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NONWAGE CONSTRAINTS IN THE CHOICE OF TECHNOLOGY IN THE CANNED PINEAPPLE INDUSTRY

by

Armando Armas, Jr.*

Introduction

In the December 1975 issue of this journal I argued that economists should first study the implications of prices on choice of technology before they shift their attention to the variables of other disciplines. I have shown that high wages due to minimum wage legislations (MWL) have constrained the choice of MLI (more labor intensive compared to the Philippines') technology in the canned pineapple industry. As initially stated, however, multidisciplinary-oriented economists believed that nonwage factors may have constrained the choice of MLI technology. After considering the wage factor therefore, it seems proper to look at nonwage factors as explanatory variables in the use of "socially inappropriate" technology.

To be consistent with my earlier article, I intend to focus on the Philippine Packing Corporation (Philpack) and the Dole Philippines, Inc. (Dolefil), the only significant firms in the integrated canned pineapple industry. Philpack and Dolefil are American owned subsidiaries often associated with higher wages, larger unionization, and a more standard technology than those of most Philippine firms. This study is limited to the influences of eight important nonwage factors in the choice of technology, *viz*, 1) scale of production, 2) nonwage labor costs, 3) brands and quality of products, 4) raw material, 5) integrated plantation-cannery system, 6) second-hand

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machinery, 7) managerial discretion, and 8) subsidized capital. These factors are considered the most important nonwage factors in the theoretical literature on appropriate technology, in technical non-economic literature on pineapple, and also in my various interviews with knowledgeable persons in the industry. To make it simple, I will discuss the influences of the nonwage factors separately as if each factor interplays with the wage factor, independent of the other nonwage factors in constraining the choice MLI technology. The influence of nonwage factors will also be discussed by comparative analysis of the firms in Hawaii, Malaysia, Taiwan and the Philippines, since the influence of MWL on choice of technology was determined mainly by intercountry analysis of firms in these countries.

I. Scale of Production

As frequently theorized [e.g. Todaro 1969], large scale production, *ceteris paribus*, requires greater capital intensive production. Table 1 indicates that some capital-intensive Hawaiian firms produced less than those of the MLI Taiwanese or Malaysian firms. This does not necessarily imply however, that the large scale production has not constrained the construction of MLI canneries in Philpack or Dolefil. In the first place, most of the large Taiwanese and Malaysian firms have many canneries distributed in various pineapple growing areas as compared with the integrated single cannery of Dolefil or Philpack. Thus even if the Taiwan Pineapple Corporation for instance is capable of annually producing as much as the annual output registered by Philpack or Dolefil, it uses five canneries located in different areas[1] such that the scale of each is remarkably smaller than that of the cannery of Dolefil or Philpack [see Chen 1968, and Food Engineering 1966]. Secondly though the officers of Philpack and Dolefil consider MLI canneries technically inferior, they cannot categorically state, however, whether the Philippine wage levels have not contributed to the economic inefficiency of large-scale MLI canneries for the Philippines.

II. Nonwage Labor Costs

Most closely related to scale of production is nonwage labor costs in the form of either payments to labor in kind or implicit costs of

[1] Based on the report of the China Credit Information Service Limited, the annual rated capacity of Taiwan Pineapple Corporation as of 1971 is 3 million standard cases. This firm, however, has five canneries located in different areas, *viz.*, Changhwa, Yuanlin, Nantou, Feng Shan, and Haulien.

management-labor problems. The cannery of Dolefil for instance is more capital-intensive vis-a-vis Philpack's, due significantly to the greater nonwage labor costs under the Dolefil conditions expected by the company planners. Most recent available data indicate that Dolefil's nonmonetary payments to labor has been about 25 per cent of its total production wage bills (in 1970) as compared to Philpack's 7 per cent (in 1971).

