.1 | 26.1 | 998 | 78.7 |
| Desiccated Coconut (6 firms) | Raw Materials Used Other Raw Materials | 133.7 | 133.7 | 335.1 | 58.2 |
| Sugar Mill and Sugar Refinery Products (35 firms) | Sugarcanes | 13,096.4 | 17,458.5 | 3,363.2 | 190.1 |
| | Lubricating Oils and Greases | 14.0 | | | |
| | Caustic Soda | 108.6 | | | |
| | Other Raw Materials | 4,239.5 | | | |
| Lumber, rough surfaced, not worked (156 firms) | | | | 2,248.6 | 150.6 |
| Lumber, rough (produced in sawmills with logging operations) (14 firms) | Raw Materials Used (Logs) | 8,068.4 | 8,336.5 | 1,088.0 | |
| | Other Supplies (Total) | 288.1 | | | |
| Total Lumber (150 firms) | | | | 3,336.6 | 150.6 |

Table 5 (continued)

EXPORT INDUSTRIES: ANNUAL ESTIMATED IMPORTED COMPONENT OF RAW MATERIALS USED, FUELS AND ELECTRICITY PURCHASED

| Industry | Imported Component of Raw Materials a/ | Value (₱1,000) | Total (₱1,000) | Imported Component of Fuel and Electricity b/ | |
|---|---|---|---|---|---|
| | | | | Fuels Used (₱1,000) | Electricity Purchased (₱1,000) |
| (1) | (2) | (3) | (4) | (5) | (6) |
| Veneer and Plywood (28 firms) | Inorganic Chemicals | 1,072.8 | 11,381.2 | 1,897.3 | 115.6 |
| | Raw Materials Used (logs) | 7,764.7 | | | |
| | Other Raw Materials | 2,543.7 | | | |
| Mining and Quarrying (101 firms) | Raw Materials Used | | 29,256.7 | 7,029.2 | 401.0 |
| | Explosives | 3,876.3 | | | |
| | Steel stock (Mill shapes and forms) | 3,403.4 | | | |
| | All other supplies | 21,977.0 | | | |
| Logging (excl. sawmilling) (338 firms) | Raw Materials Used | | | 6,066.8 | 41.6 |

Sources: Based on Tables 2, 6, and 7 using the following assumptions:

a/For Raw Materials Used, it was assumed that the Imported Component was as follows: 100 percent for Lubricating Oils and Greases, Caustic Soda, and Inorganic Chemicals; 90 percent for Explosives; 70 percent for Steel Stocks (Mill shapes and forms); 50 percent of Other Raw Materials with regard to Sugar Mills and Mining; 30 percent of Other Raw Materials with regard to all the other industries; 14.0 percent for logs (Source: See Table 7); 4.9 percent for Sugarcane (Source: see Table 6); and zero imported component for all remaining Raw Materials.

b/For Fuel Used, 40 percent was assumed imported cost, and 20 percent for Electricity.

chemicals. For the other industries an import component of 30 per cent was assumed for Other Raw Materials.

An import component of 40 per cent was assumed for fuel. The major fuels are diesel oil and gasoline, both of which are imported as crude oil but refined in the Philippines. The value added in refining is very substantial, but the machinery and equipment used are all imported. For electricity, the import component of hydro-electric power is less than that for thermal power, and the average imported component is estimated to be 20 per cent.

For two major raw material inputs it proved possible to make reasonably firm estimates of their imported components. Logs are the major raw material inputs into both the lumber and the veneer and plywood industries. The imported component of logging is the sum of the imported inputs given in Table 5 over the value of the production of logging shown in Table 7. This was 14.0 per cent. For the sugar mills the major input is sugarcane, and in Tables 6 and 6A it is estimated that the imported component of sugarcane is about 4.9 per cent. This percentage was then applied to the value of sugarcane used by the sugar mills. As pointed out earlier in this paper, one of the statistical weaknesses of the underlying data is that the value of sugarcane used in the milling process is substantially undervalued. This in turn leads to a significant undervaluation

in the imported component of sugar production. The consequences of this for the final result are taken into account later in the paper.

