

STRUCTURE OF RURAL-BASED INDUSTRIALIZATION:
METAL CRAFT MANUFACTURING ON
THE OUTSKIRTS OF GREATER
MANILA, THE PHILIPPINES

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EXplosive population growth in developing economies, though decelerating since the 1970s, has been translated into high labor-force growth rate. This growth has far exceeded the increase in arable land area which has led to increased landlessness and fragmentation of landholdings in the rural sector and pushed out immiserized labor to urban slums. In order to cope with the situation, maximum effort must be directed at expanding demand for labor in rural areas. Two obvious fronts are agriculture and small (and medium)-scale industries. But the so-called Green Revolution technology that has contributed greatly to increased food production and farm employment in Asia is not considered sufficient for solving the problem. Another option needs to be explored.

The historical experience of Japan, as well as Taiwan, has proved the development of small-scale, labor-intensive industries to be the most effective way to achieve the dual goals of growth and equity. The available evidence indicates that rural nonfarm activities carried out mainly in small-scale enterprises (including farm household enterprises) are a very important source of employment and income in developing economies today; as much as 30 to 50 per cent of the rural labor force is either primarily or secondarily engaged in a wide range of nonfarm activities, with 20 to 40 per cent of rural household income generated from these activities. Particularly significant is rural manufacturing in which employment often exceeds that in urban manufacturing establishments; rural-based, small-scale industries are generally not only more labor-intensive but also more productive per unit of scarce capital than their large-scale counterparts (Chuta and Liedholm 1979; Kilby and Liedholm 1986). These observations suggest that the promotion of rural industries is one of the most effective means to alleviate rural poverty and pathological urban growth.

For the major development of rural industries beyond a local significance, it is critically important to establish marketing channels connecting the production of small-scale enterprises scattered around rural hinterlands with large urban and/or foreign demand. In developing economies, however, markets are far from sufficiently developed to serve this purpose. Therefore, various forms of personal contract mechanisms are required as a substitute for impersonal markets for the purpose of saving transaction costs and reducing risk under severe information imperfection and market segmentation.

This paper examines various forms of production and trade contracts being employed at the grass-roots level to support rural-based industrialization. The study is based on our recent research on metal craft manufacturers in rural villages and local towns in the Philippines and their contract arrangements with export contractors in Greater Manila. It is a sequel of an earlier study on the garment industry in the Philippines by Kikuchi (forthcoming). Our goal is to identify the conditions under which certain contract forms are chosen over others, how instrumental they are in promoting rural-based industrialization, and what policies may effectively support the industrialization process.

Because of the highly elusive nature of production and trade contracts practiced by small and medium-scale enterprises in developing economies, plus the involvement of sensitive issues such as taxation and labor codes, our investigation had to largely rely on personal observations and informal conversations with entrepreneurs rather than formal questionnaires. In order to verify the information obtained from an entrepreneur, we tried to cross-check his contracting parties. Recurrent visits to the same parties were necessary until consistent answers were obtained. This type of intensive investigation made it inevitable to limit our sample to a very small size. Our approach is thus similar to that of anthropologists and sociologists, although the theoretical framework is based on standard economics.

Section I develops a theoretical framework in terms of the choice between the subcontract and the vertical integration systems in industrial development. Section II gives an overview on the metal craft industry in the study area and identifies the major players in this industry. Section III contrasts the modes of organization between the small cottage manufacturers in villages and the relatively large rural factories in local towns. Section IV analyzes the structure of production in the metal craft industry in comparison with the garment industry and rice farming, and discusses the relationship between the production technology and the industrial organization. Section V explores the organizations and activities of the export contractors in Greater Manila, who serve as a critical link connecting rural manufacturers with foreign demand. Section VI discusses possible policies for promoting rural-based industrialization.

I. THE THEORETICAL FRAMEWORK

Before proceeding with our empirical analysis, we will explain the theoretical framework of this study.

A. *Vertical Integration versus Subcontracting*

As a basic working hypothesis we postulated that the key to the wide diffusion of industrial and commercial activities over rural areas is development of the "subcontracting system" relative to the "vertical integration system." In our definition, vertical integration is a system in which the various production and marketing activities of a commodity (or commodities)—from raw materials to final product delivery to consumers—are integrated, either partially or totally, under the command of a central management. It includes the modern factory system in which various activities along the production line of a product are carried out by hired workers in a large workshop under the manager-foreman command hierarchy.

In contrast, subcontracting represents a decentralized system in which various activities in a production process are contracted out from a principal firm to autonomous producers. For example, a cotton-spinning company may establish a weaving division within the firm in order to ensure an outlet for its yarn. Alternatively, it may contract out the cloth-making process to outside weaving houses.

Vertical integration and subcontracting can be considered alternatives to an efficient market. If the market is efficient with low transaction costs and low risk, impersonal spot transactions in the market based solely on prices are sufficient to coordinate an economywide division of labor and, therefore, neither vertically integrated firms nor interfirm cooperation through subcontracting may be needed. In the real world of incomplete information, however, transaction costs are significant and risk is high; this is especially the case in developing countries where markets are small and segmented with the supply of needed market information—such as product standards, grading, and brand names—not well established, and where insurance and credit institutions are underdeveloped to cope with market risk. Thus, a trader who finds a large demand for a commodity in an urban market or from abroad will have to face the difficulty of procuring from the spot market a sufficient amount at a sufficient quality in due time. In order to exploit the profit opportunity, he may have to build under his own management a factory for the mass production of standardized commodities; in this way he vertically integrates manufacturing and trading activities. Alternatively, he may contract with autonomous producers for the supply of needed commodities in the right quantity, quality, and at the right time (Hayami, forthcoming).

If vertical integration is commonly chosen, the resulting industrial structure will be one where enterprises are small in number and large in size and are likely to be

located in urban-industrial centers. Therefore if there is to be industrial activities spread widely over the rural sector, the development of the subcontracting system is a necessary, if not sufficient, condition.