Table 1

Estimated Canned Solid Pineapple Production of Firms in the Philippines, Hawaii, Malaysia, and Taiwan (In thousand standard cases unless otherwise stated)[a]

	1969	1968	1967	1966	1965
Dolefil (in actual cases)	2,992	2,310	1,125	394	--
Philpack (in actual cases)	3,190	2,745	2,745	3,208	3,827
Del Monte Corporation[b]	2,087	2,181	2,159	2,370	2,267
Dole Company[b]	4,174	4,362	4,318	4,741	4,534
Libby, McNeill & Libby[b]	2,203	2,302	2,279	2,502	2,393
Hawaiian Canneries Co.[b]	406	424	420	461	441
4 Hawaiian Firms[b]	2,725	2,847	2,818	3,094	2,960
Taiwan Pineapple Corp.[c]	1,451	1,198	1,123	1,281	1,270
Tan San Fa Food Industrial Corp.[c]	620	512	480	547	542
Taichong Industrial Corp., Ltd.[c]	261	215	202	230	228
Taitong Food Products and Supply Corp.[c]	831	686	644	734	728
Other Taiwanese Firms[c]	1,756	1,449	1,359	1,550	1,537

[a]Output reported in standard cases are fewer than those in actual cases for equal quantity of output.

[b]Based on the company share in total canned pineapple production in 1960.

[c]Based on the company share in total canned pineapple exports in 1970.

Sources of Raw Data:

Worksheets on Production Indexes for 1955-71 (Department of Economic Research Central Bank of the Philippines; *1973 Pineapple Fact Book Hawaii* (Honolulu: Pineapple Growers Association of Hawaii, 1973): *Pineapple Hawaii – Basic Facts* (Hawaii: The Pineapple Companies of Hawaii, 1961); West Malaysia Department of Statistics (Malaysia); *Taiwan Exports of Canned Food 1970* (Taipei: Taiwan Canners Association, 1971); *Industry of Free China 1971* (Taipei: K.T. Li).

Furthermore, Dolefil, being in a more isolated area compared to Philpack, has to supply more of social overhead investments, such as subsidized electricity, water, transportation, police protection, housing, hospital, schools, to its workers who are mostly residents of its company-created community. Similarly, labor problems are expected to be more serious in Dolefil because it is located in a relatively troublesome, "Octopus" controlled region.[2]

Finally, in comparison with Asian immigrant workers, experience in the Hawaiian pineapple industry showed that immigrant Filipino workers have more disadvantageous cultural and sociological traits such as absenteeism, strong kinship ties, emotional instability, laziness, childishness, hostility, and irresponsibility[3] [Norbeck 1959]. Although nonwage labor costs discouraged employment of more workers at larger scales of production, political factors have exerted potential countervailing power in favor of more mass employment of workers.[4]

[2] Interviews with various persons revealed that the "Octopus", a syndicate composed mostly of labor union leaders (Cruz 1966 and Tutay 1966), had been the main agitator of labor unrest in South Cotabato and neighboring provinces. Negotiations with Dolefil, in fact, was handled by the Chief of the "Octopus" organization. Prior to the assassination of Mr. Adan de las Marias, considered the most powerful boss of the "Octopus", bloody strikes occurred at Dolefil for weeks. Stories were told of fieldworkers sending pineapples filled with metallic materials in an attempt to damage the machines in the cannery. On the other hand, Philpack seemed to have successfully domesticated its labor unions to a conspicuous extent that recently, rival unions charged that the management of Philpack had been interferring with the activities of the unions (see the report of the Philippine Supreme Court in case G.R. No. 1-31676 entitled "Associated Labor Union vs. Hon. Emiliano C. Tabique, *et al.*") Moreover, my interviews with common workers gave the impression that the workers were more loyal to Philpack than to their labor unions.

[3] The experience of Castle & Cooke Inc. in its Thai pineapple subsidiary implied that labor troubles seemed more serious in Thailand as compared with Mindanao. Hence, though the technology adopted by the Thai subsidiary was more labor-intensive in comparison with Dolefil, Castle & Cooke Inc. recently brought into the Thai subsidiary its most capital-intensive technologies of canning pineapple. Dole Company just completely dismantled one of its canneries in Hawaii and shipped the machines to Thailand. It is difficult to determine, however, whether the shipment of used-machine was due to the push of Hawaiian wages and/or the pull of the Thai labor problems.

