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COMPARATIVE AGRICULTURAL MODERNIZATION  
AND NON-FARM EMPLOYMENT

by

*Florian A. Alburo*

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#### ABSTRACT

This paper reports on the non-farm employment aspects of two agricultural towns considered to be at varying stages of agricultural modernization.

It is found that non-farm employment increases with the pace of agricultural modernization. At the middle stages of modernity, employment decreases before it increases again. In the same vein, part-time employment in non-farm enterprises decreases.

Implications of the findings on factor proportions, program management, and general policy are spelled out in the context of experiences found in other countries.

COMPARATIVE AGRICULTURAL MODERNIZATION  
AND NON-FARM EMPLOYMENT

*Florian A. Alburo\**

I

In an earlier paper,<sup>1</sup> it was argued that there is some worth in looking at the development of non-farm economic activities within the stages of a rural economy's agricultural modernization and transformation. By looking at comparative agricultural modernization some discernible characteristics can be identified to describe non-farm economic activities. In fact, following a framework that Gibb<sup>2</sup> had earlier used in an empirical study, it is possible to distinguish differential effects of modernization through the shape and pattern of non-farm activities.

This paper is devoted to laying more groundwork on non-farm economic activities. More specifically, an attempt is made here to analyze their employment aspects within the context of comparative agricultural modernization. In the next section the employment structure of two agricultural towns will be described while the third section aims to look at the employment responses arising from comparative changes in agriculture. Finally, some broad implications and conclusions are drawn in the last section.

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\*Associate Professor, School of Economics, University of the Philippines.

Recall an earlier paper which presented evidence of both agricultural modernization and non-farm economic activities for two Iloilo agricultural towns of Leganes and Pavia. While both are agricultural, various indicators showed that Leganes is more modernized than Pavia in a static and dynamic sense over two agricultural censuses and more recent data compiled by the province.<sup>3</sup>

The associated evidence on non-farm economic activities is instructive and does not in any way contradict the hypotheses apparent in the framework followed. In particular, Leganes displays more activities relating to indirect effect industries (e.g. rice mills and associated processing establishments) resulting from a longer sustained agricultural modernization than Pavia. The latter, on the other hand, is seen to be picking up on direct effect industries i.e. those that emerge from initial bursts of income increases as a result of agriculture growth.

The rest of the analysis is supportive of what appears as dominant features of comparative agricultural modernization. While the number of sampled establishments are about the same in both towns, their distributions point to relatively more in direct effect industries in Pavia than Leganes. Savings mobilization rates (reflected in average capitalization among establishments) are

higher across effects in Leganes. Finally, trade flows are much higher in Leganes capturing more multiplier impacts.

The limited data seem to suggest that even narrow types of agricultural modernization programs (e.g. productivity increases) do spawn, at early stages, non-farm economic activities. Moreover, one can argue that these developments are quite spontaneous, self-generated and perhaps self-financed. Comparing two agricultural towns at different points of a modernization scale, the more modernized one moves into a phase where "larger" scale (of still pre-factory size) establishments grow. What is not clear from the evidence is that particular point where changes from one type of non-farm activities to another take place.

The broad implications of the initial evidence do lead to some directions for policy and program. It might be useful to make a distinction between financial and technical assistance towards the development of rural industries in general. For one the growth of direct income effect industries do not necessarily seem to rely in a strict sense, on available external funding sources. What is needed is a set of programs aimed at increasing capacities to undertake early forms of non-farm economic activities (e.g. vocational skills). And these do not necessarily have to carry with them financial assistance packages. It appears that productivity growth and income increases serve to propel non-farm enterprises to cater to immediate changes in consumer preferences.

For another, there are apparently scale differences between indirect and direct income effect industries. A further analysis of the type of establishments within indirect effect non-farm economic activities would point to both technical and financial forms of assistance that would help develop their structure and sustain their growth.

What remains to be seen from all this is the employment aspects associated with non-farm economic activities that go with agricultural modernization. Gaining a greater understanding here especially with respect to labor absorption can help policy makers institute programs aimed at smoothening adjustments.