The vertically integrated factory system is essentially a system of hiring labor to work within a firm's workshop under the command of its management, whereas subcontracting is the system of contracting out the work to outside management. Naturally, the risks and transaction costs associated with contracts for "hiring labor" and "contracting-out work" are sharply different. In the vertical integration system, both capital and labor costs are largely fixed for the firm, at least in the short run. Therefore, risks arising from fluctuations in both the product and material input markets are predominantly shouldered by the principal (firm management) relative to the agent (hired labor) in the vertical integration system. On the other hand, in the subcontracting system, various schemes of risk sharing can be designed between the principal (parent firm) and the agents (subcontractors).

The transaction costs associated with hired-labor contracts, especially the cost of monitoring the work effort of hired laborers, are known to be very high. Indeed, how to promote work morale and to prevent shirking by employees, by such incentives as promotions and bonuses, have been central issues in the theories of industrial management and organization (Williamson 1985). This cost of monitoring the work effort of hired labor is nonexistent for the principal in the contract-out work system, and is relatively modest for the agents whose employees are typically few in number and easy to monitor. The monitoring cost is especially small where the work is performed by the labor of family members, relatives, and friends, as usually is the case in rural-based enterprises.

However, the principal or parent firm in the subcontracting system may have to face the severe difficulty of forcing his agents to observe the terms of a contract, such as the quality of products to be supplied and the date of their delivery. For example, an export contractor of garments may be severely harmed by a loss of reputation among foreign buyers if he shipped the garments supplied from a subcontractor that are later found to be inferior to the contractually agreed quality standard. Or, he may suffer the cancellation of foreign orders if the subcontractor does not deliver the ordered quantity on the agreed-upon date. The cost of preventing these moral hazards, by such means as formal quality inspections, could well be very significant when subcontractors are shrewd in exercising opportunism.

On the other hand, subcontractors are also not free from transaction costs. For example, if the parent firm refuses to accept the delivered supplies or requests a price reduction on a false claim of defective product quality, the subcontractor could face bankruptcy. Thus, whether subcontracting is commonly used will depend critically on how much risk and transaction costs are associated with this system relative to the vertical integration system and how the risk and transaction costs are distributed between principal and agents.

The cost of enforcing contracts by legal means, such as by courts, is very high and often impractical in the countryside of developing economies where the value of unit transaction is small relative to the litigation cost.

B. *Conditions for Subcontracting*

What are the conditions under which the subcontracting system becomes more advantageous than the vertical integration system?

An overriding condition is the divisibility of a production process among accountable units—accountable in the sense that inputs to and outputs from one unit can be measured separately from those of other units. In general, production processes that flow continuously within a single plant, such as the production of chemical materials, are bound to be managed under the vertical integration system. On the other hand, such industries as machine manufacturing and metal fabrication can be decomposed relatively easily into many accountable units, therefore being more amenable to subcontracting.

Developing economies are often characterized by factor market dualism in which labor wage rates are positively correlated with firm size, and large firms have much easier access to low-interest loans than small firms do. Under this structure there is strong incentive for a large firm to contract work out to small firms rather than to hire labor within the firm, as a means of minimizing the wage cost. At the same time, the financial credit that large firms can mobilize at a relatively modest cost is often advanced to small producers who suffer from severe capital constraints.

This practice of “credit ties” represents one approach to strengthening contract enforcement by interlinking various transactions. In the same vein, it is common for the parent firms to provide technical assistance and other services to subcontractors. Related to this approach is the attempt to develop long-term contractual agreements. Because establishing a stable long-term contract covering many transactions entails significant time and effort, the expected gains for both contract parties from maintaining such a relationship are likely to exceed the short-term gains from exercising opportunism. In this way the likelihood of a “prisoner’s dilemma” situation can be minimized (Gibbons 1992; Hayami and Otsuka 1993).

The power of long-term, interlinked contracts to prevent moral hazards can be strengthened if they are embraced in a personal reciprocity relationship that includes not only the transaction of economic goods and services but also the exchange of personal favors and obligations. Anthropologists and sociologists commonly call such a relationship a patron-client relationship—“a special case of dyadic (two-person) ties involving a largely instrumental friendship in which an individual of higher socioeconomic status (patron) uses his own influence and resources to provide protection and/or benefits for a person of lower status (client) who, for his part, reciprocates by offering general support and assistance, including personal services, to the patron” (Scott 1972, p.8).

The ability of the parent firms and the subcontractors to develop such a “cooperative game” situation may depend, to a large extent, on the social tradition of community relationship. In a society where this tradition is strong and people are accustomed to patron-client relations, subcontracting may be structured and operated relatively more efficiently. Rural economies in developing Asia may thus have a high chance of developing efficient subcontracting arrangements based on their community tradition (Hayami and Kawagoe 1993). This is one aspect of major focus in this study.

Government policies to limit market entry or to increase the advantage of large-scale operations by such means as concentration of import licenses and institutional credit in a few large firms tend to suppress the development of efficient subcontracting. Capital subsidization, using either direct subsidies or indirect subsidies such as tax exemptions and tariff escalation, which are usually captured disproportionately by large firms, will discourage decentralization and thereby encourage vertical integration (Little, Scitovsky, and Scott 1970).