[4] The threat of land reform was discussed seriously with me by Mr. Ninj Dolefil's president after Mr. G. Velasco became the representative of Castle &

III. Brands and Quality of Products

In pioneering studies on the economics of multinational technology [e.g., Wells 1973], it is usually asserted that quality and brand standards constrained multinationals to adopt MLI technology for their subsidiaries. With regards the canned pineapple industry, however, it is not easy to determine whether brand and quality creations necessitate the use of capital or labor deepening technology in the cannery of multinational subsidiaries. Quality creation by and large is being undertaken in the cultivation and husbanding of fresh pineapple in the plantation.[5] Once the fresh pineapple reached the cannery, however, the uniformity of pineapple pieces, such as slices, half-slices, tidbits, chunks, dices, and their expeditious handling, canning, and processing, distinguish high from low quality canned pineapple. Though the meticulous selection, inspection, and packing of pineapple pieces according to quality or brand standards still need more labor-intensive rather than capital-intensive operations, the cutting of uniform pieces and their expeditious handling, canning, and processing necessitate the use of capital-intensive technology.

Moreover, as early as 1930 labor-intensively produced Malayan canned pineapple branded with the labels of English firms strongly competed with Hawaiian products on quality standards [Malayan Agricultural Journal 1931]. During the early 1960s, the quality of Taiwanese and Malaysian canned pineapples sufficiently improved to

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broke in the Far East. On the other hand, some controversial provisions of the *Grower Agreement* provide a serious threat of nationalization of Philpack and Dolefil. Finally, the influence of political consideration in the choice of technology is documented, for instance, by a provision in an issue of Collective Bargaining Agreement (CBA) to the effect that: "In the interest of good labor-management relations the company assures the members of the Union that as of the signing of this contract, it does not anticipate any mass termination because of the present introduction of labor-saving machineries."

[5] Information based initially on interviews with the agronomists in the industry like Dr. Cesar Alaban, formerly connected with Dolefil, but presently connected with the Newtown Pineapple Corporation. Also, other researchers have expressed similar views. For instance, Mr. John Farmer, officer of Honiron, stated that "these companies (Dolefil and Philpack), of course, have had long experience in pineapple agriculture and with several years of experience in the Philippines, were able to plan their agricultural methods to yield pineapple close to their goals for size, shape, and fruit quality." (private letter, dated 16 May 1974).

penetrate the very quality conscious U.S. market [Mark and Naya 1962]. Even on the basis of retail prices in the U.S., it has been asserted that the Taiwanese pineapple has been "nearly equal to the Hawaiian in quality and the price of this product is almost as high" [Pan American Union 1966, p. 41, but for the opposite view see, e.g., Abraham 1971, Chen 1968].

In contrast, however, Table 2 shows that average prices or unit value of Hawaiian canned pineapple were noticeably higher than those from Taiwan and Malaysia. The prices of Hawaiian products also refer to those of the member of the Pineapple Growers Association of Hawaii (PGAH) of which Philpack and Dolefil are affiliated. The quoted Hawaiian prices in Table 2 could reasonably be

Table 2

Unit Value and Average Wholesale Price of Hawaiian Canned Pineapple; and the Unit Values of United States Imported Canned Pineapple from the Philippines, Taiwan, and Malaysia (In US dollars per pound)

	Hawaii Unit Value[a]	Price[b]	Philippines	Taiwan	Malaysia
1970	.136	.175	.127	.109	.124
1969	.131	.178	.125	.108	.116
1968	.137	.169	.105	.102	.113
1967	.149	.169	.104	.101	.116
1966	.133	.169	.109	.107	.118
1965	.133	.169	.107	.108	.119
1964	.136	.169	.108	.106	.122
1963	.129	.165	.109	.107	.124
1962	.121	.163	.103	.111	.116
1961	.122	.160	.108	.108	.118
1960	.103	.160	.105	-	.114
1959	.102	.148	.106	.096	-
1958	.121	.138	.107	.078	-
1957	.093	.134	.106	.83	-
1956	.098	.136	.107	.093	-
1955	.097	.135	.106	.077	-
1954	.091	.131	.108	-	-

[a]Based on the value not only of canned fruits but also of juices reconverted from fresh weight value using a conversion of 128 per cent of fresh equivalent value. All fresh market sales were valued at f.a.s. dock shipping point.