As was mentioned above, the imported component of sugarcane production is calculated in Tables 6 and 6A. The two major imported inputs in the growing of sugarcane are tractors and fertilizers. The first step in the estimation of the average annual input of tractors was to estimate the value of tractors used in the Philippines. The basis for this calculation can be seen in Table 6, Part IA. The next, more difficult step was to estimate the value of tractors used in sugarcane growing. In order to simplify matters, it was assumed that all tractors in Negros were used for sugar production even though this must somewhat overstate the real situation. In the four major sugar-growing provinces of Luzon, it was assumed that only 20 per cent of the tractors in each province were used in sugar production. The remaining sugar-growing provinces, such as Leyte, Cebu, etc., were ignored. This automatically excludes the tractors used for sugar growing in these areas, but the total number of tractors in these provinces is very small. The results of these assumptions are that 44 per cent of the tractors in the Philippines are assumed to be used in sugar growing, and 86 per cent of the tractors used for sugar are in Negros. The first assumption is not inherently unreasonable, but the second must somewhat overstate the share of tractors in Negros. It is,

Table 6

SUGARCANE: THE IMPORTED COMPONENTS

A. Tractors

I. Value of the Import Component of Tractors

A. Value of tractors in the Philippines

| | |
|---|---|
| Total number of tractors [a] | 8,094 |
| Average price per tractor [b] | ₱ 29,652 |
| Total value | ₱ 239,706,768 |

B. Value of tractors used in sugarcane growing

| | |
|---|---|
| Total number [c] | 2,276 |
| Average price per tractor | ₱ 29,652 |
| Total value | ₱ 67,487,952 |

C. Value of import component per year in sugarcane growing

| | |
|---|---|
| Total value of tractors | ₱ 67,487,952 |
| Estimated life [d] in years | 6 |
| Depreciation per year | ₱ 11,247,992 |
| 85% import component [d] of depreciation | ₱ 9,560,793 |

D. Import component as a percentage of the value of sugarcane:

$$\frac{\text{85\% import component}}{\text{Value of the sugarcane}^{e/}} = \frac{₱\ 9,560,793}{420,326,400} = 2.3\%$$

---

[a] Census of the Philippines, 1960, "Agriculture Summary" Vol. 2 (Manila: Bureau of the Census and Statistics) p. 201.

Table 6

(continued)

b/ Average price per tractor is the weighted average price of wheel type and crawler type tractors imported in 1963.

c/ Census of the Philippines, 1960, "Agriculture Summary" p. 201. It was assumed that all the tractors in Negros Occidental and Negros Oriental were used in the sugar industry, while only 20 percent of tractors in other sugar-producing areas were used for the same purpose.

| | | Total no. | No. used in sugar industry |
|---|---|---|---|
| Negros Occidental | | 1,743 | 1,743 |
| Negros Oriental | | 228 | 228 |
| Batangas | 121 | | |
| Laguna | 231 | | |
| Pampanga | 1,046 | | |
| Tarlac | 126 | 1,524 | 304 |
| | | 3,495 | 2,276 |

d/ Estimated

e/ Estimated.

f/ See fertilizers for estimate of value of sugarcane.

Table 6A

SUGARCANE: THE IMPORTED COMPONENTS

B. Fertilizers

I. Value of the import component of fertilizers

A. Total fertilizer consumption:

| | Quantity | Value |
|---|---|---|
| Importation [a] | 87,927 M.T. | ₱ 15,779,900 |
| Production [b] | 167,897 | 56,788,812 |
| Total | 255,824 M.T. | 72,568,712 |

B. Import Component:

| | |
|---|---|
| Importation | ₱ 15,779,900 |
| 20% of Production [c] | 11,357,762 |
| Total | ₱ 27,137,662 |

II. Import Component of Fertilizer Used in Sugar Industry

A. Fertilizer used in the sugar industry = 40% of total fertilizer consumption [d]

B. Import component: 40% of ₱ 27,137,662 = ₱ 10,855,065

III. Value of Sugarcane Production

A. Value of sugar production

| | Quantity | Value |
|---|---|---|
| Total production [e] | 1,560,000 M.T. | ₱ 700,544,000 |