## II

For Leganes and Pavia, a six-year interval shows significant dynamic changes in non-farm employment as indicated from the results of the establishment survey.<sup>4</sup> Of the sampled establishments in the two towns in 1977, around one half of them were not in operation in 1971. Between the two time periods (1971 and 1976), the average yearly growth rate of non-farm establishments is 13 percent in Pavia compared with 10 percent in Leganes. But this average of course hides some dynamism in terms of the yearly exit and entry of establishment. Table 1 shows the distribution of establishments between 1971 and 1976.

Table 1  
DISTRIBUTION OF ESTABLISHMENTS  
BY INDUSTRY CATEGORY  
1971 and 1976

| Industry<br>Category | Leganes<br>(Number) |      | Pavia<br>(Number) |      |
|----------------------|---------------------|------|-------------------|------|
|                      | 1976                | 1971 | 1976              | 1971 |
| Direct Effect        | 55                  | 30   | 57                | 28   |
| Indirect Effect      | 12                  | 8    | 7                 | 3    |
| Public Services      | 1                   | 1    | 1                 | 1    |
| T o t a l            | 68                  | 39   | 65                | 32   |

One way of looking at employment effects is through the scale of firms and their distribution overtime. Tables 2 and 3 show the distribution of establishments by size of full-time workers in the two towns during the years 1971 and 1975, respectively.\*

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\*The reference point for the establishment survey was 1976. There was no information gathered on the number of establishments in 1975.

Table 2

DISTRIBUTION OF SAMPLE ESTABLISHMENTS  
BY SIZE OF FULL-TIME WORKERS  
1971

| Number of<br>Workers | Leganes | Pavia |
|----------------------|---------|-------|
| 0                    | 1       | 4     |
| 1-2                  | 29      | 22    |
| 3-4                  | 5       | 3     |
| 5+                   | 3       | 2     |
| Total                | 38      | 31    |

Table 3

DISTRIBUTION OF SAMPLE ESTABLISHMENTS  
BY SIZE OF FULL-TIME WORKERS  
1975

| Number of<br>Workers | Leganes | Pavia |
|----------------------|---------|-------|
| 0                    | 4       | 5     |
| 1-2                  | 44      | 51    |
| 3-4                  | 10      | 2     |
| 5+                   | 4       | 3     |
| Total                | 62      | 61    |

Some observations can be drawn on the data. First the number of establishments with at least one full-time worker is higher in Leganes than in Pavia although what seems to be more important is their distribution. It seems that establishments pass through an initial phase without the employment of full-time workers. Since the total number of establishments changed between two periods however, there is no direct way to substantiate this. One only notes that the absolute number of establishments without full-time workers is greater in 1975. This is perhaps due to the emergence of new establishments in that year rather than the deterioration of establishments that evolved in 1971.

Second, the major bulk of size is in the 1-2 full-time worker range. More than four-fifths of establishments in Pavia have this size in 1975, an increased share over 1971. Much of these distributional changes however clearly reflect the increase in the number of establishments between the two periods.

Third, the establishment scale in Leganes is significantly much greater than Pavia, in absolute and relative terms. Between 13 and 16 percent of establishments in Leganes has a size of 3-4 full-time workers compared with Pavia's 3 to 9 percent during the period 1971 and 1975.<sup>5</sup>

Employment of course must be defined more precisely in terms of e.g. hours per week or work-days per year.<sup>6</sup> The survey undertaken to gather employment data in both towns did not ask hours worked but rather distinguished between full-time and part-time employment of workers. This notion of employment is obviously short of some capacity utilization criterion but can indicate orders of magnitude viewed by establishment owners.

Table 4 below gives the absolute number of workers classified according to part-time and full-time for the two towns in 1971.