[b]Converted from US dollars per case based on the net weight of pineapple per case. The prices used pertain to canned solid pineapple products.

Source of Raw Data:

Various issues of the following: *United States Agricultural Production Statistics* (Washington D.C.: U.S. Department of Agriculture); *The Almanac of the Canning, Freezing, and Preserving Industries* (Maryland: Edward E. Judge & Son); *United States Imports for Consumption* (1954-63) and *United States Imports for General Merchandise and Consumption* (1964-70) (Washington D.C.· U.S. Bureau of Census).

used as proxy for the prices of the products of Philpack and Dolefil. Because prices are directly related to brands and quality [e.g., Cowling and Rayner 1969] Philippine exports, though officially considered unbranded, could be sold at higher prices branded with the most distinguished international brands such as Dole and Del Monte brands. Such multinational intracompany transaction, however, could be interpreted to mean that Castle & Cooke Inc. and Del Monte Corporation, not the canneries of Dolefil and Philpack, create the brands in the markets by spending millions of dollars on consumer directed activities to promote brand acceptance and/or loyalty [Velasco 1972, Pan American Union 1966].

Accordingly, some interviewed officers of Dolefil and also of Philpack supposed that capital-intensive technique was *sine qua non* for their operations. It could not, however, be ascertained whether capital-intensive production methods in the cannery really create better brand and high quality canned pineapple.

IV. Raw Material

It has been hypothesized that raw material input also constrains the choice of MLI technology, because in some operations it is

Table 3

Unit Values of Fresh Pineapple in Taiwan, Malaysia, Philippines, and Hawaii (Converted to US dollars per ton)[a]

	Taiwan	Malaysia[c]	Philippines	Northern & Eastern Mindanao (Philpack Region)	Southern & Western Mindanao (Dolefil Region)	Hawaii Fresh Market
1970	41	58	73	72	93	100
1969	37	58	88	78	127	100
1968	32	60	73	66	109	110
1967	32	63	52	52	57	100
1966	30	61	38	38	31	102
1965	31	60	36	38	30	110
1964	31	60	36	38	30	104
1963	37	60	36	38	31	100
1962	30	n.a.	35	35	31	115
1961	25	n.a.	67	69	55	n.a.
1960	26.2[b]	n.a.	65	67	56	n.a.
1959	22.2[b]	n.a.	64	66	62	n.a.
1958	27.9[b]	n.a.	72	75	62	n.a.
1957	29.1[b]	n.a.	72	75	70	n.a.
1956	39.7[b]	n.a.	72	75	70	n.a.
1955	40.8[b]	n.a.	72	75	70	n.a.
1954	52.3[b]	n.a.	75	75	75	n.a.
1953	21.6[b]	n.a.	75	75	75	n.a.

[a]Based on the official selling exchange rate.

[b]Refers to the purchase price of the Taiwan Pineapple Corporation.

[c]Unit F.O.B. value of fresh pineapple exports.

Sources of Raw Data:

Various issues of the following: *Taiwan Agricultural Statistics* (Taipei: Chinese-American Joint Comission on Rural Reconstruction); *West Malaysia Foreign Trade Statistics* (Malaysia); Bureau of Agricultural Economics, Department of Agriculture and Natural Resources (Philippines); and the *Statistics of Hawaiian Agriculture 1971* (Honolulu: Hawaii Department of Agriculture, 1970).

considered that more raw materials are wasted by labor— vis-a-vis capital-intensive techniques [Stewart 1974, Bacon 1974]. This study, however, found it difficult to determine whether fresh pineapple inputs have accounted for the nonadoption of MLI technology in Dolefil or Philpack. Table 3 indicates, for instance, that the unit values of fresh pineapple in the Philippines are higher than in Taiwan