B. Value of sugarcane [f] : 60% of sugar production = ₱ 420,326,400

IV. Import Component of Fertilizers as a Percentage of the Total Value of Cane Production:

$$\frac{₱\ 10,855,065}{420,326,400} = 2.58\ \%$$

Total imported component of sugarcane production is therefore:

₱ 9,560,793 + ₱ 10,855,065 = ₱ 20,415,858 or 4.88% of the value of production

Table 6A

(continued)

a/ Foreign Trade Statistics of the Philippines, 1963 (Manila: Bureau of Census and Statistics) pp. 89, 191.

Imports of fertilizers were as follow:

| | Quantity | Value |
|---|---|---|
| Crude | 15,264 M.T. | P 1,112,869 |
| Manufactured | 72,663 | 14,667,031 |
| Total | 87,927 M.T. | P 15,779,900 |

b/ Philippine Sugar Institute, Annual Report 1964-65, appendix A18, p. 136.

c/ An import component of 20 percent of the domestic production of fertilizers is an estimated figure. This represents the depreciation of equipment used in the manufacture of fertilizers, which are mostly imported, and an allowance for some imported raw materials.

d/ It was assumed that 40 percent of the total domestic consumption of fertilizers was used by the sugar industry. The Philsugin Annual Report of 1964-65 (Appendix A17, p. 135) reported that total fertilizer consumption in 1964 was 419,847 M.T., and of this amount 126,100 M.T., or 30 percent, was used in sugarcane production. In order to make a rough allowance for imported inputs in sugarcane production other than fertilizers and tractor depreciation, the value of fertilizers used in sugar growing has been increased by one-third to 40 percent of the total.

e/ Philippine Sugar Association (unpublished reports). The value of sugar production is the sum of the value of exports and domestic consumption.

f/ Value of the sugarcane is estimated at 60 percent of total sugar production. This follows from the usual sharing agreement between the millers and the growers whereby the former receive 40 percent of the sugar produced and the latter 60 percent.

nevertheless, true that sugar growing in Negros is more mechanized than it is in the rest of the country, and Negros' share of tractors must be higher than its share of the output of sugar for the country as a whole.

Using an average estimated life of six years and an import component of 85 per cent, it follows that the depreciation on tractors equals 2.3 per cent of the value of sugarcane. No estimate has been made of the import component of the fuel consumed by these tractors, but it is probably equal to at least 25 per cent of the depreciation on the tractors.

The fertilizer component of sugar growing is shown in Table 6A. This estimate, too, is not without its difficulties, one of which arises from the changing share of total fertilizer consumption that is imported from year to year. Imported fertilizer is assumed to have a 100 per cent import component and domestically produced fertilizer, a 20 per cent import component. The share of total fertilizer consumption used in the sugar industry is reported as 30 per cent; but in order to make a rough allowance for imported inputs other than fertilizers and tractor depreciation, this share was raised to 40 per cent. The result of these assumptions is that the imported component of sugarcane is estimated at 4.9 per cent of the value of the cane.

Table 7 is based on all the data and calculations of Tables 1 through 6. It is self-explanatory except for Column (5), perhaps, which is the ratio of Column (3) to Column (4). It is obvious from Column (5) that there is a very substantial variation in the imported component of the different industries.

The major reason for the very low import component of coconut oil and desiccated coconut is that the major inputs, copra and coconuts, are assumed to have a zero import component. This is not quite true, however, because even though tractors and fertilizers are not used,[10] copra and coconuts do use transport facilities which have a substantial import component. Because of estimation difficulties this import component has been ignored. The cost of transporting copra to the final markets, however, would indicate that it is not a negligible amount and may be on the order of 2-3 per cent of the total value of production. It is also true that the real imported cost of transporting most of the products has been underestimated and that this causes a slight underestimate of the real degree of import dependence.

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[10] Some coconut plantations use fertilizers, but the total amount is negligible.

