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Data Collection  
Strategies for  
Small-Scale  
Industry Surveys

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# Data Collection Strategies for Small-Scale Industry Surveys

by

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Although there are several strategies to collect survey data, only two basic data collection methods have been used to generate survey data on small-scale industries in developing countries. The two methods are the one-shot business survey and the multiple-visit (cost-route) survey. This paper reviews the way these two methods have been used and the central issues that must be considered when choosing which data collection strategy to employ.

### HISTORY OF SURVEY METHODS USED

The vast majority of small-scale industry inquiries have used the one-shot business survey method. With this method, the survey data are obtained at a single point in time by means of either self-enumeration (in other words, mailed questionnaire) or one or two personal interviews with the proprietor.

The one-shot business surveys of small-scale industry have long historical roots. In the earliest business surveys undertaken in both the industrialized and the developing countries, an attempt was made to enumerate all firms of all sizes.<sup>1</sup> Subsequently, these general business surveys began to exclude the small firms or enumerated them in separate, special business surveys "because of the work and problems that small units contribute to basic industrial inquiries."<sup>2</sup> Indeed, the United Nations' 1973 World Program of Industrial Statistics recommended that different survey procedures should be considered when obtaining data from small-scale firms engaging less than five workers.<sup>3</sup> Specifically, the U.N. program proposed that for the smaller firms government censuses could be based on sample rather than on a complete coverage of enterprises and that shorter, less comprehensive, questionnaires might be

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<sup>1</sup> See United Nations (1953) for a discussion of the history of industrial censuses.

<sup>2</sup> United Nations (1953, p. 108). Egypt attempted to cover all manufacturing in 1937, for example, but included only large-scale firms after 1944.

<sup>3</sup> United Nations (1971, p. 31).

used. The data however — even those relating to the flow variables such as inputs, outputs, profits, and sales values — were still to be obtained at a single point in time.

Separate, one-shot business surveys of small-scale industries have been undertaken in a number of developing countries.<sup>4</sup> These surveys have been conducted by government statistical agencies, such as in India (1965) and Ghana (1965); university research units, such as the Industrial Research Unit of the University of Ife in Nigeria (1972), the Institute for Small-Scale Industry of the University of the Philippines (ILO, 1974), and the small enterprise group at Michigan State University (Liedholm and Mead, 1987); individual researchers, such as Kilby in Nigeria (1963), or Steel in Ghana (1977); and international agencies, such as the International Labour Organization (Sethuraman, 1981) and the World Bank (Little, Mazumdar, and Page, 1987). The geographic coverage and the kinds of data collected in these one-shot surveys vary widely from country to country.

The multiple-visit (or cost-route) survey technique, on the other hand, has not been widely used for collecting small-scale industry data. This method, in which firms are interviewed **repeatedly** for a crop season or even a year or more, has been employed largely in farm management and production studies.<sup>5</sup> It was extended to the industrial sector by researchers at Michigan State University in such countries as Sierra Leone (Chuta and Liedholm, 1985), Bangladesh (BIDS, 1981), Jamaica (Fisseha and Davies, 1981), Honduras (Stallmann and Pease, 1983), Thailand (Narongchai, 1983) and Egypt (Davies, et al., 1984).

### CRITERIA FOR CHOICE OF METHOD

This choice of which data collection strategy to employ in small-scale industry inquiries depends on a number of factors. A key element in the decision, however, centers on the relative amount of sampling and nonsampling errors generated by the two techniques. If resources for

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<sup>4</sup> See Liedholm and Mead (1986) for a review of those surveys undertaken in Africa and United Nations (1975) for a review of government surveys in all regions.

<sup>5</sup> See, for example, Spencer (1972), Norman (1973), and Tollens (1975).

investigation are fixed, increasing the frequency of interviews will necessitate reducing the sample size and consequently tend to increase the sampling error. On the other hand, reducing the frequency of visits may tend to increase the amount of nonsampling errors, such as those due to measurement and response inaccuracies, particularly if significant amounts of memory recall are involved.