Table 4

Fresh Pineapple Harvests in Hawaii, the Philippines, Malaysia, and Taiwan
(In thousand metric tons)

				Malaysia		
	Phil-pack	Hawaii	Philip-pines*	Canner Estate	Total	Taiwan
1970	187	896	451	n.a.	n.a.	338
1969	184	864	420	104	301	325
1968	181	952	375	115	247	311
1967	197	844	296	120	275	296
1966	177	943	243	123	254	270
1965	137	940	229	145	254	231
1964	164	855	213	134	218	227
1963	154	924	209	123	194	163
1962	155	890	193	133	196	192
1961	140	858	194	110	194	173
1960	156	945	190	106	150	167
1959	132	894	150	n.a.	n.a.	146
1958	103	916	201	n.a.	n.a.	137
1957	155	864	208	n.a.	n.a.	99
1956	112	914	164	n.a.	n.a.	83
1955	87	965	138	n.a.	n.a.	71
1954	127	701	176	n.a.	n.a.	66
1953	139	762	185	n.a.	n.a	68
1952	130	762	166	n.a.	n.a.	62
1951	106	640	145	n.a.	n.a.	52

*Conservatively adjusted to reflect the understatement of the official reported estimates in the Mindanao regions.

Sources:

Bureau of Agricultural Economics; National Development Company; *Malaysia 1969 Official Year Book* (Kuala Lumpur: Buku Pasmi Tahunan, 1970); *Taiwan Agricultural Statistics 1970* (Taipei: Chinese-American Joint Commission on Rural Reconstruction, 1971); *Statistics of Hawaiian Agriculture, 1971* (Honolulu: Hawaii Crop and Livestock Reporting Service); various issues of *Production Yearbook* (Rome: Food and Agricultural Organization).

and Malaysia. The cost of growing fresh pineapple in Philpack[6], however, has been very low and pineapple harvests in the Philippines are greater as compared with Taiwan and Malaysia (Table 4) since the latter countries are strongly handicapped by their lands [Abraham 1971, Py 1967]. The implication is that the cost of wasting equal quantity or weights of fresh pineapple is not necessarily greater in the Philippines when compared to Taiwan and Malaysia.

On the aggregate therefore, there is no definite empirical evidence of greater wastage of raw materials with MLI as against capital-intensive techniques since more labor inputs are also required in increasing the ratio of solid products[7] [International Processed Fruits 1970, but for the opposite view, see Farmer 1962]. In effect, the hypothesis that raw material constrains the choice of MLI technology has no definite statement on whether it would be capital or labor biased technology.

V. Integrated Plantation-Cannery System

In close connection with raw material and scale of production, it has been asserted that the integrated plantation-cannery organization constrained at the outset the establishment of MLI canneries for Philpack and Dolefil. Fresh pineapple grown in the plantation is controlled as to shape, size, and texture, such that the resulting uniformity, some observers argue, encourages the utilization of capital-intensive technology. In addition, it is asserted that the plantation system provides a continuous supply of fresh harvests which makes large scale canning operations feasible in most production phases. Available information, however, does not indicate

[6] Prices of pineapple harvests were arbitrarily determined in the *Grower Agreements* between Philpack and Dolefil on one side and the National Development Company (ND) on the other. It has been pointed out that the price fixed in the contracts had been too low, in spite of the recent revision. The government did not have a share in the profit of the so-called joint agricultural venture. The unit costs of agricultural operations were, however, overstated because some costs pertaining to cannery operations were included as part of agricultural operations.

[7] For example, *Castle & Cooke, Inc. 1972* reports that "contour peeling makes it possible to use a higher proportion of the fruit in more profitable canned product rather than as juice. All of Dole's chunks in grocery sizes will be contour-peeled in Hawaii in the 1972 packing season." [p. 5]. It has been observed, however, that pineapple has been manually contour peeled into whole sliced output in Malaysia and other LDCs even in the pre-World War periods. Contour peelers recently installed in Hawaii produce only chunk products.

whether the integration of the plantation with the cannery leads to the option of capital-intensive pineapple canning technology.