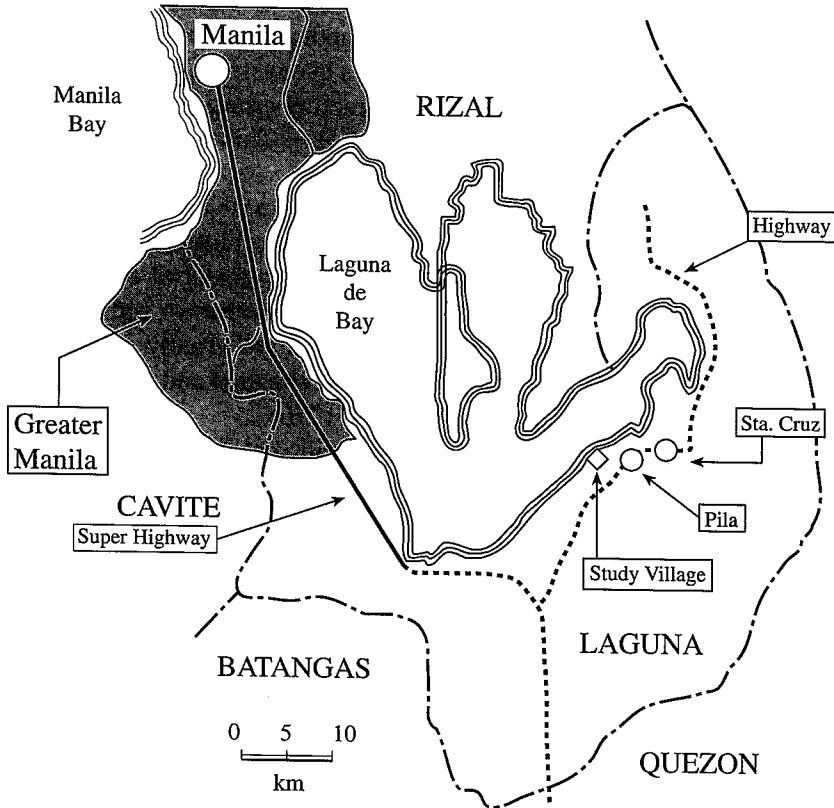
On the other hand, government services for small-scale enterprises such as technical development and extension, dissemination of market information, legal consultation, and management training will encourage decentralization by promoting the relative advantage of small-scale operations, and will also strengthen the bargaining position of small-scale operations (Staley and Morse 1965; Pack and Westphal 1986). Above all, public investment in infrastructure such as rural electrification, transportation, and telecommunication systems provides critical support for the broad expansion of the industrial and commercial network based on subcontracting.

II. STUDY SITES AND PLAYERS

Our investigation into the rural-based metal craft industry in the Philippines began in one village in the eastern part of Laguna Province. This was followed by research in the two surrounding townships (Pila and Sta. Cruz) and was further extended to the Greater Manila area. This sequence follows the chain of subcontracting in this industry. The fieldwork was conducted periodically from June 1995 through August 1996.

The province of Laguna lies along the southern coast of Laguna de Bay (the largest lake in the Philippines), south of Manila (Figure 1). The strip of irrigated lowland along the lake is one of the most productive rice areas in the country. The area is popularly known as “the heartland of the Green Revolution” for its early adoption of modern rice varieties. The western coast of the lake has now been rapidly converting into a part of Greater Manila. However, the eastern coast, where we undertook our investigation, still remains rural in its basic features, though increasingly subject to urban influences.

Fig. 1. Greater Manila and Laguna Province



For the purpose of monitoring economic and social changes in the area, we have conducted detailed surveys six times since 1974 covering all the households in the village (*barangay*) (Hayami 1978; Hayami and Kikuchi 1981, Chap. 5; Hayami, Kikuchi, Bambo, and Marciano 1990). The latest survey in 1995 recorded the population at 1,141 persons in 242 households, of which nearly 80 per cent are landless agricultural laborers making a living mainly from casual farm employment. A high rate of landlessness is a common feature of irrigated rice regions in the Philippines, the result of strong population pressure on limited land resources under an inactive land rental market constrained by land reform regulations (Hayami, Quisumbing, and Adriano 1990). Typical of rural villages in the Philippines, this village had traditionally been characterized by low reliance on nonfarm economic activities, especially manufacturing, as a source of household income. Indeed, the share of manufacturing in total household income remained at only 1 per cent from

TABLE I
 PERCENTAGE COMPOSITIONS OF HOUSEHOLD INCOME BY SOURCE AND BY TYPE OF HOUSEHOLD
 IN THE STUDY VILLAGE, 1974, 1987, AND 1995

	(%)								
	1974			1987			1995		
	Farmer	Landless	Total	Farmer	Landless	Total	Farmer	Landless	Total
Number of households	54	41	95	53	103	156	51	191	242
Self-employed:									
Farming	88	26	77	50	12	37	27	8	15
Rice	75	0	63	39	0	27	19	0	7
Non-rice	13	26	14	10	12	10	7	8	8
Nonfarm enterprise	5	8	5	15	10	11	17	27	23
Commerce	4	8	4	11	5	7	4	6	6
Manufacturing	0	0	1	1	3	1	7	17	13
Transport	1	0	0	3	2	2	6	4	4
Hired wage earning:									
Farm work	8	63	17	30	72	45	26	53	43
Nonfarm work	5	59	14	14	42	24	3	22	15
Casual	3	5	3	16	30	21	23	31	29
Salaried	1	5	1	2	16	7	8	17	13
Salaried	2	0	2	13	15	14	15	13	15
Other ^a	0	3	1	7	5	7	31	12	19
Total	100	100	100	100	100	100	100	100	100
Farm total ^b	93	85	91	64	54	61	30	30	30

^a Includes grants, remittances, land rent, and income obtained from capital rental services, such as tractor and threshing-machine services, to other households.

^b Percentage of income from farming and farm wages.

1974 to 1987. To our great surprise, the 1995 survey recorded that this share had suddenly increased to 13 per cent. The share was especially high for landless households where it reached 17 per cent (Table I).

This change resulted from the establishment of one paper mill and seven metal craft manufacturers during the period from 1991 to 1995. The paper mill produces folk art paper from local materials such as banana stems and cogon grass mainly for paper craft goods for domestic demand. The seven metal manufacturers produce Christmas ornaments, such as candle stands and Santa Claus dolls for hanging on Christmas trees, and other various ornaments, gifts, and toy items from tin plate and wire. These are for subcontracted orders from export contractors operating in Greater Manila.¹

¹ It may be worth noting that these metal craft manufacturers are specialized to produce ornaments, gifts, and toys for export. They do not produce any other items meant for the domestic markets, e.g., household utensils or parts for other metal industries in the country.