Table 7

THE IMPORT DEPENDENCE OF EXPORT INDUSTRIES

| Industry | Value of Imported Inputs | | | Value of Production | % of Imported Component to Value of Prod. |
|---|---|---|---|---|---|
| | Fixed Assets (₱1,000) | Materials, Fuels and Electricity (₱1,000) | Total (₱1,000) | (₱1,000) | (₱1,000) |
| | (1) | (2) | (3) | (4) | (5) |
| Coconut Oil | 1,284.4 | 1,102.8 | 2,387.2 | 323,711.6 | 0.7 |
| Dessicated Coconut | 757.2 | 527.0 | 1,284.2 | 90,090.1 | 1.4 |
| Sugarcane | 9,560.8 | 10,855.1 | 20,415.9 | 420,326.4 | 4.9 |
| Sugar Mill and Sugar Refinery Products | 18,540.4 | 21,011.8 | 39,551.0 | 696,750.7 | 5.7 |
| Logging | 19,633.3 | 6,108.4 | 25,741.7 | 184,131.0 | 14.0 |
| Lumber | 9,501.8 | 11,843.7 | 21,345.5 | 146,708.3 | 14.5 |
| Veneer and Plywood | 11,285.6 | 13,394.1 | 24,679.7 | 131,510.5 | 18.8 |
| Mining and Quarrying | 13,910.0 | 36,686.9 | 50,596.9 | 214,081.0 | 23.6 |

Source: Column (1): Table 4, Column (2) for all industries except sugarcane. Sugarcane, Table 6.

Column (2): Total of materials, fuels and electricity given in Table 4. For sugarcane see Table 6A.

Column (4): Annual Survey of Manufactures, 1965 (unpublished) (Manila: Bureau of Census and Statistics). For mining and logging the source is the Economic Census of the Philippines, 1961, Vol. 1, Part A, and Vol. 2 (Manila: Bureau of Census and Statistics, 1965).

Another reason for the low import component of coconut oil and desiccated coconut is that the value added in these processes is very low. The value added in coconut oil, for example, is only a little over 20 per cent. Coconut oil involves a modest amount of processing of a product with an assumed zero import component.

Both sugarcane and sugar production have relatively low import components although they are significantly higher than that of the processed coconut products. Earlier in this paper, we mentioned that one of the data weaknesses of Table 1 was the understatement by about 45 per cent of the value of sugarcane used in the mills. If a full adjustment is made for this understatement, then the import dependence of sugar production rises from the 5.7 per cent in Table 7 to 6.4 per cent.

Wood products are substantially more import dependent than sugar or coconut products. In the case of sugar and coconut products, the value of imported capital inputs (Column 1) was roughly equal to the value of imported intermediate goods imports (Column 2). For logging, however, capital goods imports are more than three times as large as raw material imports.[11] This reflects the capital intensive nature of the industry with

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[11] The raw material inputs used in logging must be somewhat understated because fuels were the only input included. Imported components other than fuel and fixed assets would probably not be very large, but no data are available as to their magnitude.

its large investment in short-lived yarders and transport equipment. A moveable yarder[12] lasts as little as three years and costs around ₱170,000. A medium-sized firm will have five or more. Because of the appalling state of the roads in most logging areas, the heavy trucks and trailers are subject to rapid wear and tear. In addition, the building of their own roads requires heavy investment in bulldozers and road-making equipment by logging firms.

The high import component of logging is reflected in the high imported intermediate goods inputs in the lumber and the veneer and plywood industries. Both industries also require a large investment in machinery and production equipment. In the case of the veneer and plywood industries, this raises the imported component to almost 19 per cent of the value of production.

For all the wood products industries it is probable that our estimate understates the total imported component by two or three percentage points. This is because of our inability to include supplies other than fuel in the raw material inputs of logging.

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[12] The yarder hauls and lifts the logs to the trailer.

The mining industry has the highest import component, and its imports of materials and fuels are nearly three times as large as its imports of fixed assets. (See Table 7.) However, quite a large share of the items included under materials are, in fact, mill and mine machinery and spares. They would be better classified as fixed assets.

