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Overview of Statistical Data Sources and Notes for Estimating Primary Industry and Manufacturing GDP of Philippines -A Comparison with the Hooley Estimates

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1. Introduction

The purposes of this paper are below.

- (1) Explain the relationship between the statistical data sources and estimated components of primary industry and manufacturing, which are aggregated into each total value added from 1902 to 1940.
- (2) Summarize the estimation methods and results, and explain the differences from the previous study by Professor Richard Hooley.

Professor Richard Hooley's GDP estimate of the Philippine economy in pre-World War II period was published as Hooley [2005] (hereafter referred to as **the Hooley estimates**), which analyzed the U.S.-administered economy. This is the most important previous study not only in our estimates of two sectors, also in the whole historical estimation of the Philippine economy. It is always referred to in our estimates of other industries¹. More than half of the statistical sources used in the Hooley estimates are also placed in the basic statistical sources for our GDP estimation of Philippine economy.

The Hooley estimates are probably the only comprehensive study of long-term economy of Philippines depending on historical statistics covering the period from pre-World War II to the present. The economic statistics from 1902 to 1990 are examined in his study, and numerical revisions to the original data mainly for the prewar period were made intensively. We are fortunate to be provided the valuable data, which has made the process of estimation available to us. The worksheet, on which he wrote down the detailed working process, is the starting point of our estimates process as same².

We will organize and review the detailed estimation methods of the Hooley estimates and the use of historical data, which are not normally published, and finally compare them with our estimates methods.

<Table 1.> Basic Statistics

2. Statistical data sources and estimated components

The sources of the historical statistics used in the Hooley estimates and our estimates are summarized below. Hereafter, the title of the statistical sources will be abbreviated to the

¹ Other previous estimations are Hooley [1968] and Baba Keinosuke [1943]. For a detailed review of studies on Philippine GDP estimates, see Nagano [2007].

² Limited to agricultural products, the earlier results for the prewar period were published by Odaka and Kanbayashi [1999]. Census data and agricultural statistics from the Bureau of Agriculture were compared to estimate production, production value, and cultivated area.

numbers listed in Table 1³. *The Statistical Bulletin of the Philippine Islands* (**Ref. No.1**) is the most basic data source for GDP estimation in prewar period. It is a compilation of annual data on a wide fields of Philippine society and economy, including population, education, and sanitation, based on information from the various bureaus. For example, information for agricultural products is an excerpt from the Bureau of Agriculture's survey. The quantity and value of production of the major agricultural crops and the major manufacturing commodities are available.

The original information of agriculture for the Ref. No.1 comes from the special report of Bureau of Agriculture, *The Last Annual Report of the Bureau of Agriculture* (**Ref. No.2**). This is an unpublished annual report from the Bureau to the U.S. government, which is republished as Youngberg [1930]. It provides detailed information on the major crops: palay, coconuts, sugar cane, shelled corn, abaca, maguey, tobacco, cacao, and coffee⁴. Ref. No.2 provides detailed summaries from 1910 to 1929 with time series tables, which provides data series of quantity, value and acreage of land planted by each major and minor crops. The report covers all aspects of agriculture, including the support activities carried out by the Bureau of Agriculture, and are published in June for the current fiscal year.

The Annual Report of the Director of the Plant Industry 1931 (**Ref. No.3**) is a continuation of Ref. No.2, but only contains data of 1930 and 1931. In order to link to later years, it is necessary to rely on *The Philippine Statistical Review* by the Department of Agriculture (**Ref. No.4**). Ref. No.4 is a quarterly publication which reports economic conditions and statistics for each fiscal year, as well as contains an analysis of those conditions and statistics, for example wholesale price, market prices, and export of some commodities. From 1934 (vol. 1) to 1936 (vol. 3), agricultural statistics are presented in one of the four issues from the first season. The 1940 edition (**Ref. No.5**) and 1946 edition (**Ref. No.6**) of *the Yearbook of Philippine Statistics* are statistical sources that led to postwar, but each was produced by a different department. In particular, Ref. No.5 is the only data source titled “statistical yearbook” published by the Bureau of Censuses for the prewar period.

The basic method in the Hooley estimates depends on these data sources complemented by the *Philippine Statistical Yearbook 1978* (**Ref. No.7**) published by the National Economic Development Authority (NEDA) which began publication of statistical yearbooks in the 1970s⁵. And for missing data in these data series, the *Census of the Philippine Islands* 1903 edition (**Ref. No.8**), 1918 edition (**Ref. No.9**), 1939 edition (**Ref. No.10**) are used to interpolate the missing data. Statistical data sources for economy of Philippines in prewar period, when the

³ For an explanation of statistical data for the prewar period, see Odaka and Kambayashi [1999]. For trade-related statistical data in particular, see Nagano [2007].

⁴ The Bureau of Plant Industry is a reorganization of the Bureau of Agriculture. For more information on the Bureau of Agriculture itself, see The Bureau of Plant Industry [1952].