The subsequent search in neighboring villages and the surrounding townships (*municipalities*) of Pila and Sta. Cruz found that similar manufacturing enterprises based on subcontract arrangements with export contractors have been sprouting up rather widely since the late 1980s. The most numerous are activities related to the production of ready-made garments, such as sewing and embroidering, which have been covered in the previous study by Kikuchi (forthcoming). The metal craft industry (as well as plastic, paper, and wood craft industries) for the manufacture of ornaments, gifts, and toys have followed the spread of the garment industry after a few years' time lag. They are simple in technology and highly labor-intensive. It must be emphasized that some garment and craft manufacturing activities for local consumption have existed since long ago but have had no significant share in the economy of this area. The new wave of labor-intensive industrialization has stemmed from foreign demand and has been progressing at such a scale as to become a significant income source not only in towns but also in hitherto purely agriculture-based villages.

Further exploration in Greater Manila found that the wave of foreign demand for labor-intensive, low-technology products began to reach the Philippines in the late 1970s and the early 1980s. This was the period when newly industrializing economies (NIEs) in Asia, such as Taiwan, the Republic of Korea, and Hong Kong, began to shift in a major way to more sophisticated high-value products corresponding to their sharp wage increases. The redirection of international demand for labor-intensive products away from the NIEs spread over ASEAN and other low-wage Asian economies. However, the political turmoil associated with the downfall of the Marcos regime delayed the moves of Filipino entrepreneurs to capture this opportunity. But from the late 1980s, as the turmoil subsided, they began to recover their lost opportunity relying on the country's low wages relative to its rich endowment of human resources, especially the high level of education in the Philippines. Most of export contractors in Greater Manila we interviewed started their businesses in the late 1980s.

Initially the urban-based entrepreneurs tried to meet the orders from foreign buyers by establishing their own factories. Later, as foreign demand continued to expand, they found it advantageous to contract out parts of the production process to outside agents, especially those located in rural areas where cheap labor is more abundantly available. They continued to maintain their own workshops for final adjustments and brushups, but the crude fabrication process has increasingly been handed out to subcontractors as this metal craft industry is easy to disintegrate into accountable units. Some subcontractors are located within Greater Manila but most are located in neighboring provinces in a radius of about one hundred kilometers. It is common for workers employed in an exporter's workshop to return to their hometowns and initiate business under subcontracting with the former employer.

III. COTTAGE MANUFACTURERS AND RURAL FACTORIES

How are the rural-based industries organized under subcontracting arrangements with the export contractors? According to our observation it seems convenient to classify them as “cottage manufacturers” and “rural factories.” Typically belonging to the former are the metal craft manufacturers found in our study village. They operate either in the operators’ houses or in neighboring shanties with mud floors and lacking solid walls. Their production is based on highly labor-intensive technology requiring very little capital, and they typically employ ten to twenty workers.

The physical characteristics of “rural factories” are similar to “cottage manufacturers,” but their scale of operation is larger, employing thirty to seventy workers. However, a more important distinction is their relative independence from the export contractors. Each cottage manufacturer relies on orders from only one export contractor, while a rural factory receives orders from several contractors. Another distinction is that a rural factory usually operates with more than one workshop, under either direct management of an owner operator or subcontracting to small manufacturers. Also important is the difference in the access to government assistance and institutional credit. The rural factories are usually covered by industrial extension activities of the Department of Trade and Industry (DTI) and often benefited from subsidized credit related to the extension programs. The cottage manufacturers are outside the reach of these government programs.²

This difference stems to a large extent from the difference in the educational level of operators. Most operators of rural factories are college graduates, while those of the cottage manufacturers have attended only elementary school or at most high school. This difference underlies the difference in their ability to file for government assistance and other institutional supports.

While the cottage manufacturers reside mostly inside the villages, the rural factories tend to be located in the more urbanized parts of townships. However, some rural factories are located within villages. The paper mill in our study village is one such examples.

A. *Subcontracts with Export Contractors*

Both the cottage manufacturers and the rural factories for metal craft goods operate as subcontractors to export contractors. Typically a subcontractor receives an

² The promotion of small and medium-scale rural industries is one of the top-priority targets in the development policy in the Philippines, and the DTI has been enthusiastic in pursuing this target (Kikuchi, forthcoming). Various policy measures have been mobilized for this purpose, a major one being the provision of institutional loans at subsidized interest rates. Such supportive activities as providing technical guidance and management training for rural entrepreneurs, and organizing international trade fairs are also important measures.

order from his principal contractor specifying the product design, the unit price, the quantity, and the delivery date. The products are usually delivered by chartering a jeepney (informal minibus) once every two to three weeks. The delivered commodities are inspected within a week and paid per piece for those that pass the quality inspection. The subcontractor with his workers goes to the principal's warehouse one day before the payment for correcting defects found by the inspector, so as to minimize the rejection rate. The payment is usually made by dated check, though post-dated check is sometimes used. Some advance payments on the order of 10 to 20 per cent of the product value are often provided.

This contract, which we may call the "advanced-order" contract, is different from the "putting-out" contract commonly used in the garment industry in which materials for processing are supplied by the export contractors to subcontractors. If a metal craft subcontractor so wishes, he can receive from the export contractor the supply of materials such as tin plate and wire as a trade credit in kind. However, the price of such advanced materials is set about 10 per cent higher than the cash purchase price on the market. Considering the production period of about three weeks from material purchase to product sale, the 10 per cent markup amounts to an exorbitant rate of interest, as high as 520 per cent per year. Therefore, except for a few who are desperately short of working capital, most subcontractors prefer to buy materials from local hardware stores.

