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**Regional Programme on Enterprise Development (RPED)  
Ghana Manufacturing Enterprise Survey (GMES)  
Waves I - V (1991-97)**

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**Explanatory Note: Investment Data**

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This note provides some explanation of the treatment of investment-related data in the Ghana manufacturing sector dataset. It should be read in conjunction with the main explanatory note accompanying this dataset titled “Background Information on Use of Dataset”.

As part of the surveys carried out between 1992-98 (collecting firm-level data for 1991-1997), firms within the sample were asked various questions about the investments that they had recently made in three broad categories:

- (a) land - purchase or leasehold acquisition of new properties for expansion of their manufacturing activities or improvements made to existing properties;
- (b) buildings - the construction or purchase of new buildings or improvements made to existing buildings;
- (c) plant & equipment - outright purchase or leasehold purchase of manufacturing-related or other machinery and equipment intrinsic to the different stages of the firm’s productive and distribution processes.

One of the characteristics of manufacturing firms in Ghana (as in many other countries covered by the African RPED surveys) has been low levels of fixed investment. This is reflected in the data gathered during the Ghanaian surveys. In particular, there are relatively few observations of investments made in the first two categories mentioned above ie land and buildings, which by their nature tend to be infrequent and lumpy investments.

More common are investments made in the acquisition of plant and machinery, which makes the analysis of the determinants and results of these investment patterns more interesting. Hence in most of the work carried out thus far in deriving useful variables from the data, this latter measure of investment has been utilised. The benefit of using the measure of investment made in plant & machinery as the key firm-level investment variable is reinforced in this particular dataset by problems experienced in the data collection exercise for other forms of investment in wave1.

The results of some of the work to derive useful investment-related variables are contained in the SAS program file entitled invest.sas and the main variables contained in this file are described further below. The investment data collected across the three waves of the survey is unfortunately not complete. In particular, values for investments made in land and buildings are not available for 1991 (wave 1 of the survey). Potential users of this dataset are advised to consult the original questionnaires in conjunction with this explanatory note when seeking to undertake data analysis on this section of the survey results.

## Summary of data collected from Waves 1-5 of survey:

### **Levels of investment made in plant & equipment**

- 1983-91 During wave 1 of the survey, firms were asked to recall the last 3 investments made in plant & equipment during the lifetime of the firm (records R49 and R50 in Section 5: Technology Questionnaire, Part C). This recall data has been organised into a series of variables according to the year in which the investment was made (from 1983 to 1991). It is possible that this recall data underestimates total investment by excluding information on firms making more than three investments during this period. However, due to the low aggregate investment level, it is believed that this is not a significant exclusion. The observations on these variables are contained in the inv.sd2 data file and the cedi values have also been converted to US\$ values using relevant average exchange rates for each year for comparability (see variables INV83 - INV91 for cedi values and INV83US - INV91US for dollar values).
- 1991 In wave 1 of the survey, firms were also asked to record the total value of their investment during 1991 (Section 2, question 17a). The responses to this question were not coded as part of the original data, but were subsequently entered in the inv.sd2 datafile as the variable INV91QU. The question was generally interpreted as a measure of total investment made in plant & equipment and it is considered that this variable is a better measure of each firm's actual investment levels in plant & equipment in 1991 than the recall value INV91 above.
- 1992 Firms were asked the value of their investment in plant & equipment during 1992 in the wave 2 survey, question Z11Q23 .
- 1993 Firms were asked the value of their investment in plant & equipment during 1993 in the wave 3 survey, question L15Q40 .
- 1994-1995 Firms in wave 4 were asked the value of their investment in plant & equipment during 1994 and 1995, S3Q29 .
- 1996-1997 Firms in wave 5 were asked the value of their investment in plant & equipment during 1996 and 1997, F4Q8.

### **Initial investment made in Plant & Equipment**

- 1991 In the Wave 1 survey (record R48) firms were asked to give details of their initial investments made in plant & equipment at start up, The year and value of this initial investment was not recorded, due mainly to the lack of credible responses to this question in the early stages of the survey implementation period.

However, additional information was gathered for some firms including type of equipment, purpose of investment, results of acquiring new equipment, sources of information used to find equipment and details of any technical adaptations made. This data is all contained in the data file rec48.sd2 within the wave1 folder.

### **Levels of total investment**

(including investments made in land & buildings)

1991 Data on investments made in land and buildings was not collected. The variable INV91QU should be interpreted as total investments made in plant & equipment during 1991, but could also proxy for total investment if necessary.

1992-1997 A breakdown of the three categories of investment is available and is derived in the SAS programme invest.sas. The three categories identified are investment in land (INVLAND), investment in building (INVBUILD) and investment in plant and machinery (INVPLANT). The investment in plant should be the same as INV. The two variables, in the early round of the questionnaire, can be derived more than once in the questionnaire so there are some problems of consistency.

### **Sources of Financing for Investments Made**

For each of the components of total investment (see above), firms were asked to give details about (a) the form of these acquisitions - purchase or lease and (b) the sources of financing - by value or percentage of total investment value.

Potential sources of financing were broken down into several categories. In Wave 2, this information was originally recorded in the form of percentages of the value of total investment (in land, buildings and plant), with a check to ensure that these proportions summed to 100%. In the Wave 3 questionnaire, the information was entered as actual values, with a check to ensure that these proportions summed to the value of total investment recorded. In Waves 4 and 5 the data was recorded as percentages.