⁵ The National Economic Council (NEC), which was responsible for economic planning and statistics, was reorganized and NEDA was established in 1973. For more information on the statistical system in the Philippines, see Nozawa [2002] or Nozawa [1999].

economy is dominated by the primary industries, are classified mainly into those edited by the Bureau of Agriculture and others. And the Hooley estimates and our estimates draw strongly on the Bureau of Agriculture⁶.

Next discussion is about statistical data on the industry of livestock, forestry industry, and fisheries industry. The number of livestock and poultry in the prewar period is available in the 1919 edition of Ref. No.1, which covers data series from 1913 onward. By using the annual editions of Ref. No.1, the information on the number of major livestock: carabao, cattle, horse, mule, goat, and sheep are obtained until 1929. Since there are few comprehensive statistics for the period after 1929, it is necessary to combine several different data sources to estimate important data series such as number of livestock and slaughtered animals up to 1940. We have obtained the figures from 1929 through 1940 from Ref. No.3. Data series for Poultry (chicken and goose) are reported for only one year each in Ref. No.8, No.9, and No.10. No other data on poultry are found in any data sources except for the census years. It is said that poultry breeding has not begun widely until the 1910s⁷.

The annual harvests of logs, the timber cuts from the forest are defined as the production activity of the forestry industry. These logs are sawmilled by the same owner into temporarily processed lumber, and in some cases, even into plywood or veneer. However, these activities should be considered as manufacturing. The quantity of production of byproducts such as resins, bamboo, rattan, and ivy used for daily necessities also are included in the total value added of forestry industry.

Prewar statistics on the quantity of various logs are reported since 1908 in Ref. No.1 and are compiled by the Bureau of Forestry industry. The Hooley estimates relies primarily on Ref. No.1 for the production, and the changes in value added between the three census years are related to the increase rate of the production over the same period⁸. On the other hand we attempt to estimate the quantity and value of production each year as possible. We will make use of the amount of trees (logs) categorized by 16 major species and the quantity of byproducts, which are available from each annual edition of Ref. No.1 for estimating forestry industry production from 1908 to 1929. In addition, these data series are estimated for public and private ownership of forests separately. Thereafter, in addition to data series from Ref. No.3 and No.4, supplementary data from prewar Japanese government and research institutions are used to complete the data series up to 1938⁹.

There are no continuous data series of production reported by categories for the domestic

⁶ The first postwar statistical yearbook was *the Yearbook of Philippine Statistics 1946*, compiled by the Bureau of Census and Statistics in 1947, which was published until the 1969 edition in 1971. This was followed by the publication of *the Philippine Statistical Yearbook* series by NEDA in 1974.

⁷ Bureau of Plant Industry [1952].

⁸ For example, for the years of 1903 and 1918 census, a proportional coefficient is obtained from (value added of 1918 – value added of 1903) / (quantity of 1918 – quantity of 1903) and multiplied by the annual quantity. Export prices are applied to the calculation of the value added in 1939 constant price.

⁹ We used the Fifth Division of the Trade Bureau of the Ministry of Foreign Affairs [1940] and the East Asia Research Institute [1941].

fishery industry in the prewar period. The set of quantity and value of fish caught are reported only for 1938 in Ref. No.10. The quantity data is missing from the previous two censuses. The Hooley estimates for the fisheries industry makes use of the value from each three censuses to interpolate the value between the censuses themselves. Ref. No.1 contains some information on the quantity and value of export related to fisheries industry, including processed food products, which is reported by the Bureau of Customs as trade statistics. As in the case of livestock and poultry, the problem of data consistency is that there are differences in the reported components because of the revision in postwar period. It is difficult to compile consistent statistical tables through both periods, since the postwar data is categorized by types of businesses: commercial, non-commercial, fishing or aquaculture.

The value added ratios applied to the major products in the Hooley estimates are derived from unpublished document edited by NEDA in 1978. *Manual on the Philippine System of National Accounts*: (Ref. No.11) doesn't contain statistical data series and explains the concept of the SNA and the methods to calculate data for each industry. The manual was revised to the new SNA and recompiled in 1993. On the other hand, we obtained different value added ratios from the International Input-Output table of 1978 published in postwar¹⁰.

Ref. No.1 and No.3 are regarded as statistical abstracts which also provide information about the major manufacturing industries as well as the primary industry. The data series of the quantity and value of productions are available for cigars, cigarette, sugar, copra, coconut products and alcoholic beverages. The information for cigars and cigarette is reported by the Bureau of Inner Revenue and for sugar by the Sugar Association. These manufacturing industries are characterized by the fact that they input crops listed above as raw materials. Therefore, these data series are shared not only by the Bureau of Agriculture in Ref. No.2 but also by the Census Bureau in Ref. No.10 especially on information about sugar cane and coconuts. Almost the same data series are obtained from different data sources as of different industry. Surveys of the entire manufacturing, including household industries, were conducted in the 1903 and 1918 censuses. The data series available for our estimates have changed in components of production by industry between the two periods so that few tables have continued from 1902 to 1918. Finally we take only data series of total value of production from Ref. No8 and No.9.

The survey of manufacturing to be published in Ref. 10 was lost in the war before published and we are not able to obtain most of it (Hooley [2005]). Ref. No.6 provides abstracts only for total value of whole manufacturing and quantities of several major industries. The information on manufacturing in prewar Philippines is limited. We don't have any other choice but to take only the total value at three census years for the prewar period from 1902 to 1940 as same as the Hooley estimates,

¹⁰ Institute of Developing Economies [1983].