In terms of their dependence on imports, the export industries fall neatly into the two categories, traditional and modern. Whatever disadvantages the traditional industries of coconut products and sugar may have, either real or imagined, it is certain that they are much less import dependent than the modern capital intensive industries of logging and mining.

Shaky as much of the data are, the likely bias is to understate slightly the imported component throughout rather than change the relative import dependence of the various industries.[13] Coverage of firms in some of the industries, especially wood products, is incomplete, but this is unimportant so long as sufficient firms are included to make the sample representative of the industry.

Many of the individual components of the estimates must be subject to large margins of error. But there is no reason to think that these error

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[13] This bias is because of undercoverage of the imported components and has been discussed in the text.

terms are systematically biased. However rough the estimates, they are certainly better than none at all. Information exists to refine most of them considerably, but it is thought that such refinements would not significantly change our estimates of import dependence.

The next step is to estimate the significance of these findings for the foreign exchange balance of Philippine exports. Over most of the period from 1950 to 1966 the export of coconut products, sugar products, wood products, and minerals have accounted for well over 80 per cent of total exports (see Table 8). The only other exports of any significance are abaca, tobacco, textile yarn and fabrics, miscellaneous manufactured articles, and re-exports. Together with the four major export groups these products have generally accounted for 90-95 per cent of total exports.

In order to estimate the foreign exchange balance of exports, an import component was "guessed" for these minor exports. The import component of abaca and tobacco was assumed to be 1 per cent, and that of canned pineapples, textiles, and miscellaneous manufactures was estimated at 25 per cent. Re-exports were estimated to have a 90 per cent import component. No estimate was made for the import component of the remaining exports. The import component of each export product was calculated for the years 1950, 1955, 1960, and 1966. The results are shown in Table 9.

Table 8

Philippine Exports
(Value in F.O.B. Million U.S. $ and Percentage Shares of Total Exports)

| Year | Coconut Products a/ | | Sugar Products b/ | | Wood Products c/ | | Minerals d/ | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Value | % Share | Value | % Share | Value | % Share | Value | % Share | Value | % of Total Exports |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| 1950 | 178.4 | 53.9 | 46.5 | 14.0 | 10.8 | 3.3 | 13.0 | 3.9 | 248.7 | 75.1 |
| 1951 | 196.0 | 45.9 | 67.2 | 15.7 | 17.4 | 4.1 | 26.5 | 6.2 | 307.1 | 71.9 |
| 1952 | 121.4 | 35.1 | 95.4 | 27.5 | 19.1 | 5.5 | 34.9 | 10.0 | 270.8 | 78.1 |
| 1953 | 153.8 | 38.6 | 98.5 | 24.7 | 31.5 | 7.9 | 35.3 | 8.8 | 319.1 | 80.0 |
| 1954 | 163.9 | 40.9 | 108.6 | 27.1 | 36.3 | 9.1 | 35.5 | 8.8 | 344.3 | 85.9 |
| 1955 | 152.4 | 38.1 | 110.0 | 27.4 | 43.3 | 10.8 | 40.4 | 10.0 | 346.1 | 86.3 |
| 1956 | 175.9 | 38.8 | 103.4 | 22.8 | 51.5 | 11.4 | 57.0 | 12.5 | 387.8 | 85.5 |
| 1957 | 172.6 | 40.1 | 86.6 | 20.0 | 48.8 | 11.3 | 54.8 | 12.7 | 362.8 | 84.1 |
| 1958 | 184.0 | 37.3 | 120.4 | 24.4 | 77.0 | 15.6 | 52.7 | 10.6 | 434.1 | 87.9 |
| 1959 | 184.1 | 34.8 | 117.8 | 22.2 | 95.1 | 18.0 | 54.9 | 10.3 | 451.9 | 85.3 |
| 1960 | 178.0 | 31.8 | 138.3 | 24.6 | 105.2 | 18.7 | 61.6 | 10.9 | 483.1 | 86.0 |
| 1961 | 122.0 | 24.6 | 139.5 | 27.9 | 102.0 | 20.4 | 57.4 | 11.4 | 420.9 | 84.3 |
| 1962 | 169.0 | 30.3 | 127.0 | 22.8 | 125.0 | 22.4 | 51.9 | 9.3 | 472.9 | 84.8 |
| 1963 | 245.0 | 33.7 | 155.0 | 21.3 | 169.8 | 23.3 | 66.5 | 9.1 | 636.3 | 87.4 |
| 1964 | 247.0 | 33.2 | 160.6 | 21.6 | 167.3 | 22.5 | 61.5 | 8.3 | 636.4 | 85.6 |
| 1965 | 244.0 | 31.8 | 142.4 | 18.5 | 161.1 | 21.0 | 77.0 | 10.0 | 624.5 | 81.3 |
| 1966 | 280.0 | 33.4 | 115.9 e/ | 13.8 | 226.5 f/ | 27.0 | 115.1 | 13.7 | 737.5 | 87.9 |