This data has been compiled in the SAS program file invest.sas into a consistent set of variables which measure the amount of investment in land, buildings and plant (in cedi values) financed from the following sources:

- CRE = company retained earnings;
- PS = personal savings;
- BFR = borrowed from friends or relatives;
- BLOD = bank loan;
- SC = supplier credit;
- BML = borrowed from money lender;
- OTH = other forms of financing.<sup>1</sup>

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<sup>1</sup> For Wave 3, OTH includes the following three additional options - holding company/parent company, sale of equity and new partner

## Supplementary Information

Firms have also been asked for supplementary information on any investments that had been made in plant & equipment regarding:

- (a) Type of equipment acquired - new/used, locally produced or imported;
- (b) Purpose of investment in equipment - increasing capacity, improving quality, product diversification etc;
- (c) Results of investments made in equipment - effect on production cost, product quality etc.

See the questionnaires and the relevant record files in the SAS data files.

## Derived Variables

*Investment/ capital stock ratios:* A number of derived variables have been calculated in this program comparing investment levels in plant & machinery with alternative measures of the firm's capital stock.

It has been the general practice to use the replacement value of the firm's capital stock (ie the current market value of equivalent new machinery) as the standard and most reliable measure. Experience has shown that data collected from firms for this variable is more reliable and consistent than for the resale value of the capital stock.

Both measures have been included here, but it should be noted that there were specific problems noted with observations on both of these variables for particular firms, some of which have consequently been excluded from the analysis presented in the invest.sas program file.

*Investment/ employment & Investment/value added ratios:* these and other useful ratios have not been included in the material presented here but can readily be calculated by merging the relevant investment data files with the data files containing these general firm variables (see the accompanying dataset documentation and particularly the genfirm.sas program file).

**Table 1.4 Main Variables Contained in SAS Program File: invest.sas  
Investment Variables for Waves 1 - 3 of Ghana Survey (1991-93 data)**

Variable Name	Description (note: all values in cedis unless otherwise indicated)	Record/ Question Reference		
		Wave 1	Wave 2	Wave 3
FIRM	Number of firm within survey			
WAVE	Wave of survey (from 1 to 7)			
<b><u>Investment in Plant &amp; Equipment</u></b>				
INV83	Recalled investment value in plant & equipment during 1983		R49Q02	
INV84	Recalled investment value in plant & equipment during 1984		R49Q02	
INV85	Recalled investment value in plant & equipment during 1985		R49Q02	
INV86	Recalled investment value in plant & equipment during 1986		R49Q02	
INV87	Recalled investment value in plant & equipment during 1987		R49Q02	
INV88	Recalled investment value in plant & equipment during 1988		R49Q02	
INV89	Recalled investment value in plant & equipment during 1989		R49Q02	
INV90	Recalled investment value in plant & equipment during 1990		R49Q02	
INV91	Recalled investment value in plant & equipment during 1991		R49Q02	
INV83US	US Dollar value of INV83			
INV84US	US Dollar value of INV84			
INV85US	US Dollar value of INV85			
INV86US	US Dollar value of INV86			
INV87US	US Dollar value of INV87			
INV88US	US Dollar value of INV88			
INV89US	US Dollar value of INV89			
INV90US	US Dollar value of INV90			
INV91US	US Dollar value of INV91			
INV91QU	Value of total investment in plant & equipment in 1991 (preferred to INV91 above)		R8Q17a	

**Table 1.4 (continued)**

Variable Name	Description (note: all values in cedis unless otherwise indicated)	Record/ Question Reference		
		Wave 1	Wave 2	Wave 3
INV92	Investment value in plant & equipment during 1992 (from wave 2)		Z11Q23	
INV93	Investment value in plant & equipment during 1993 (from wave 3)			L15Q40
INV92US	US Dollar value of INV92			
INV93US	US Dollar value of INV93			
INV	Value of firm's investment in plant & equipment (by year)			
INV9092	Average of most recent 3 year's investment from wave 1 survey			
INV902US	Average of most recent 3 year's investment (measured in US dollars)			
INVDUM	Dummy variable = 1 for firm's which invest (by year)			
INVD9092	Dummy variable = 1 for firm's investing during period 1990-92			
<b><u>Total investment</u></b>				
INVLAND	Value of investment in land			
INVBUILD	Value of investment in buildings			
INVPLANT	Value of investment in equipment (should =INV)			
TOTINV	Aggregate of INVLAND2+INVBUILD2+INVPLANT			
<b><u>Derived Variables</u></b>				
CAP	Replacement value of firm's capital stock	R8Q13A	Z10Q17	L14Q31
CAPSALE	Resale value of firm's capital stock	R8Q13B62	Z10Q17A	L14Q34
IC	Investment/ replacement capital stock ratio (= INV/CAP)			
IC91	INV91/CAP ratio			
IC91A	INV91/CAPSALE ratio			
IC92	INV92/CAP ratio			
IC92A	INV92/CAPSALE ratio			
IC93	INV93/CAP ratio			
IC93A	INV93/CAPSALE ratio			
INV9092C	Aggregate investment 1990-92/ capital stock			
INVL	Total value of investment in land (by year)	--	Z27Q1A	L33Q1CA
INVB	Total value of investment in buildings (by year)	--	Z27Q1B	L33Q1CC

**Financing of Investment (showing Wave; Type of Investment; Financing Source)**

**Table 1.4 (continued)**

Variable Name	Description (note: all values in cedis unless otherwise indicated)	Record/ Question Reference		
		Wave 1	Wave 2	Wave 3

(Type of Investment)CRE	Company Retained Earnings
PS	Personal Savings
BFR	Borrowed from Friend or Relative
BL	Bank Loan or Overdraft
SC	Supplier Credit
BML	Borrowed from Money Lender
OTH	Land; Other Forms of Financing

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*All values are in cedis (current values) unless otherwise noted.*