3. Estimation Method

3-1. Major Crops

In the each section below, we compare our estimates method with that of the Hooley estimates and point out differences and similarities. The method of the Hooley estimates is that total quantity of production divided by total population is assumed to present per capita domestic consumption of each major crop. Then the validity of the calculated results is examined, and domestic supply is also calculated by using data series of export. We think that this process is an attempt is to combine another data series to the Ref. No.1 to validate the estimation. On the basis of pseudo-consumption per capita, quantity of production is corrected for the entire postwar period since 1902. The validity of this indicator itself is determined based on the situation of the crop at the time.

In the Hooley estimates, all missing data are interpolated. Since only each three year of data are available from the prewar censuses, a linear interpolation between 1902 and 1910 in the Bureau of Agriculture data series is applied. Otherwise an average value of several years after 1910 is regarded as the figures from 1902 to 1909. Because of differences in survey systems and numerical estimation methods, gaps exist between the Census data and Bureau of Agriculture data. We must be careful when interpolating missing data by using both data sources. The Hooley estimates uses the socioeconomic background as a criterion in selecting either one of the sources.

We also correct and revise both the data of 1902 from Ref. No.7 and the data series after 1910 from Ref. No.1 and No.2, as same in the Hooley estimates, by calculating the per capita domestic supply. The Philippine population statistics are provided by the Bureau of Census over a longer period than the statistics of agricultural crops we concern in this paper.

When revision is applied to the data of 1902 Census we should examine the result against the consistency of the statistical data series of the Bureau of Agriculture since 1910. This working process is an argument for the trends in these data. This means that after missing data series is interpolated between the Census and Bureau of Agriculture data the result is matched to the trends of data series in the Bureau of Agriculture data.

The criterion used to determine the validity of the estimation results in the Hooley estimates, pseudo per capita consumption, is more clearly defined by using trade statistics. The domestic supply should be calculated for the entire period under consideration. The domestic supply is defined as (domestic production – exports + imports). On this basis, per capita domestic supply (consumption) is calculated by deducting farm expenditures for household consumptions, seed and feed if related data are available. And the validity of the quantity of production is determined against the trends of these results. In other words, we are discussing about the validity of the estimation by testing whether the results are also consistent with trade statistics. We rely on the data of exports and imports for each agricultural crop and

further assume a stable trend in per capita domestic supply.

Reviewing the Hooley estimates from a critical perspective we find that only a single criteria is applied and no attention is paid to interrelationships with other criteria. One indicator is examined to obtain revised data series. If these are valid when applied to another related indicator from the same data sources, then the result of revision could be appropriate and keep the consistence with the entire data series. First, we will examine the validity of the revision itself applied to the quantity of production. Second, the revised quantity per unit area cultivated (planted) by agricultural land data is examined. Agricultural statistics of Philippines are the summation and the average of figures reported in each province. The provincial quantity and value of production are estimated based on both the area planted and average quantity of production of each province, then are summed up to nation-wide total. Therefore, there should be no anomalies in the average quantity of production per area cultivated. These estimating processes are different from the Hooley estimates.

As mentioned above, the price information for crops in Ref. No.1 and No.2 comes from the value of production divided by the quantity. It is the average producer price calculated by reports from various provinces. We make use of the nominal price to calculate the value of production after revising the quantity of production. In principle, any revision is applied to the nominal price. This also differs from the Hooley estimates, which make various corrections to prices¹¹. Note that after calculating total quantity and value in Ref. No.1 and No.2 the result was converted to a figure of calendar year because the data series of agricultural crops in prewar period comes from the survey conducted at the end of physical year.(June 30th).

In addition, the value added ratios in the Hooley estimates were applied uniformly to agricultural crops. We applied an individual value added ratio to each agricultural crop to ensure the accurate estimation. Since there is little information on value added ratio for primary industries, we obtain individual ratios from the 1975 edition of the Philippine Input-Output Tables by the Institute of Developing Economies.

3-2. Minor crops

Besides the major crops, we also estimate quantity, value and value added of crops classified as minor for the food crops and commercial crops¹². Though the minor crops are a group of crops that become increasingly important as commodity diversify in the postwar period, they don't exist in the data sources of the prewar period. While it is difficult to create individual series, the Hooley estimates attempt to solve this problem by calculating the value of the minor crops as a fixed portion of the total value of major crops. The Hooley estimates, based on Ref. No.11, defines the value of the minor commercial crops as 3% of the total value of major

¹¹ In the Hooley estimates, some modifications are made to the average price or the prices are estimated directly. But the method and the evidence is not clear.

¹² The minor commercial crops are rubber, ramie, fiber crops, and other non-food crops. And minor food crops are banana, pineapple, mango, cassava, camote, peanuts, mongo, onion, garlic, tomato, eggplant, cabbage, citrus, and other root crops, tubers, spices, fruit bearing vegetables, leafy or stem vegetables.

commercial crops. We have confirmed that the ratios for minor crops obtained from Ref. No.11 are also roughly calculated in the prewar data sources.