Table 4  
EMPLOYMENT BY TOWN, CATEGORY AND INDUSTRY EFFECT  
(Number of workers)  
1971

| Industry Category | Leganes         |                 | Pavia |    |
|-------------------|-----------------|-----------------|-------|----|
|                   | FT <sup>1</sup> | PT <sup>2</sup> | FT    | PT |
| Direct            | 168             | 34              | 56    | 11 |
| Indirect          | 11              | 3               | 4     | 3  |
| Public Services   | 5               | 0               | 6     | 0  |
| Total             | 184             | 74              | 66    | 14 |

<sup>1</sup> Full-time

<sup>2</sup> Part-time

For both towns, the major bulk of employment is in direct effect industries. It appears that Leganes has the largest share of employment among the sample establishments in the two towns.

The 1976 figures show a similar distribution of absolute employment. See Table 5

Table 5  
EMPLOYMENT BY TOWN, CATEGORY AND EFFECT  
(Number of Workers)  
1976

| Industry Category | Leganes |    | Pavia |    |
|-------------------|---------|----|-------|----|
|                   | FT      | PT | FT    | PT |
| Direct            | 214     | 58 | 103   | 56 |
| Indirect          | 14      | 10 | 9     | 5  |
| Public Services   | 7       | 1  | 6     | 0  |
| Total             | 235     | 69 | 118   | 61 |

The depth of rural non-farm industries may be measured by the scale of factory inputs such as labor and capital. Some estimate of the average capitalization rates was earlier presented showing the relatively high scale of public service industries compared with direct effect industries in both towns.<sup>7</sup>

The average number of employees, combining part-time and full-time is reported in Tables 6 and 7 for 1971 and 1976, respectively. It appear that the scale of establishments in

in Leganes is larger than Pavia, with the slight exception of indirect effect industries.

Table 6

AVERAGE NUMBER OF EMPLOYEES PER ESTABLISHMENT  
(Part-time and Full-time)  
1976

| Industry Category | Leganes | Pavia |
|-------------------|---------|-------|
| Direct            | 5.0     | 2.80  |
| Indirect          | 2.0     | 2.0   |
| Public Services   | 8.0     | 6.0   |
| Average           | 4.47    | 2.75  |

Table 7

AVERAGE NUMBER OF EMPLOYEES PER ESTABLISHMENT  
(Part-time and Full-time)  
1971

| Industry Category | Leganes | Pavia |
|-------------------|---------|-------|
| Direct            | 6.70    | 2.4   |
| Indirect          | 1.75    | 2.3   |
| Public Services   | 8.0     | 6.0   |
| Average           | 5.67    | 2.5   |

The establishment size in Leganes is greater but its differential with the size in Pavia narrows down between the two time periods. The composition of establishments by industry category also is not totally comparable. In the direct effect industries quite a larger number are jeepney operators, or those manufacturing for local demand compared with the bulk in Pavia on recreational services. For the indirect effect industries the kinds of establishments are quite similar (e.g. palay traders and rice millers). And of course public services establishments are similar in both towns (e.g. private high schools and banks).

### III

The employment response associated with agricultural modernization can be looked at along several fronts — in terms of differential effects on the three general categories of industries, the constraint of capital needs, and the changes in the form of employment per establishment.

Agricultural modernization was reported to be occurring faster in Leganes than in Pavia, with yearly growth rates of 12 and 9 percent, respectively.<sup>8</sup> Yet, despite a larger absolute employment in Leganes, yearly growth rates are less than half of Pavia implying, roughly, employment elasticity of modernization of .05 in Leganes and .93 in Pavia. There are of course differences

across industries. For example, most of the employment increases in Pavia are in the direct effect industries whereas the public service industries account for the larger portion of employment growth rate in Leganes. Because of the heavy absolute weight of direct effect industries, overall growth rates are higher in Pavia.

It can be noticed in Tables 6 and 7 that there are variations in the average number of employees per establishment. Employment seems to fall in moving from direct effect industries to public service effect industries, i.e. employment decreases in the indirect effect industries but subsequently increases in the public services category. Given the earlier analysis in which Leganes is argued to be more modernized, employment growth is expectedly higher in the third category industry effect. Yet scale effects are not apparent in order to propel higher non-farm labor absorption in Leganes.<sup>9</sup> The converse can be applied to the employment situation in Pavia.