Source: Central Bank, Statistical Bulletin, December, 1966.

a/Copra, coconut oil, copra meal and cake, desiccated coconut.
b/Centrifugal sugar and molasses.
c/Logs, lumber, veneer, and plywood.
d/ Metalliferous ores including metal scrap.
e/Centrifugal sugar excluding molasses (which was valued at $9.97 million in 1965).
f/Wood products except veneer (which was valued at approximately $10 million in 1965.

Table 9

THE FOREIGN EXCHANGE BALANCE OF PHILIPPINE EXPORTS

(Million U. S. dollars)

| Year | Foreign Exchange Balance of Exports | | | Percentage of Imported Inputs to total Exports (3)/(2) |
|---|---|---|---|---|
| | Total Exports | Imported Inputs | Balance (Net Exports) (2) - (3) | |
| (1) | (2) | (3) | (4) | (5) |
| 1950 | 331.0 | 15.6 | 315.4 | 4.7 |
| 1955 | 400.6 | 30.7 | 369.9 | 7.7 |
| 1960 | 560.4 | 45.7 | 514.7 | 8.2 |
| 1966 | 838.0 | 80.3 | 757.7 | 9.6 |

From Table 9, it is clear that the value of imported inputs (Column 3) rose at a substantially faster rate than that of total exports (Column 2). As a result, the percentage of imported inputs to total exports rose from 4.7 per cent in 1950 to 9.6 per cent in 1966. The cause of the growing import dependence of Philippine exports has been the rise in relative importance of import dependent minerals and wood products. The share of wood products and minerals in total exports rose from 7.2 per cent in 1950 to 29.7 per cent in 1960 and 40.7 per cent in 1966 (see Table 8).

The increasing import dependence is not a result of a growth in the relative share of the minor import dependent products such as manufactures, textiles, and pineapples. In fact, the share of these products in total exports was lower in 1966 than in 1950.

The high growth rates of the import dependent wood products and minerals is shown most vividly in Graph 1. The higher than average growth rate of minerals occurred between 1950 and 1952 and again between 1964 and 1966. On the other hand, wood products grew at a much faster rate than total exports over the whole period. The inverse of the higher than average growth rates of minerals and wood products has been the relatively lower growth rates of coconut products and sugar (see Graph 1).

Despite the growing import dependence of the export sector, it still remains true to say that the export sector is not highly import dependent. In 1966, the estimated imports used by the export sector amounted to $80.3 million, leaving a net export total of $757.7 million. In other words, $80.3 million in imports was needed to produce exports worth $838 million. For the reasons explained in the text, it is likely that this is a conservative estimate and that the actual import component was somewhat larger. If long-run trends of the past continue into the future, exports will grow increasingly dependent on imports.