Some information on minor food crops is obtained from the censuses. The Hooley estimates interpolates the ratio of minor food crops between each prewar census years and applies the series of ratios to the total value of major food crops for each year. The ratios calculated for each census year are 53.5% in 1902, 29% in 1918, and 27.6% in 1938.

Comparing our result with the Hooley estimates as the whole agricultural production, there is a slight difference in total value of production from 1902 to 1910, the period of interpolated data, however no fundamental difference are found in the overall level and trend of total value of production. Note that the Hooley estimates includes a 10% upward adjustment to the total value considering the underestimation. The adjustment for the underestimation is not applied at the final stage of our estimates process because we could not obtain the obvious evidence. If these corrections were excluded we obtained a slightly larger value of production.

3-3. livestock and poultry

According to data compiled by the Bureau of Plant Industry in the postwar period poultry breeding and production has not taken off widely until the 1910s. Our estimate covers the quantity and value of production and number of animals slaughtered for the major animal livestock: carabao, cattle, hog, and goat, chicken and duck. We use Ref. No.1 to estimate the main livestock from 1902 to 1940, however, prewar poultry data series, both quantity and value, are only available for each census year. In addition the data series on dairy products and eggs are almost nonexistent for the prewar period. And as in the case of agricultural products both quantity and value of production for the major livestock is missing from 1903 to 1909. We apply the method of interpolating census data series in most of poultry production estimation.

When estimating the quantity and value of livestock and poultry production, it is assumed that farmers are shipping livestock for slaughter. The components covered by Ref. No. 1 are the actual number of animals "inventory" on farms, their value, and the number of animals slaughtered, which are published continuously from the prewar period until the early 1970s¹³. Since inventory is stock data, it is necessary to calculate the net increase in estimating value added, as in the case of number of slaughtered animals at a slaughter house. "Live weight" as flow data series was added in The Statistical Yearbook of 1980, and the value of production was also adjusted to a data series of live weight. We considered this type of data as the quantity of production by animal breeding farmers for estimating the total value added of livestock in the prewar period.

According to the Bureau of Agricultural Statistics, which is responsible for postwar agricultural statistics, live weight is defined as the actual weight of livestock shipped primarily

¹³ The inventory of each year is the data series of the number of animals kept on farms at the end of December of the previous year. Reported livestock data is always delayed by one year due to difficulties in data aggregation (The Bureau of Plant Industry [1952]).

for slaughter, and it doesn't include imported livestock¹⁴. It refers to new born livestock from breeding stock primarily for meat. We not only estimate the data series of live weight back to the prewar period, but also consider the number of newborn livestock as a net increase in livestock numbers. The increase or decrease in the inventory forms the basis of our estimates, however we did not decompose the changes as semi-processed goods. The numbers of newborn animals or shipped animals in a given year are regarded as the quantity of production, which was multiplied by the unit price per mature animal for calculating the value of production. For the net increase in livestock of farms, imported animals for slaughtered are added to the number of newborn livestock.

Data series of the livestock and poultry in the Hooley estimates have only total value added of aggregated production, so that the comparison of estimation methods is rather limited. Though it is difficult to extend the data series for livestock and poultry industry after the data series for major livestock covered by Ref. No.1 ends in 1929, even detailed estimating method for the number of head count and its value are not available from the worksheet. Recalculating the value added to the total value of livestock inventory based on the value added ratio 0.72 in the Hooley estimates, we compared it with our results. The estimated value of livestock in the Hooley estimates of 1902 shows the largest difference, about 52 times higher. In subsequent periods, the difference narrowed to about 3 times the value of 1940. There would be a substantial difference in the assumption of the level of unit price (price per head in the Hooley estimates).

3-4. forestry industry

The Hooley estimates use the value of forestry industry production reported in each three census (Ref. No.8, No.9 and No.10) and the value added ratio of Ref. No.11 to calculate the value added of 1903 and 1918 at 1939 constant price. This value is interpolated to be proportional to the increasing or decreasing quantity of production between the three census years.¹⁵ The 1939 prices applied to the value added calculations are export prices for forestry industry products.

We use data series of major species of timber cut from 1910 to 1929, the period for which both the quantity from public forest and total quantity from whole forests by group are listed in Ref. No.1. Forestry industry production is reported by classification of tree species, and many byproducts are also covered. Based on this series of data, we will estimate the data series of quantity of timber cut from both public and private owned forests from 1902 to 1940. For the period after 1929, the data series from Ref. No. 4, No.6 and No.10 are used together and the estimation is extended to 1940 by applying the ownership ratio between public and private

¹⁴ Information from *Metadata for National Agricultural Statistics in the Philippines 3rd edition*, compiled by The Bureau of Agricultural Statistics Authority, published in Open STAT publication. (<https://openstat.psa.gov.ph> (accessed October 1st 2023)).