Since indirect effect industries are oriented towards backward linkages (e.g. repair shops, milling, independent truckers, vehicle body building etc.) it might be useful to look at the relative factor proportions used within each industry effect category.

Table 8 reports the capitalization rate per employee per establishment in both towns for 1976.

Table 8

AVERAGE CAPITALIZATION RATE PER EMPLOYEE PER ESTABLISHMENT  
(Pesos)  
1976

| Industry Category | Leganes | Pavia |
|-------------------|---------|-------|
| Direct            | 553     | 727   |
| Indirect          | 2250    | 1428  |
| Public Services   | 1250    | 1333  |
| Average           | 710     | 783   |

There seems to be a wide variation in the capital-labor ratios within the two towns than between them. In particular the capital-labor ratios, while absolutely low on the average, are quite high for indirect effect industries. It is understandable that the second stage of industries experience capital-intensiveness, given the illustrative types of establishments and the nature of output of these industries. One can therefore expect that, as agricultural modernization proceeds, the labor absorption capacity of non-farm economic activities partly depends on an agricultural economy's stage in the specified framework of industry category of effect. And this does not seem

to be refuted by the limited evidence on the two towns.

It is also possible to speculate on the form of employment that emerges from non-farm agricultural development. Employment across industries in both towns is either part-time or full-time. Although full-time workers compose a large part of total employment, one can notice that annual increments of part-time workers are higher in Pavia than in Leganes. Apparently there is stage in the development of non-farm enterprises in which part-time employment escalates before more full-time workers take an increasing share. It seems that Pavia is yet increasing employment but more of the part-time nature. The potential trade-offs implicit between the two forms of employment cannot be ascertained since the forms of labor absorption are categorical rather than numerical. But the direction is illustrative.

In summary, the employment aspects in non-farm economic activities associated with agricultural modernization vary with the breadth and depth of non-farm activities. Consistent with the previous findings, labor absorption is quick at early stages but heavily utilizing part-time employment. In the middle stages labor absorption would be quite low but reverses at the last stages of non-farm agricultural development. Since there are scale differences across the different stages of industries, the absolute employment absorption will likewise be lower as agricultural towns begin on the latter stages of non-farm economic activities.

## IV

The previous sections have argued that there are discernible patterns in the behavior of non-farm employment between two agricultural towns that are at varying stages of agricultural modernization. While this study of comparative modernization may be limited in generalizability, it is useful to catalogue some of the wider implications that may be cause for increasing our study of comparative experiences.

1. There is some significant scope for non-farm employment, both part-time and full-time. As agricultural modernization proceeds, employment increases though its rate (in absolute and in the relative shares of part- and full-time workers) partly depends on its stage of modernization.

2. Such an agricultural modernization spawns a phase of low labor absorption. In terms of the framework presented, at the stage where backward linkages are developing, employment may fall. What the implications of this on overall labor absorption will be associated with the relative strengths of the phases, all other things (e.g. wages) constant. In terms of policy this phase needs to be mitigated in order to continue increasing employment.

3. The phase where employment in non-farm economic activities falls is also characterized by high capital-labor ratios.

Stimulation of or accommodation for this type of phase requires capital resources for which corresponding labor use is low.

4. Assuming that the emergence of direct effect industries is quite a self-generating process<sup>10</sup> and that, as earlier found, employment is high, it seems that this is where active employment policy is least necessary. Indeed this can contrast with the implied need for a program of financial and technical assistance in the indirect effect industries which generates a lower rate of non-farm employment.

A final remark is apropos these comments. There is some worth in looking at non-farm employment measured according to stages of modernization as opposed to the traditional manner of decomposing it in terms of the size of establishment. In fact, it appears that in early rural industrialization firm sizes are quite small and donot really measure up to standard concepts of small-scale industry. Yet their behavior is important in the process of employment generation in agricultural modernization.