The reason why the putting-out system is commonly used in garment subcontract arrangements is the need to make the products homogeneous so as to be consistent with the demands of foreign buyers. The supply of materials of a specific type out of many types of clothing materials is a vital means for the export contractor to collect a sufficient amount of standardized products from subcontractors according to the specifications of foreign buyers. In contrast, materials such as tin plate for metal craft goods are sufficiently homogeneous that the choice of material does not significantly affect the product quality. This contrast between garment and metal craft subcontracting is consistent with the hypothesis that the putting-out system is induced more by the need of the principal contractor to achieve product standardization than the need to mitigate the working capital constraint of the subcontractors.

Such a contractual mode applies to both the cottage manufacturers and the rural factories. The difference arises in the specification of product design. The job of a cottage manufacturer is simply to reproduce the sample product received from his principal contractor. On the other hand, a rural factory often makes the sample product according to a rough sketch drawn by the contractor. In this case the product development is a collaborative venture between the rural factory and the export contractor. There is even a case in which a rural factory produces original sample products which are demonstrated to foreign buyers through its export contractor on such occasions as trade fairs. The product development capacity of rural factories

seems to operate as a force both to strengthen their collaborative relationship with principals and to promote their independence.

B. *Organizational Characteristics*

The industrial organization in terms of labor management and coordination among various tasks is surprisingly similar for both the cottage manufacturers and rural factories despite differences in firm size and product development capacity. They both depend heavily on piece-rate contracts. Managerial tasks at a higher level than production activities, such as negotiations with exporters and procurement of materials, are handled by operators and family members. Overhead activities such as maintenance of the workshop and packing/unpacking of materials and products are also shouldered by the family in small enterprises and a few laborers are employed on daily (or hourly) wages in larger enterprises. Cutting tin plate and twisting wire into appropriate sizes and forms are either done by family labor or contracted out to neighboring families at piece rates. By far the largest task in terms of labor requirement is assembling the intermediate products into final products mainly with the use of soldering irons. This task is performed in the workshop by workers employed at piece rates. They say that this process is better carried out in the workshop instead of contracting out, because of convenience in quality control. Counting and inspecting the final products are the major task of operators and family members. They are often assisted by a few experienced workers who are given some fixed sums in addition to their piece-rate remuneration for their own production. In the case of cottage manufacturers in the study village, almost 90 per cent of workers are hired (Table II). This dependence on hired labor is somewhat higher but not much different in the rural factories because of their practice of contracting out to other workshops.

This organization based heavily on piece-rate contracts is common to other rural-based industries such as garment production, and plastic and paper craft goods.³ However, for some cultural reasons we have not been able to identify, the metal craft industry is characterized by a heavy reliance on young male laborers compared to other industries, especially the garment industry where almost all the workers are women. We were told that metal fabrication using soldering irons is supposed to be a man's job. Whatever the reason, the very rapid growth of this industry in less than five years created a bottleneck in the local labor market, and rural entrepreneurs have tried to recruit laborers from other provinces such as Bicol and Zambales.

In the case of cottage manufacturers in the study village, the laborers recruited

³ For instance, in subcontracting firms in the export garment industry, sewing, which is the central part of the production process (and which is nothing but assembling parts), is carried out by hired workers at piece rates (Kikuchi, forthcoming).

TABLE II
WORKERS IN COTTAGE MANUFACTURERS IN THE STUDY VILLAGE, 1995

	Male	Female	Total
No. of workers:			
Family	9	7	16
Hired	88	51	139
Total	97	58	155
Origin of workers:			
East Laguna village	53	49	102
Other villages in Pila	14	1	15
Other provinces ^a	30	8	38
Total	97	58	155
Educational level of workers (school years):			
East Laguna village	8.3	7.3	8.0
Other villages in Pila	9.2	8.0	9.1
Other provinces ^a	8.3	9.5	8.6
Total	8.5	8.3	8.4

^a Includes Quezon City, Zambales Province, and provinces in Bicol region.

from outside the local community accounted for about 30 per cent of male labor according to the 1995 survey (Table II). They are housed in a corner of the workshop under rather awful living conditions. They are paid at ordinary piece rates in addition to transfer expense from home. Meals are cooked either individually by the workers themselves or centrally in the operators' kitchens. In the latter case meal charges are deducted from wage payments at the rate of about twenty-seven pesos equivalent to U.S.\$1 per day.

The piece-rate payment for a male worker ranges from 70 to 150 pesos per day for about eight to ten hours of work. This daily wage is comparable to most farm tasks even though less than eight hours are usually required for hired farm work per day. While the wage per hour is lower than that for farm work, a major advantage of the metal workshop is steady year-round employment. Another attraction is less arduous and less "dirty" work than the drudgery in the paddy field. Workers receive their wages every two weeks.

Time wage rates range from 6 to 15 pesos per hour depending on experience and skill, with the daily average wage standing around 70 pesos. The ability to mobilize labor at much lower cost than the official minimum wage rate of 145 pesos per day is considered one of major factors underlying the development of the rural-based metal industry through subcontracting with urban-based exporters.

The management of labor appears to be the most difficult task especially for larger-scale operators. They are relatively free from monitoring the workers' efforts because payment is on a piece-rate basis, and because of the relative ease of inspecting the quality of crude metal craft goods. Training laborers for the piece-rate tasks

is also not difficult, as the needed skill of fabricating craft goods by soldering iron can be learned through on-the-job training in a week or so. However, absenteeism and/or job-hopping, often after receiving advanced wage payments, are a source of headache for operators, especially when they are being pressed by delivery dates. In addition, laborers recruited from distant places tend to create friction with the local community because of drunkenness and violence. These problems are relatively modest in small workshops where it is easier to develop an intimate personal relationship between operators and workers. For this reason, it is common for rural factories to contract out part of their production to small workshops under the putting-out system.