¹⁵ For example, $\{(value\ added\ of\ 1918 - value\ added\ of\ 1903) / (quantity\ of\ 1918 - quantity\ of\ 1903)\} \times$ quantity of each year.

to the total quantity of total production¹⁶. In the case of forestry industry byproducts, even between 1918 and 1929, the period covered by Ref. No.1, the number of components fluctuates to such an extent that it is difficult to distinguish between missing data and the absence of the production itself. Each component of byproducts is considered to have no production for that year if there is no record in the data sources.

Since there are only a few years for which unit prices are available for both the quantity and value of forestry industry production, export prices are used to calculate the value as in the Hooley estimates. From trade statistics, the quantity and value of export are obtained for logs and lumber of all major groups of tree species, as same for byproducts, for the period from 1915 to 1940.

Comparing the quantity of production, our results are somewhat larger than the Hooley estimates. This is probably because we calculate the total quantity by summing up the quantity of major four species of timber cut, which is estimated respectively. However, for reasons that are unclear in detail, the Hooley estimates is about 5.5 times larger in the value of production value on average, during the postwar period. In the estimation process noted on the worksheet, it is stated that the value of production should be adjusted upward, 1.75 times larger, to account for the omission of the component to be estimated (underestimation). However, the difference is about 3 times larger than our result.

3-5. fisheries industry

As mentioned previous section, with respect to fisheries products, statistical data sources provide little information about the quantity of production. The quantity of annual production has begun to be published in the series of the statistical yearbooks since 1974, however it is difficult to produce statistical tables that are consistent with prewar data series.

The Hooley estimate uses three censuses for the fisheries industry and interpolates the value of production data. Detailed process noted on the worksheet is that the value of each three prewar census should be adjusted upward by multiplying 4.5 because the value of production reported by the Bureau of Fishery in 1948 is larger than those by the census of the same year

Our method of estimation, like the Hooley estimate, used the quantity and value of 1938 with certain upward adjustments as the basis for the estimation¹⁷. The difference from the Hooley estimate is that our estimate uses the ratio of export quantity to the amount of domestic fish caught. The ratio is 0.15%, and when applied to the export amount in the prewar period the estimated quantity per capita is 12 kg in 1938. Since the quantity per capita is 15.6 kg in the 1930s and 18.6 kg in the 1920s, we considered the result based on this method to be reasonable.

The data series of the price also obtained from the trade statistics for fishery industry

¹⁶ In the data sources the share of private forests in total forest is assumed to be about 1% on average.

¹⁷ However, the comparison between the Bureau of Fishery and the census in 1948 results in the fact that the value of production in the census should be multiplied by 2.4

excluding processed and manufactured products. And the data series of the export price are used as a basis for analogizing the trend of domestic prices. Since the domestic price obtained from the 1938 census is 1/5 of the export price, this ratio is applied to the data series of the export price to obtain a somewhat continuous domestic price from 1915 to 1940.

The comparison of the value with the Hooley estimates shows that our estimate is about twice as large at the maximum and about 1.2 times larger on average. As mentioned above, the value of production in the Hooley estimates is an interpolation of the census values. The series of 1939 price is calculated by using export prices.

3-6. manufacturing

The method used to estimate prewar manufacturing in the Hooley estimates is an interpolation of the census values by using the trend of commercial revenue. The data series of the Bureau of Treasury on government sales tax revenues is divided by the tax rates of 0.3%, 1%, and 1.5% for the three periods: 1902–1914, 1915–1922, 1923 and beyond respectively, to calculate total sales for manufacturing and commerce¹⁸. The total value of the census is interpolated so that the trend of the value in the manufacturing sector would follow that of commercial income. However, while the trend of the value in manufacturing sector in the period of 1918–1938 censuses was upward, the trend in total commercial sales is downward. For this reason, the average growth rate is used for interpolating in the same period.

The major manufacturing industries in the prewar Philippines were directly related to major agricultural products, such as sugar, tobacco, copra, and coconut oil. However, a number of other manufacturing industries also existed and may have constituted the whole manufacturing sector of Philippines. Unfortunately, it is impossible to know the contents of the 1938 Census of Manufactures, which has remained unpublished and lost. We inherit the Hooley estimates for estimating value added that is interpolated by census values. At the same time, we proceed to make the estimation for the major manufacturing industries respectively as possible.

Our estimates take into account the problem that agricultural statistics in the prewar Philippines do not capture the value of production of crops separately from their subsequent processing. For example, palay and rice mills, sugar cane and sugar mills, coconuts and copra mills, and tobacco leaf and cigar mills may be subject to this problem. The yield of palay, coconuts, and tobacco leaf are directly reported as agricultural production. The harvested quantity of palay, coconuts, and tobacco leaf is directly reported as the production of agricultural products.

In particular, sugarcane needs to be estimated to be separated. In Ref. No.1, the production of raw sugar is also published. This is because of the close relationship between farmers and sugar mills in the production of sugar for overseas markets. In the production process,

¹⁸ However, it could not be confirmed within the Bureau of Treasury's annual report.

harvested sugarcane is immediately sent to the sugar mills for processing, so it is thought that the data is published in raw sugar terms. In other words, the amount of sugarcane production reported in terms of raw sugar is the same as the amount of production in the manufacturing industry. In the Hooley estimates, the value added calculation for the agricultural crops includes the same resulted value as the manufacturing sector based on Ref. No.1. We re-estimated the quantity and value of production of sugarcane as an agricultural crop based on the information on sugarcane as a raw material and the value added ratio in the Census.