Though the plantations of Philpack and Dolefil yield pineapple of predetermined sizes, shapes, and fruit quality, the production of specific type of pineapple depends upon "too many" complex agricultural variables such as soil type, amount of sunlight, rainfall, plant variety, altitude, plant spacing, wind, etc. [See, for instance, Collins 1960, Mendiola 1951, Elayda 1933]. Furthermore, although Hawaiian (and supposedly Philpack and Dolefil's) pineapples weigh between two and six pounds, most of them are usually barrel-shaped and thus a number of workers may be required to trim them into five sizes and pack them to suit each can size [Farmer 1962]. In contrast, even if nonplantation pineapples vary from one to over twenty pounds in weight, nonintegrated firms can buy pineapples of narrower ranges and more uniform shapes from independent farms.

Lastly, nonintegrated Taiwanese firms and integrated Hawaiian firms can pineapples seasonally whereas partially integrated Malaysian firms and wholly integrated Philpack and Dolefil have year-round cannery activities. Without more authoritative information on the distributions of pineapple among integrated and nonintegrated firms, therefore, it would be difficult to resolve whether the integration of plantation and cannery in Philpack and Dolefil has constrained the choice of MLI technology.

VI. Second-Hand Machinery

The Hawaiian canned pineapple industry has been dependent on its technological leads in order to maintain its competitiveness. Hawaiian firms have been under constant pressure to install the latest machine models whenever it becomes economically feasible [Norbeck 1959]. Being subsidiaries, Philpack and Dolefil are believed to have received second-hand machines from their respective Hawaiian parent companies. The machines and equipment handed-down are thought to constrain the establishment of MLI canneries for Philpack and Dolefil at the outset.

Whereas the installation of used-machines is a great possibility, there are reasons, for doubting whether used-machines have actually constrained the building of MLI canneries in the Philippine subsidiaries. With regards Dolefil for instance, its cannery was built as a

whole with newly acquired machines [Food Engineering 1966][8] In contrast, the cannery of the Thai subsidiary of Castle & Cooke Inc. was expanded with used-machines from the Dole Hawaiian canneries which were being closed down.

The cannery of Philpack, on the other hand, was expanded gradually such that it was possible that used-machines were transferred whenever its parent company adjusted its plants due particularly to the rising Hawaiian wage rates. Officers of Philpack nonetheless claimed that the company's machine shop reconditioned used-machines to suit the specific conditions in Philpack.[9] Thus, even granting that handed-down machines probably constrained any decision to construct MLI canneries, it was also highly possible that factor prices in the subsidiaries, affected the utilization of transferred machines. There was no information available on this matter, however, and as a result it could not be determined whether second-hand machines really constrained any decision of Philpack or Dolefil to build MLI canneries.[10]

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[8] G. N. Giovanetti, project sales manager of FMC International, claimed that FMC Corporation was instrumental in the design, engineering, and supply of the Dole Plant in Mindanao.

[9] As already noted Dolefil and Philpack have machine shops that develop machine models to suit the needs of the subsidiaries. Most of the models developed, however, were merely modifications of new or second-hand machines brought from Hawaii. Interview with the personnel manager of Philpack, in particular, gave the impression that intermediate technology was being adapted at Philpack. He argued that visiting Hawaiian executives were often surprised by the removal of some automatic-devices from the used-machines sent by their parent company.

[10] In a letter by Mr. P. Perrine, president of Philpack, to Executive Secretary Melchor dated 14 December, 1974, he asked the approval of the government for Philpack's pineapple expansion, among other plans. The expansion plans, however, were endorsed to the National Economic and Development Authority (NEDA) for evaluation, comments, and recommendations. From my interview with the Director of Policy Coordination Staff (NEDA), I discovered that the expansion plans were not acted upon due to the paucity of the data submitted by Philpack. Further interviews with the officer of Philpack in charge of the expansion plan revealed that most of the data requested by the NEDA Policy Director could not be made available. With regards the requested data on capitalization and labor utilization, the interviewed officer of Philpack asserted that there was difficulty in supplying data because they could not properly impute the prices of handed-down machines (which constitute the bulk of the cannery machinery).