The experiences illustrated by the comparative agricultural modernization of Pavia and Leganes and their structure of non-farm employment need a larger set of sample Philippine experience.<sup>11</sup> They donot however conflict with findings of other studies in Thailand,<sup>12</sup> Haiti<sup>13</sup> in the Carribean, and Sierra Leone<sup>14</sup>

and Tropical Africa<sup>15</sup> in Africa. Although these studies donot document the stages of agricultural modernization,<sup>16</sup> the employment structure in rural industries are consistent with the findings here.<sup>17</sup>

# FOOTNOTES

<sup>1</sup> F.A. Alburo, "Comparative Agricultural Modernization and Non-Farm Economic Activities," Discussion Paper No. 7817 UP School of Economics (June 1979).

<sup>2</sup> Several of Gibb's papers develop the framework followed here. See for example, "Report on On-Going Research: Some Evidence on the Impact of Agricultural Modernization on Non-Agricultural Incomes in Agricultural Market Centers," Discussion Paper No. 72-4 UP Institute of Economic Development and Research (April 1972), and "Preliminary Data on Non-Farm Employment Changes in an Agricultural Sub-Region," Discussion Paper No. 72-19 UP-IEDR (June 1972).

<sup>3</sup> F.A. Alburo, op.cit., III

<sup>4</sup> For a description of this establishment survey see F. David, "Inter-Municipality Patterns of Trade and Economic Activities: Survey Design," Research Memorandum No. 16 (September 1977).

<sup>5</sup> F.A. Alburo, op.cit.

<sup>6</sup> It is important to raise the basic weakness of the concept of employment apparent in the analysis of this paper. For one, the concept of the labor force was not defined explicitly in the survey and this could well vary. Strictly speaking this would be persons either 10 or 15 years old and over (depending on whether the new labor code of the Philippines is followed). For another, part-time and full-time employment are used liberally but their exact meanings and measurement are ambiguous. Again, in a strict sense full-time employment is a 40-hour (or as some could argue 50-hour) week. Otherwise, what is being measured is underemployment. It is therefore tempting to dismiss the comparative measurement of employment in this paper.

But the point argued here, at this time, is not so much employment in the sense of precise units as much as providing directions and general patterns of non-farm employment. Indeed, as evidenced, some insights can be clearly hypothesized.

<sup>7</sup> F.A. Alburo, op.cit., fn. 20.

<sup>8</sup> Ibid.

<sup>9</sup> The apparent smallness in the scale of indirect effect industry (in both towns) is partly responsible for the slow labor absorption. This emphasizes the scale effects may require a market larger than the boundaries of the towns under study.

<sup>10</sup> F.A. Alburo, op. cit.

<sup>11</sup> Comparative studies can be done on the other three Iloilo towns that are part of the establishment survey which data are reported and analyzed here. At the macro level provinces can be studied by varying pace of agricultural modernization and non-farm employment.

<sup>12</sup> See D.C. Mead and P. Charsombut, "Rural Off-Farm Employment in Thailand, Phase I Survey Results," Research Paper No. 2, Center for Applied Economics Research, Kasetsart University (June 1980).

<sup>13</sup> S. Haggblade, J. Defay, and B. Pitman, "Small Manufacturing and Repair Enterprises in Haiti: Survey Results," Working Paper No. 4, Michigan State University Rural Development Series (1979).

<sup>14</sup> C. Liedholm and E. Chuta, "The Economics of Rural and Urban Small-Scale Industries in Sierra Leone," African Rural Economy Paper No. 14, Michigan State University (1976).

<sup>15</sup> D. Byerlee, C. Eicher, C. Liedholm and D.S.C. Spencer, "Rural Employment in Tropical Africa: Summary of Findings," African Rural Economy Paper No. 20, Michigan State University (1977).

<sup>16</sup> For a review of the non-farm employment literature see E. Chuta and C. Liedholm, "Rural Non-Farm Employment: A Review of the State of the Art," Rural Development Paper No. 4, Michigan State University Rural Development Series (1979).

<sup>17</sup> One example is the average number of workers per enterprise. It is about 2.8-4.0 in Jamaica, 3.8 in Bangladesh and 3.6-11.0 in Thailand.