The main manufacturing industries using tobacco leaf are cigars and cigarettes industry, with more than 50% of the former for export and more than 90% of the latter for domestic consumption. The information from the Bureau of Inner Revenue obtained in Ref. No. 1 is used almost verbatim to align the quantity of production. The same is true for alcoholic beverages. However, since only the quantity of production is available for these industries, export prices are used to calculate the value of production.

Manufacturing industries using coconuts as raw material are copra drying factory, oil factory, and desiccated coconuts factory. Since the quantity and value of production of copra, coconuts oil, and desiccated coconuts as commodities are obtained from Ref. No.1 and No.2, each data series is considered as the data for the corresponding industry. Most of the coconuts were sent to the copra manufacturing industry. For the quantity of copra, the data of copra manufacturing industry in the 1938 census and the quantity calculated in Ref. No.1 and No.2 are almost identical.

4. Summary of comparison

The difference between our estimates and the Hooley estimate is that we take into account not only the domestic supply per capita, but also the self-consumption rate and inputs to feed and seed. The criteria for validating the results of the estimates are as close as possible to the concept of per capita consumption. And classified individual value added ratio is applied to each estimated value of component as possible in calculating the value added,

This also applies to the estimation of the manufacturing. In addition to extending the value added in the census, we have separately aligned the quantity, its value and value added in the main manufacturing industries. This estimation process allows us to take into account the components of household consumption from the products of manufacturing as well as the products of primary industries for the GDE estimation.

As for the results of the GDP estimates for the primary industry, no fundamental differences are found in the trends of total quantity and nominal value added, despite the many revisions and differences in estimation methods, as already mentioned. As for differences in value added ratio and upward revisions for underestimates, the Hooley estimates are at most 40% larger. See Figure 1 for a summary of the comparison of the estimates from 1902 to 1940.

<Figure 1> Comparison of the primary industry GDP

Reference in English

- Annual Report of the Director of the Plant Industry for the Year Ending December 31*, Bureau of Plant Industry, 1931
- Bureau of Census and Statistics [1965], *Statistical Handbook of the Philippines 1965*, Manila: Bureau of Printing.
- Bureau of Commerce and Industry, *Statistical Bulletins of the Philippine Island* nos. 1-12 (1918-1929), Manila: Bureau of Printing. 1919-1929,
- Bureau of Commerce and Industry [1947], *Yearbook of Philippine Statistics* 1946, Manila: Bureau of Printing.
- Bureau of Plant Industry, the Bureau of Animal Industry & the Fiber Inspection Service [1952], *A Half - Century of Philippine Agriculture*, the Bureau of Plant Industry, Manila: Graphic House.
- Census Office of the Philippine Islands [1920], *Census of the Philippine Islands: taken under the direction of the Philippine Legislature in 1918* vol. 3, Manila: the Census Office of the Philippine Islands. Manila: the Census Office of the Philippine Islands.
- Commission of the Census [1943], *Census of the Philippines: 1939, vol. IV -Report for Economic Census, Forestry industry Transportation, Fisheries, Mines Electric Light and Power*, Manila: Commission of the Census, originally printed in Washington.
- Department of agriculture and commerce [1934], *The Philippine Statistical Review* Fourth Quarter (vol.1 no.4), Manila: Bureau of Printing.
- [1935], Second Quarter (vol. 2 no. 2), Manila: Bureau of Printing.
- [1936] Third Quarter (vol. 3. no. 3,) Manila: Bureau of Printing.
- Department Commerce and Industry [1958], Bureau of the Census and Statistics, *Yearbook of Philippine Statistics 1957*, Manila: Bureau of Printing.
- [1966], *Yearbook of Philippine Statistics 1966*, Manila: Bureau of Printing.
- [1974], *Yearbook of Philippine Statistics 1969*, Manila: Bureau of Printing.
- Hooley, Richard [1968], "Long-term growth of the Philippine economy 1902-1961", *The Philippine Economic Journal*, No. 7, pp. 1-24, 1968.
- [2005], "American economic policy in the Philippines, 1902-1940: Exploring a dark age in colonial statistics", *Journal of Asian Economics*, No. 16, pp. 464-488, 2005.
- Institute of Developing Economies [1977], *International Input-Output Table Japan-Philippines 1970*, Tokyo: Institute of Developing Economies.
- [1996], *International Input-Output Table Philippines-Japan 1990*, Tokyo: Institute of Developing Economies.
- Mangahs, Mahar., Aida E. Recto & Vernon W. Ruttan [1970], Production and Market Relationship for Rice and Corn in the Philippines, Technical Bulletin No. 9, Philippine:

- Los Banos, The International Rice Research Institute.
- National Economic Council and Department of Agriculture and Natural Resources [1959], *The Raw Material Resources Survey series no. 1*, Manila: Bureau of Manila: Bureau of Printing.
- National Economic and Development Authority [1975], *Philippine Statistical Yearbook 1975*, Manila: NEDA Production unit.
- [1978a], *Manual on the Philippine System of National Accounts: Framework, Sources and Methods*, Manila: National Economic and Development Authority.
- [1978b], *Philippine Statistical Yearbook 1978*, Manila: NEDA Production unit.
- [1986], *Philippine Statistical Yearbook 1986*, Manila: NEDA Production unit.
- United States Bureau of the Census [1905], *Censo de las Islas Filipinas tomado bajo la dirección de la Comisión Filipina en 1903 tomo IV, Agricultura, estadística, social é industrial (Census of the Philippine Islands: taken under the direction of the Philippine Commission in 1903 vol. IV, Agricultural, Social and Industrial Statistics)*, Washington: Bureau of the Census.
- Youngberg, Stanton [1929], *The Last Annual Report of the Bureau of Agriculture* by Stanton Youngberg 1929.
- [1930], "Resume of the Annual Report of the Bureau of Agriculture for the Year Ending December 31, 1929 " *Philippine Journal of Agriculture*, vol.1,no.1, pp.37-121,1930.

Reference in Japanese

- Baba Keinosuke [1943], *Analysis of the Economic Power of the Philippine Islands 1943.*, Ryukeishosha, Chapter 4, 1993.
- Fifth Division of the Trade Bureau of the Ministry of Foreign Affairs [1940], *Overview of the Philippine Forestry industry*. Fifth Division of the Trade Bureau of the Ministry of Foreign Affairs 1940.
- Institute of Developing Economies [1983], *Input-Output Table of the Philippines 1975*, Institute of Developing Economies, 1983.
- [1992], *International Input-Output Table Philippines-Japan 1985*, Institute of Developing Economies.
- Kounosuke Odaka and Ryu Kambayashi [1999], "Prewar Philippine Agricultural Statistics in the Philippines: 1902-1946," Asia Long-Term Economic Statistics Project Discussion Paper, DP99-21.
- Nozawa, Katsumi [1999], "History of the Philippine Statistical System," Hitotsubashi University, Institute of Economic Research, Asian Long-Term Statistics Database Project Newsletter, No. 13, 1999.
- [2002] "A Historical Review of Philippine National Income Statistics," Journal of the Institute of Asian Studies, No. 29, pp. 241-277, 2002.
- The East Asia Research Institute [1941], *Forestry industry in Philippines*.

Yoshiko Nagano [1986], *Studies on the Economic History of the Philippines: Sugar Capital and Landownership*, Keiso Shobo, 1986.

——[2007] "Philippine Economic History Research and National Accounts: A Memorandum on Economic History," Asian Long-Term Economic Statistics Project Discussion Paper, No. 209, 2007.

Reference in Japanese (Original Japanese title)

アジア経済研究所 [1983] 『フィリピン産業連関表, 1975 年』 (*Input-Output Table of the Philippines 1975*, Institute of Developing Economies, 1983.)、アジア経済研究所。

—— [1992] 『日本・フィリピン国際産業連関表 -1985 年』 (*International Input-Output Table Philippines-Japan 1985*)、アジア経済研究所。

尾高煌之助、神林龍 [1999] 「戦前期フィリピン農産物統計 Agricultural Statistics in the Philippines: 1902~1946」アジア長期経済統計プロジェクトディスカッションペーパー、DP99-21。

外務省通商局第五課[1940] 『比島林業概観』 (再刻、外務省通商局第五課『比律賓産業資料』 1932 年。)

東亜研究所[1941] 『比律賓の林業』。

永野善子 [1986] 『フィリピン経済史研究 -糖業資本と地主制-』、勁草書房、1986 年

——[2007] 「フィリピン経済史研究と国民経済計算 -経済史についての覚え書き-」アジア長期経済統計プロジェクトディスカッションペーパー、No.209、2007 年。