IV. PRODUCTION STRUCTURE OF THE METAL CRAFT INDUSTRY

The advantage of rural-based entrepreneurs to mobilize cheap labor is especially large in the metal craft industry because it uses extremely labor-intensive technology. Capital requirements are very small, even compared to other labor-intensive activities in rural areas such as garment manufacturing and rice farming, as illustrated in Table III.⁴ Capital-output ratios calculated by dividing the value of capital stock (including both fixed and working capital) by value added (output minus current input value) in metal manufacturing are only about one-fifth that of garment manufacturing and about one-third that of rice farming. Even larger differences can be observed in the capital-labor ratio (capital stock per worker). These data unequivocally show the high labor-absorptive and income-generating capacity of the metal craft industry in capital-scarce economies for whatever statistical margin of error is assumed.

A. *Cottage Manufacturer versus Rural Factory*

A striking similarity is found between the cottage manufacturers and the rural factories in their production structure despite the difference in their scales of operation. They are almost identical in both their ratio of value added to total output and their relative shares of factors in value added. The slightly smaller capital-output ratio and larger labor productivity of the rural factories (as measured by value added per worker) is a reflection of the fuller utilization of capital stock and labor force because of the more stable flow of orders they are able to receive compared to the cottage manufacturers, rather than a difference in technology used. The rates of return on capital are almost the same.

These observations are consistent with the hypothesis that cottage manufacturers

⁴ The paper mill in our study village is not included in Table III because it is the only sample in this industry. In terms of income share and capital requirement, however, it is closer to the garment than the metal craft industry.

TABLE III
 PRODUCTION STRUCTURE OF RURAL INDUSTRIES COMPARED TO RICE FARMING (Averages per Firm/Farm per Year)

	Metal ^a							
	Cottage Manufacturer		Rural Factory		Garment ^b		Rice Farming ^c	
	1,000 Pesos	% Share	1,000 Pesos	% Share	1,000 Pesos	% Share	1,000 Pesos	% Share
Year of survey	1995		1996		1994		1995/96	
Sample size	7		2		37		51	
Output value	330		1,081		630		142	
Current input	131		416		50		17	
Value added	198	100	665	100	580	100	125	100
Labor income	141	71	487	73	372	64	46	37
Capital income ^d	7	4	23	3	103	18	22	18
L and income	0	0	0	0	0	0	19	15
Operators' surplus	50	25	155	23	105	18	38	30
Rate of return to capital ^e	154%		156%		40%		125% (8%) ^f	
Capital stock	(6) = (7) + (8)		114		515		63 (963) ^f	
Fixed capital ^g	(7)		35		480		46 (946) ^f	
Working capital ^h	(8)		80		35		17 (17) ^f	
Capital-output ratio	(6)/(2)	0.19	0.17		0.89		0.50 (7.7) ^f	
No. of workers per firm ⁱ	(9)	22	51		17		7	
Labor productivity	(2)/(9)	9	13		34		18	
Capital-labor ratio	(1,000 pesos / worker)	1.7	2.2		30.3		9.0 (138) ^f	

^a Samples for cottage manufacturers are from the study village in Pila and those for rural factories are from Sta. Cruz. Assumed rejection rates of 20 per cent.

^b Samples for garment firms are from various towns in the rural parts of Laguna. Assumed rejection rate of 5 per cent.

^c Samples are from the study village in Pila. Statistics are for an average former cultivating 2 ha under leasehold arrangement.

^d Assumed interest rate of 20 per cent. For rice farming, actual income share of capital services.

^e [(3) + (5)]/(6). For rice farming, (4) is added to the numerator.

^f Figures in parentheses show the samples which include land value (450,000 pesos/ha in 1995 prices) in fixed capital.

^g For rice farming, the value of total rice-farming assets owned by villagers per 2 ha of rice land cultivated by farmers in the study village.

^h For metal and garment production, one-month costs for current inputs and labor. For rice production, 50 per cent of the cost of current inputs, hired labor and capital rental per season.

ⁱ For rice farming, the number of laborers engaging in rice farming, both self-employed and employed, per 2 ha of rice land cultivated by farmers in the study village.

and rural factories share a common production function with constant returns to scale. Undoubtedly this characteristic underlies the similarity in their internal organizations, as explained in the previous section. This would explain why, in the absence of scale economies, rural factories would prefer to contract out part of their production to smaller workshops as their operations grow above a size efficiently manageable by the operator himself and his family, instead of building a manager-foreman system in an expanded workshop. In this way the risk arising from demand fluctuations can also be reduced.

B. *Comparison with the Garment Industry*

The major difference between the metal craft and garment industries is the much smaller requirement of fixed capital for the former. This is clearly seen from a comparison between metal craft cottage manufacturers and garment manufacturers. Their scales of operation are not so different in terms of the average number of workers per enterprise. But the average garment manufacturer uses as much as fourteen times more of capital stock than the average metal craft manufacturer. The operation of the garment manufacturer requires the purchase of high-speed sewing machines, one for each sewer. To protect these high-cost machines, the workshop must be enclosed by solid walls and roof and have a cement floor. In contrast, the metal craft manufacturer needs only rudimentary tools such as soldering irons, bull hammers, and metal cutters which can be operated unharmed in a crude structure with mud floor and no walls. Thus, average capital stock per metal craft manufacturer is only 13,000 pesos. If the business starts at a modest scale of ten workers, the initial fund requirement including both fixed and working capital could be less than 15,000 pesos. This amount of capital can be mobilized by landless laborers through such means as the sale of livestock (where the price per head for cattle and pigs is about 10,000 pesos and 2,000 pesos respectively).

Thus, five out of seven metal craft manufacturers in the study village belong to landless households. In contrast, the fixed-capital requirement of 480,000 pesos for a garment manufacturer is equivalent to about the value of one hectare of well-irrigated rice land, which is clearly beyond the reach of landless laborers. Therefore, garment manufacturing has been limited to landed households with collateral or those who have accumulated money from trade and/or formal employment such as government officials.