VII. Managerial Discretion

As early as the late 1930s, the dissatisfaction of some economists [e.g. Lester 1946, Hall and Hitch 1939] on the profit maximization assumption resulted in the formulation of models on satisficing and/or managerial discretionary behavior of the firm [e.g. Williamson 1964, Cyert and March 1963].

Regarding technological choice, it has been hypothesized that monopolistic firms, specifically multinationals, are not pressured to adjust their technology to the prices of inputs, because they are nonprofit maximizing firms. This version of the managerial discretion model, though popular, lacks predictive propositions and empirical contents in the firms under study. At the outset, Philpack and Dolefil have adopted the more labor-intensive technologies than those used in Hawaii. Moreover, strong competition has prevailed in the canned pineapple markets ever since the first commercial pineapple cannery was built in Hawaii [see, for instance, Pan-American Union 1966, Kay 1965, Mark and Naya 1962]. In fact, knowledgeable officers of Philpack and Dolefil argued that they have been constantly studying means to reduce production costs. Moreover, as in Hawaii [Norbeck 1959], the Philippine subsidiaries offer various rewards to employees who come up with acceptable suggestions based on economic profitability rather than mechanical artistry. These considerations are sufficient to disprove the version of the managerial discretionary choice of "inappropriate" capital-intensive technology.

A more recent version of the managerial discretionary model on the other hand theorized that multinationals do not utilize MLI technology because plant designers who are mostly engineers, prescribed excessively mechanized techniques to satisfy the "engineering man's" devotion to mechanical aestheticism [Pickett, *et al.* 1974, Wells 1973]. Such a version of the managerial discretion model, while consistent with profit maximizing models of the firm, seems to have some descriptive validity as far as Philpack and Dolefil are concerned. Remarks on mechanical sophistication abound in the interviews with the executives of the firms, particularly Dolefil.[11] Though subject to obvious overstatement, most officers of

[11] For instance, an expatriate at Dolefil, introduced to me as an expert "born with the pineapples and will retire with the pineapples" argued that the automatic slicers were not inappropriately labor-saving machines. He cooly

Dolefil including its president, for instance, are proud to consider Dolefil's cannery as "the most modern pineapple cannery in the whole world". Likewise, before the entry of **Dolefil**, some officers of Philpack considered their cannery as "the biggest pineapple cannery in the Far East equipped with all sorts of mechanical devices and conveyors including the most modern set up of an automatic concentrate control" [Estupigan 1962, p. 4]. Lastly, representatives of machinery firms, including those that service Dolefil and Philpack, seem to prescribe plant designs which are even more capital-intensive than those in Hawaii mainly on account of mechanical efficiency.[12]

VIII. Subsidized Capital

Among various economic factors, the subsidization of capital, *viz.*, low maximum legal interest rates, undervalued foreign exchange rates, and low tariff rates on capital goods, has been frequently hypothesized as more significant than MWL in constraining the choice of MLI technology [International Labour Office 1974, Barker, *et al.* 1972].

Multinational subsidiaries are often suspected of easily acquiring capital at lower prices than other firms. It has been argued however, that the price of capital intercountry is more uniform than that of labor since capital is the most mobile among productive resources [Stigler 1967]. Moreover, it has been emphasized that returns in foreign investments are expected to be higher as risks are greater overseas particularly in LDCs [e.g. Buchanan and Ellis 1955]. Thus, there is no *a priori* reason to indicate whether foreign investors have imputed lower or higher prices on their capital goods, subsidized or unsubsidized.

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remarked "Working like grandma? " when I asked whether manually operated semi-automatic slicers could have been used instead. When I asked if Taiwanese or Malaysian techniques could be used, he arrogantly replied "What are we (Americans) going to the moon for? " Throughout the interview I got the feeling that he preferred mechanical over economic efficiency, or else he was not aware of the better alternative, economically.