野澤勝美 [1999] 「フィリピン統計制度の歴史」一橋大学経済研究所『アジア長期統計データベースプロジェクト・ニュースレター』 No.13、1999 年。

—— [2002] 「フィリピン国民所得統計の史的考察」アジア研究所紀要、第 29 号、頁 241-277、2002 年。

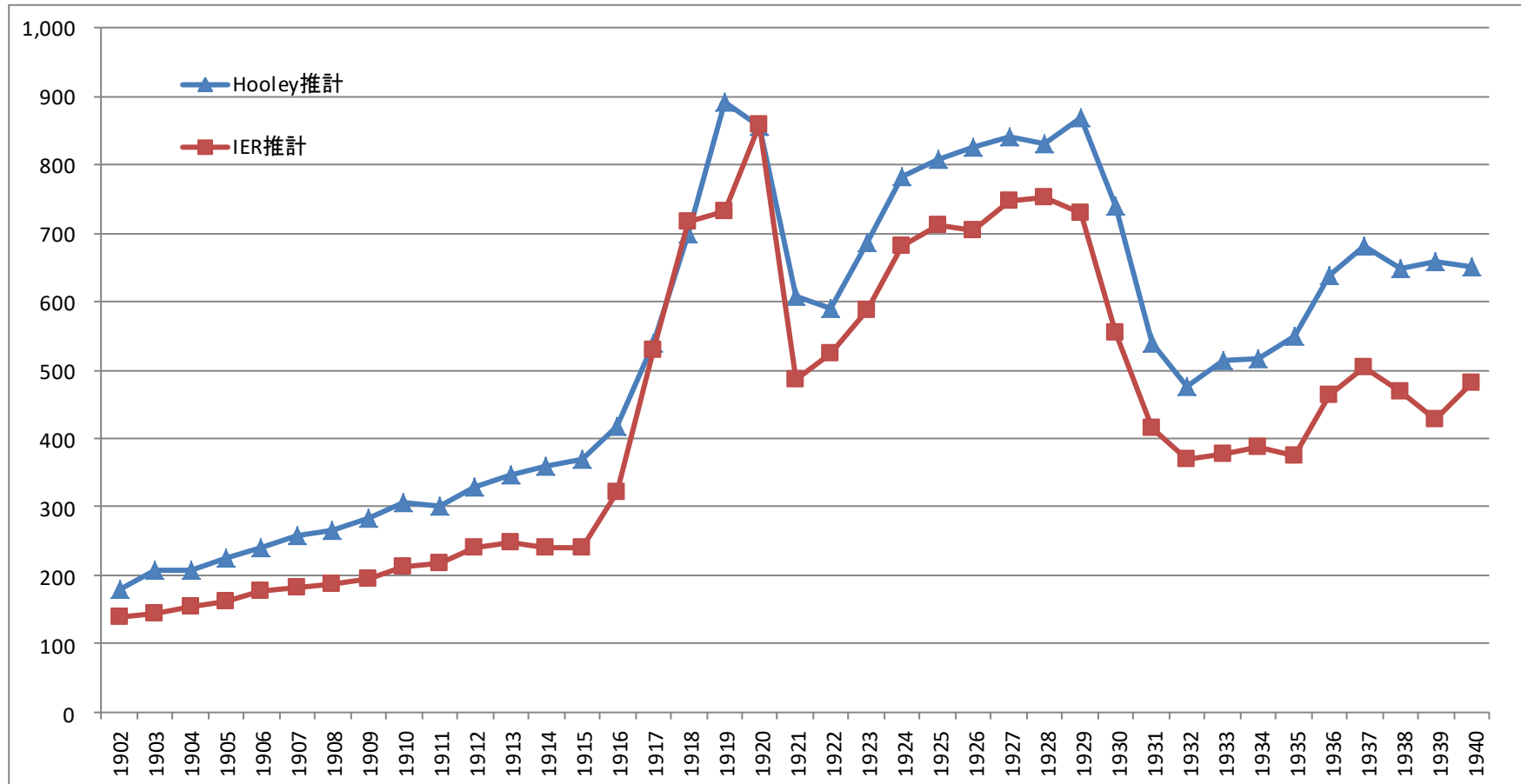
馬場啓之助[1943] 「比島経済力の分析」1943 年。(『南方軍政関係資料⑩ 比島調査報告 第 2 巻』復刻版、比島調査委員会編、龍溪書舎、第 4 章、1993 年。

Table 1. References: Basic statistical data sources

基本統計資料
Ref. No.1. <i>Statistical Bulletin of the Philippine Islands</i> , nos. 1-12 (1918-1929), Bureau of Commerce and Industry,
Ref. No.2. <i>The Last Annual Report of the Bureau of Agriculture</i> , by Stanton Youngberg, Director of Agriculture, 1929.
Ref. No.3. <i>Annual Report of the Director of Plant Industry for the Year Ending December 31</i> , 1931.
Ref. No.4. <i>The Philippine Statistical Review</i> , Fourth Quarter, 1934 (vol.1, no.4), Department of Agriculture and Commerce, 1934, ----- Second Quarter, 1935 (vol.2, no.2), Department of Agriculture and Commerce, 1935, ----- Third Quarter, 1936 (vol.3., no.3.), Department of Agriculture and Commerce, 1936,
Ref. No.5. <i>Yearbook of Philippine Statistics</i> 1940, Bureau of Census and Statistics, 1941,
Ref. No.6. <i>Yearbook of Philippine Statistics</i> 1946, Bureau of Commerce and Industry, 1947,
Ref. No.7. <i>Philippine Statistical Yearbook</i> 1978, National Economic and Development Authority, 1978,
Ref. No.8. <i>Census of the Philippine Islands: taken under the direction of Philippine Commission in 1903</i> , vol. IV, Bureau of the Census, 1905,
Ref. No.9. <i>Census of the Philippine Islands: taken under the direction of the Philippine Legislature in 1918</i> , vol. 3, The Census Office of the Philippine Islands 1920.
Ref. No.10. <i>Census of the Philippines: 1939</i> , vol. IV - <i>Report for Economic Census, Forestry Transportation, Fisheries, Mines, Electric Light and Power</i> , Commission of the Census.(originally printed in Washington, D. C., 1943.)
Ref. No.11. <i>Manual on the Philippine System of National Accounts: Framework, Sources and Methods</i> , Manila: National Economic and Development Authority, 1978.

Source: Also listed in the references.

Fig.1. Comparison of the primary industry GDP (current price, million peso)



Source: Hooley [2005] and our estimation.