It is interesting to note, however, that while the requirement of fixed capital is much higher in the garment than the metal craft industry, the reverse is true for the working-capital requirement as far as rural factories are concerned. Also, the cost of current inputs is much lower for garment manufacturers. This difference reflects the different forms of subcontract, i.e., the putting-out system commonly used in garment subcontracting and the advanced-order contract used for metal craft subcontracting, as explained earlier.

A striking discovery is the extremely high rate of return on capital in the metal craft industry compared to that for garments. This might be due to the higher risk involved in the metal craft industry as it is a very new industry in the study area. The garment industry is more mature and has stabilized. Even within the limited area of our study, it appears that the incidence of failure is higher in the metal craft than in the garment industry.

The high rate of return in the metal craft industry over that of garments may thus include the innovator's excess profit in the Schumpeterian sense as a reward to the entrepreneur's risk taking. However, it must be recognized that to the operators of cottage manufacturers who have no access to institutional credit, the effective rates of informal credit may well be close to 100 per cent per year. The extremely high rates of return to capital in the order of 150 per cent might be barely sufficient to induce landless laborers to undertake this risky new business.

On the other hand, the rate of return on capital in the order of 40 per cent for the garment industry might be sufficient to maintain investment since the entrepreneurs in this industry usually have access to institutional credit at a typical interest rate of 20 per cent per year.

C. *Comparisons with Rice Farming*

The labor-using and capital-saving nature of the metal craft industry is also evident from comparisons with rice farming (with the average size being two hectares in the study village) in terms of capital-output and capital-labor ratios. The capital intensity of rice farming as measured by these ratios is higher than in metal craft manufacturing but lower than in garment manufacturing so long as land is not included in capital stock. However, if the value of rice land is added to the value of capital stock (as calculated in parentheses in Table III), the capital intensity of rice farming exceeds that of garment manufacturing by a wide margin. Moreover, the rate of return on capital declines to a mere 8 per cent.

The very high capital intensity and the low rate of return when land value is included in capital are, to a large extent, due to the elevation of land prices far above the capitalized value of rice farming incomes because of the expectation of the future conversion of farmland into urban use, although the conversion has still been rather limited in this eastern part of Laguna compared to the western part. New entries to rice farming have, therefore, been limited largely to those who accumulated savings from nonfarm professions and who have sought social prestige and the security associated with landownership in addition to the future appreciation of land value.

Clearly, rice farming in this area does not represent an enterprise like the metal craft industry where poor landless laborers can participate and improve their income and living by exploiting their entrepreneurship.

V. EXPORT CONTRACTORS

Export contractors of metal craft goods (as well as plastic, paper, and wood craft goods) operate widely in Greater Manila and its surroundings. Typically they receive orders from foreign buyers with offices in Manila and act as procurement agents for U.S. supermarket and department store chains. Some receive orders directly from abroad. The contracts between foreign buyers and export contractors are similar to those between export contractors and rural subcontractors, namely, advanced-order contracts specifying the quantity, the unit price, the product design, and the delivery date. Advanced payments and credit guarantees are practiced to some extent but not the supply of materials characteristic of the putting-out contract. The degree of independence of the export contractors from the buyers seems to depend on their product development capability, which is similar to the relationship between the export contractors and the subcontractors. In fact, many export contractors started business as subcontractors and then advanced to their present status. Almost all operators hold college degrees. They are thus located in a continuous spectrum with operators of rural factories.

Compared with rural factories, however, the organizational modes or management styles of export contractors appear to vary much more widely. Three contractors from among those we interviewed provide examples of three contrasting modes of operation.

A. *Toward the Modern Factory*

One mode represents a development toward the modern factory system. An export contractor based on the southern outskirts of Greater Manila is trying to organize his workshop in a manager-foreman hierarchy with about one hundred fifty workers employed at time rates. Most of the fabrication of crude craft goods is contracted out to some forty subcontractors. However, the finalization process such as painting, assembling, and packaging in gift boxes, is mainly done in house. The operator says that the factory system with direct supervision of workers is necessary for maintaining the required standard of quality.

This firm relied solely on one foreign buyer (a supermarket chain based in Dallas, Texas) which has an office in Makati. This buyer sends its inspectors to the factory to check the quality of products at the time of final packaging for export. This final check by the buyer is done for the products that have passed the inspection of nine in-house quality control workers.

Although this firm relies on orders from one buyer, it has a strong product development capability with five employees specialized in product design and sample-product making. Thus, the product development is a collaborative effort between the buyer and the contractor, which seems to underlie their stable long-term trade

relationship. However, this contractor does not receive trade credit and guarantees from the buyer, except for 10 to 20 per cent of product value that is advanced when a contract is closed for each order. Production takes one month or more and the final payment is normally a week after shipment. Meanwhile the operator has to pay wages and for the purchase of materials every two weeks. The operator thus considers the mobilization of working capital as the most crucial element in management. He relies mainly on commercial bank loans with interest rates of 20 to 25 per cent. However, this credit line is not easy to expand because of the lack of sufficient collateral (his factory building is not owned but rented).

The operator feels that the management of labor does not pose much of a problem at present. However, he does not think it is wise to expand his workshop further because labor regulations prohibit employing labor below the official minimum wage and prevent flexible employment, i.e., layoffs in response to reduced orders. Thus, he feels it is necessary to rely on subcontracting even for the final process of production in order to expand his business. At the same time he does not think it is easy to develop a reliable relationship with a subcontractor that assures high product quality and timely deliveries.

B. *Complete Contracting Out*

A contrasting case to this modern factory mode is found in the southern part of Greater Manila, near Quezon City. In terms of total sales, this firm does not seem so different from the one based on the factory system. However, the number of employees is only about ten including two quality inspectors. The operation of this firm is mainly based on subcontracting with more than seventy rural producers.