The exact nature of the trade-off between these two sources of error cannot be specified with complete certainty. Casley and Lury (1981) contend that, in developing countries, nonsampling errors are relatively more important than the sampling ones. Reinterview studies have shown the presence of "alarming high levels of response errors even on the simplest of survey questions" (Scott, 1985, p. 15), and in some Indian surveys nonsampling errors were probably six times the sampling errors (Casley and Lury, 1981, p. 87);

Concern for nonsampling errors in small-scale enterprise surveys is of particular importance because most small firms do not keep written records or books. In Sierra Leone, for example, only 17 percent of the small industry proprietors keep even a minimal set of records (Chuta and Liedholm, 1985). In Jamaica, the percentage drops to 9.8 (Fisseha and Davies, 1981), while in rural Bangladesh the percentage is only 6 (BIDS, 1981). In view of the lack of written records, the interviewer must rely on the respondent's memory for obtaining the required information. Memory recall is thus critically important when collecting data from small-scale industries in developing countries.

The memory performance of respondents, and consequently the amount of measurement error, depends importantly on the length of the recall (or reference) period. Since memory errors tend to increase as the length of the recall period increases,<sup>6</sup> the most accurate observations can be obtained from those activities that took place or can be measured on the day of the inquiry. In this regard, one can usefully distinguish between the relative measurement accuracy of current stock and annual flow data. Since current stock data, such as the number and kinds of workers or the number and kinds of capital stock, relate to the day that the inquiry

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<sup>6</sup> See, for example, Zarkovich (1966). Collinson (1972) has argued, however, that memory recall may be improved, in some cases, as the reference period increases.

takes place, this type of information can be expected to possess a relatively low degree of measurement error even when obtained in one-shot business surveys. Data relating to the flow of activities over a period such as annual labor hours, profits, income, output, and sales might, on the other hand, be expected to be subject to much higher measurement error, since longer periods of memory recall are required.

A one-shot business survey may thus be a suitable vehicle for small-scale inquiries if only stock-type data were required. Stock data can be useful, for example, in providing an idea of the extent and composition of small-scale activity in a country or for providing the initial sampling frame for subsequent, more detailed inquiries. Kilby's study of Eastern Nigeria's small-scale industrial sector (1963), the Fisseha and Davies small enterprise study in Jamaica (1981), and Chuta and Liedholm's study of manufacturing enterprises in Sierra Leone (1985) are examples of the use of one-shot business surveys to provide stock data for one of these purposes.

If annual flow data are required, however, an alternative data collection strategy may be needed. The ability of respondents to recall accurately flow-type activities that have taken place previously depends importantly on the regularity and frequency of the flows to be measured.<sup>7</sup> Events that occur regularly over a period create a pattern of experience for the respondents and enable the respondent to remember these events more easily. Moreover, events that occur infrequently over the period will also tend to be remembered individually. The regularity and frequency of small-scale industrial flow variables will thus provide important clues to the most appropriate data collection strategy.

The available evidence for the small-scale industry surveys indicates that the flow of activities over the year is irregular both daily and weekly as well as seasonally. The majority of the small-scale firms, for example, respond to individual orders whose magnitude varies daily (see Liedholm and Mead, 1987). There are also large seasonal variations in the level of inputs and outputs of small-scale industry in both urban and rural locations. In the larger urban areas, for example, the mean output in the peak month in the Sierra Leone study was twice that in the

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<sup>7</sup> See Collinson (1972) for a discussion of these two characteristics.

lowest month; in the rural localities, the corresponding variation was four times (Chuta and Liedholm, 1985). Moreover, the seasonal pattern of activity varies from industry to industry. The irregular nature of the activity will thus tend to make it difficult for the respondent to remember the individual flow activities over the entire year. The daily and seasonal variations also make it dangerous to impute the total yearly flows from data covering only a small portion of the year.<sup>8</sup>

The Sierra Leone study also reveals that a large number of the flow variables occur with great frequency over the year. Labor is used and output is produced daily, for example, while other inputs may be purchased somewhat less frequently. It is thus unlikely that all these individual flow activities will be remembered accurately over the entire year. In view of the irregular yet continuous nature of the flow data to be collected, the one-shot business survey appears to be an inappropriate vehicle for collecting these types of data. Consequently, some form of multiple-visit survey technique is needed if flow data are to be collected without unduly large amounts of measurement error.<sup>9</sup>