[12] Honiron, for instance, proposed a plant design to Rumar Enterprises, Inc. with the "Two-Diameter" system, the latest technology in the trimming of pineapples invented to minimize the use of labor. In fact, the "Two-Diameter" system has not even been installed in most Hawaiian canneries. Mr. Lards, former Vice-President of Honiron Philippines, Inc., expressed his surprise over the nonutilization of the "Two-Diameter" system in the Philippines in spite of their claim that it is presently the most mechanically efficient method to trim and pack pineapple.

As far as Dolefil or Philpack is concerned, available information fails to specify whether the apparent subsidization of capital has decisively affected the choice of technology towards any *a priori* direction. The financial statements of Dolefil, for instance, had been reporting interest payments at about 6 per cent per annum. Financial officers of this firm, however, claimed they applied the prevailing local interest rates, e.g., 12 per cent, in evaluating any company transaction. Likewise, some officers of Philpack claimed to have applied the prevailing costs of capital (money) in the local investment markets in assessing the profitability of most of their activities. The financial statements of Philpack, however, seemed to have reported surplus earnings based on a much lower interest rate than that prevailing in local investment markets.

Furthermore, in addition to the common risks associated with foreign investments, Philpack and Dolefil are constantly subjected to greater risks not only because of the expiration of their parity rights, but also the unsettled constitutionality issues affecting the Dolefil's plantation holdings. The annual financial reports of Dolefil to its stockholder(s) however usually include a statement to the effect that the company's legal councils are confident that the case against Dolefil will be dismissed.[13] On the other hand, unlike most foreign firms in the Philippines, the so-called *Growers Agreements* extended the corporate life of Philpack to 1988 and Dolefil, 2013. Thus, there is no *a priori* ground for a definite estimation of the business life of Philpack or Dolefil, which may favor the construction of either a capital- or labor-intensive cannery.

[13] Ever since Philpack was established, various public criticism have been expressed on its land holdings. With the entry of Dolefil, the constitutionality of land holdings (of Dolefil) was raised to the Philippine Supreme Court. Furthermore, with the coming expiration of the American parity rights in the exploitation of Philippine natural and agricultural resources, Philpack and Dolefil became the subject of Congressional investigations that reached the front pages of local newspapers. Even after the declaration of Martial Law and the placing of the whole Philippine islands under land reform area, the Philippine Supreme Court has not decided the case against Dolefil. For some backgrounds see Salonga 1974, Tañada 1964 and Mattic (undated).

Most recently, however, Presidential Decree No. 668 signed on 7 March 1975 authorized NDC "to acquire, hold, develop, and dispose all lands acquired by Americans under the Parity Agreement which expired on 3 July 1974." This decree also extended the corporate life of NDC for another 25 years from 5 January 1975 and increased its capitalization from P50 million to P200 million. Lastly, the NDC board has sought the authority to allow the use of P34 million special shipping fund to finance new projects of the company and purchase lands from the Americans.

Lastly, as far as foreign exchange rate is concerned, inconsistencies confuse the issue of whether the overvalued official exchange rate significantly constrain the choice of MLI canneries. From interviews, it seemed that the officers of Philpack or Dolefil applied a more realistic exchange rate to compare the prices of foreign vis-a-vis domestic inputs. But from various financial reports the official exchange rate was used for conversion of transactions to their US dollar equivalent. Moreover, despite the awareness manifested by the officers of the firms on the realistic or black market foreign exchange rate, the firms were put in a "disequilibrating" position during the devaluation of the Philippine peso. At an extreme occasion, Dolefil seemed to have suffered "unexpected" losses from its long-term debts due to the *de facto* devaluation of the Philippine peso under the floating exchange rate system.

Concluding Remarks

The extent of the influence exerted by most of the nonwage factors on the decision to construct MLI canneries in the Philippines can not be determined. Without more detailed information on how these firms weighed the various abovementioned factors, the extent to which these factors interacted with the wage variable in constraining the choice of technology remains speculative and theoretical. Consequently, the extent to which the influence of other variables may have eliminated any possible constraints of wage can not be established for sure. Thus, unless data on other factors are made available, we can only go so far as to conclude that nonwage factors *may* have contributed to the problems of "inappropriate" technological decisions in the Philippine canned pineapple industry.

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