The most interesting feature is its use of the "in-house contract" system. This firm has its own workshop where more than fifty workers produce not only metal but also plastic, paper, and wood craft goods. However, they are not the employees of this firm but employed by leaders of groups, each consisting of about ten workers. The firm pays to the leaders upon the delivery of their products at piece rates. This is the system that was practiced in the early stage of industrialization in the Western world but disappeared as it was replaced by the manager-foreman-labor hierarchy. Thus, it is like seeing a living fossil to find the in-house contract system being practiced in this firm. The merit of this system is said to be that it reduces the burden on the management to monitor the work of the laborers while at the same time a check on product quality and delivery date can be maintained throughout the production process. This advantage is especially large for the small-lot production of complicated products requiring artisan skill.

The use of this mode of operation appears to be in response to the average lot size of orders received by this firm which seems to be relatively small. Unlike the one based on the factory system that relies on one large buyer, this export contractor receives orders from about fifty buyers through such means as international trade fairs and industrial shows. Its products, especially those produced in its own

workshop, such as model ships and locomotives, are rather complicated and requiring artisan skill and dexterity. The organization of this firm may be efficient for the mass production in small lots of commodities requiring traditional artisan skill in response to suddenly rising demand from abroad.

C. *Toward Modern Subcontracting*

The third example of an export contractor is located in a middle-sized city near the northeastern edge of Greater Manila. This firm appears to be significantly larger than the two previous examples in terms of total sales. Yet, there are less than fifty manual workers engaged in the final modification and brushup work inside its own workshop. The supply of the products in semifinished and finished form is contracted out to nearly one hundred subcontractors. To maintain and improve the quality of the products, about twenty employees travel around to the rural-based subcontractors and give them technical guidance. Also nearly the same number are employed for product design and development. Altogether, the size of the white-collar staff is larger than the number of blue-collar workers. The product quality of this firm is, therefore, sufficiently high to meet the demand of middle to upper-middle class consumers in high-income economies whereas most other export contractors are geared for the demand from the lower-middle class and below.

This strategy of concentrating in-house resources on product development and contracting out the mass production process as much as possible to small and medium enterprises, while strengthening their production capability through technical assistance and other measures, has been the strategy commonly adopted by Japanese firms in a wide range of industries including textiles and electronics. This firm has successfully obtained orders from as many as seventy buyers all over the world. Some of the orders have been acquired through participation in trade fairs in Tokyo and other places abroad.

The major problem confronting this firm is how to develop reliable relationships with subcontractors, a problem which was shared by all the export contractors we studied. Even in this firm which has been making major efforts in providing technical guidance and other assistance, deliveries can be delayed and the quality of delivered goods can be lower than the sample products, causing crises in this firm's relationship with foreign customers. Thus, the operator considers it better to reduce rather than increase the number of subcontractors and foster the capability of a smaller number of dependable subcontractors. This has also been the basic strategy of major Japanese firms (Abegglen and Stalk 1985; Asanuma 1988).

VI. CONCLUSION

This study of the metal craft industry from village to urban center in the Philippines indicates the large potential for labor-intensive industries to raise the income and living standard of rural people, especially of the landless poor. Industries of this

type are very well suited for the rural Philippines because of the small capital requirement relative to the large absorption of low-skilled labor. But more importantly, such industries can adequately exploit the potential of rural entrepreneurship that is relatively abundant in villages and local towns in the Philippines. Sharply rising wages in the Asian NIEs followed by some ASEAN neighbors created a niche for entrepreneurs in the Philippines. Recovery from the political crisis at the end of the Marcos regime, together with progress in liberalization and deregulation in trade, foreign exchange, and foreign direct investment since the late 1980s, opened the door for rural entrepreneurs to fill this niche. This opportunity has been rapidly exploited through the formation of a subcontracting network from metropolises to rural villages.

At present there seems to be little need for regulations on this industry. Competition is strong and entry is open, leaving no room for monopolistic exploitation. Export contractors are eager to develop reliable and mutually beneficial relationships with conscientious and capable rural entrepreneurs, which means that the bargaining position of the latter is not inferior to the former.

Moreover, many operators of rural factories are motivated to advance to the status of export contractors. There is ample evidence that their wish is not an unattainable goal. The active competition underlying the rapid development of the metal craft industry can be promoted further by the government's extension of technical assistance including advice on product design and the provision of marketing opportunities by such means as trade fairs and industrial shows. The activities of the DTI in these areas have had a significant impact in promoting the industry.

Such government support will have to be increased greatly if the Philippines is to advance beyond the supplying of cheap craft goods to the lower-income classes in the high-income economies. Such a shift will be necessary for the sustenance of the industry in view of the growing competition from lower-wage economies such as the People's Republic of China and South Asia.

Presently the government's support services stop at the local-town level and do not reach the small cottage manufacturers in the villages. Probably this is no great worry. The present efforts of export contractors to foster relatively small dependable subcontractors, coupled with government support, will strengthen the "rural factories" in the outlying towns. As their scale of operation expands, they will increasingly contract out their production process to the "cottage manufacturers" as they have already started doing. The former will provide technical guidance and other forms of assistance as the requirement of product quality from export contractors continues to rise. In this way a multi-layered subcontracting structure can be created. This is the system typically used in the Japanese automobile industry (Asanuma 1985; Wada 1991).

This structure can minimize total transaction cost associated with the network of subcontracts, while manufacturing activities in the villages can be expanded.

Therefore, it might be more efficient in terms of both economic growth and equity for the government to concentrate its scarce resources on rural factories and support their spillover effect rather than spread its assistance thinly over a large number of cottage manufacturers in the villages. Along with this, continued efforts to improve villager access to higher education are vital for rural and national development, and this includes increasing the likelihood for village entrepreneurs to advance to being operators of rural factories and further still to being export contractors. Equally important is public investment in transportation, communication, and electrification in rural areas, especially in the remote hinterlands, if the poor people in these areas, who have hitherto been isolated from the major currents of development, are to be included in the Philippines' rural-based industrialization process.

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