The results of two tests of the memory recall accuracy of small-scale proprietors tend to support the contention that annual flow data cannot be generated accurately from one-shot surveys. In Honduras, detailed input and output data were collected twice-weekly from December 1979 until December 1980 from 81 randomly selected entrepreneurs. The entrepreneurs were then asked at the end of the period to provide their best estimate of their total sales, costs, and profits for that one-year period. When these one-shot estimates were compared

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<sup>8</sup> See, for example, Child (1973), who has attempted to estimate yearly flows from monthly flow data.

<sup>9</sup> Collinson (1972) has argued that "end period effects" and "conditioning effects" could cause measurement errors to be high in multiple-visit surveys. The "end period effect," in which respondents tend to include items from earlier periods in their reporting for the current period, can be minimized by relating the reference period and frequency of interviews to the frequency of transactions; thus, labor reference period would be short while purchased inputs reference periods would be longer. "Conditioning effects," which might negatively influence such surveys if respondents gradually lose interest and drop out of the survey, did not appear to be a serious problem in the Sierra Leone survey. Indeed, less than 5 percent of the sample dropped out because of the unwillingness to continue to cooperate.

with the actual sales, cost, and profit information provided during the twice-weekly enumeration, the divergences were marked. The estimated mean value of sales, for example, based on the one-shot memory recall, was 85 percent higher than that derived from the twice-weekly enumerations. Moreover, there was a high degree of variation in these responses; only 25 percent of the entrepreneurs' one-shot responses were within 25 percent of the enumerated values. The one-shot estimates of costs and profits exhibited similar divergences. The mean value of profits was overestimated by 47 percent and only 21 percent of these one-shot estimates were within 25 percent of profit figures collected twice weekly.

In Jamaica, a similar test was conducted on a random sample of 80 respondents who had also been enumerated twice-weekly for one year (May 1979-April 1980). Forty-five percent of the respondents said they could not recall any of the requested information. For the remaining 55 percent, their one-shot recall greatly overestimated cost, but, contrary to the Honduras experience, their sales were underestimated by over 20 percent (Fisseha, 1982).

The results of these two tests indicate that the measurement errors associated with one-shot surveys of flow variables are extremely high. Flow results generated from such one-shot studies should thus be treated with extreme caution and healthy skepticism.

How accurate are the flow data collected once or twice a week? Although there have been no rigorous tests of this aspect of memory recall for small-scale proprietors, this question was examined before the start of the Sierra Leone small-industry study. Most proprietors could provide reasonable estimates of output, sales, labor, and inputs for four days, after which the accuracy appeared to drop. Transactions involving purchased inputs were remembered for much longer periods. Thus, twice-weekly visits may be required if measurement errors for the key labor and output variables are to be kept within reasonable limits.<sup>10</sup> Accurate data on purchased inputs, on the other hand, can be obtained with weekly or even, in some cases,

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<sup>10</sup> The need for twice-weekly enumeration of some variables parallels the practice recommended by researchers who have engaged in farm management and production surveys in developing countries. Spencer (1972), Norman (1971), and Tollens (1975), for example, all argue that twice-weekly interview intervals probably are required if reasonable estimates of certain variables are to be obtained. Only Spencer (Kearl, 1976), however, has rigorously tested for the accuracy of memory recall.



monthly interviews. Finally, stock data probably should be gathered only twice, at the beginning and end of the survey period, while entrepreneurial data should be collected only once, preferably at the end of the survey period. Thus, the frequency of interviews should vary depending on the kinds of data being collected. These interviews should ideally be conducted over the entire year, however, to capture seasonal variation in activity.

In conclusion, if only stock-type information on small-scale industries is required, a one-shot data collection strategy is quite appropriate. A multi-visit survey strategy must be given serious consideration, however, whenever annual flow-type information is needed, particularly if the potentially significant measurement errors are to be kept within tolerable limits. Further studies are needed to determine if the frequency and length of such multiple-visit surveys can be reduced without markedly increasing the measurement error.

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