It is unfortunate that this increased dependence on imports is not a result of genuine export diversification and the growth of manufactured exports but merely a change in the composition of essentially unprocessed products.[14]

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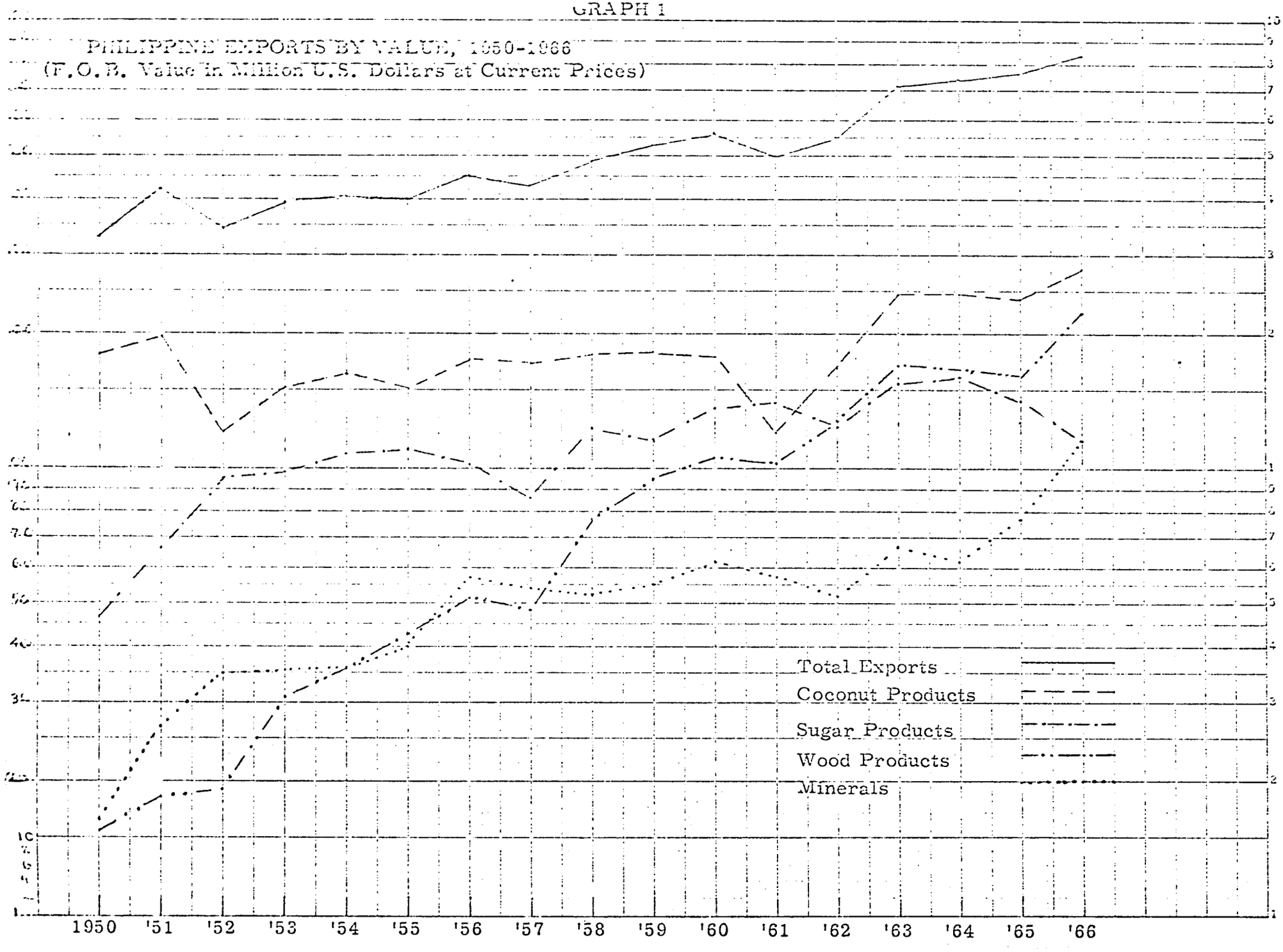
[14]It is true that plywood is a highly processed product, but log exports in 1965 and 1966 were ten times the value of plywood exports.

GRAPH 1

PHILIPPINE EXPORTS BY VALUE, 1950-1966
(F.O.B. Value in Million U.S. Dollars at Current Prices)