EXPLAINING EMPLOYMENT GROWTH IN SMALL INDUSTRIAL ENTERPRISES: DOES POLICY MATTER?

A case study for Central Java

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1. INTRODUCTION

Small-scale and micro industries (SSMI) have received a considerable amount of attention in development strategies and policies in many countries. One of the main arguments in favour of small scale production is its potential to create employment, as it uses more labour per unit of output. Although the empirical evidence in the debate around the allocative efficiency of small scale production is not unambiguous, scale-biased (macro) economic environments favouring large industries have been used as a justification for the promotion of small industries through direct assistence programmes.

The effectiveness of small industry promotion programmes has received mixed judgements. One the one hand, (government) assistance has been praised as having *"..a favourable effect on employment.."* in small enterprises (*Pernia and Pernia, 1986*), while, according to others (*UNDP et al., 1988*), it may present in many cases an *"..ineffective palliative.."* for unfavourable demand conditions of (rural) SSMI. These evaluations are, however, not entirely comparable, since the latter one is an *"..overall, qualitative assessment.."* using effectiveness criteria such as *outreach, assimilability, impact, sustainability*, while the former one is based on a quantitative *analysis of economic and social impact*. This analysis of impact can thus be seen as part of a broad policy evaluation.

This paper attempts to contribute to the debate around the impact of small industry promotion, using evidence concerning small industry assistence programmes in Central-Java, Indonesia. The analysis is based on the data set employed in Sandee et al. (1994); the selection of data and the methods used are different, however.[*]

In the next section, some remarks on economic impact analysis as a policy evaluation tool are made. Then, the organization and contents of small industry programmes in Indonesia are described in short. This is followed by a description of the field survey, the data, specifications and methodology used, a discussion of the results and some concluding remarks.

[*] These data have been collected in 1993 by researchers of the Free University, Amsterdam and Universitas Kristen Satya Wacana, Salatiga, in the framework of the "Policies, Programmes and Projects for Small Scale Industries" research project. The use of these data is gratefully acknowledged.

2. MEASURING THE IMPACT OF POLICY

An analysis of impact can be considered as an essential part of a comprehensive process of policy evaluation (*Folmer and Nijkamp, 1985*). In such a process, impact analysis constitutes a tool with which the merits of certain courses of action can be assessed, after policy objectives have been formulated (*Nijkamp and Rietveld, 1990*). The impact of certain policy instruments may then be placed in the framework of a *stimulus-response model*. In the case of SSMI assistance, the *instruments* (stimuli) here are the various programmes and projects formulated in order to assist small industries. The policy *objectives* (responses) often include employment, production and productivity in these firms. Some of the anticipated effects may have a more specific character such as the introduction of (product/process) innovations, or the penetration of particular markets (for example, the export market). Other policies (i.e. policies not explicitly addressing small scale industry) will also have impacts on small scale industry. Among these are rural development policies affecting rural markets of SSMI and trade regulation implying constraints for SSMI. In addition, other factors (non-policy variables) such as the macro-economic conditions are relevant. An important point is also that policy programmes aiming at promoting small enterprise may have unfavourable side-effects such as crowding out within small scale industry, or negative environmental effects.

The question is, then, whether any statistically significant relationship between the policy instruments and the intended model effects can be observed. In this case, the relationship between assistance to small manufacturing enterprises in Central Java and employment growth in these enterprises is being studied.

Referring to the important statements on methodology in this type of research in an article by Bolnick and Nelson [*1990*], the following remarks can be made. As the autors rightly argue, *" … credit impact must be measured by the differential between firms with credit and similar firms without credit, after controlling for measurable baseline attributes"* (p.307). This approach is reflected in the modeling approach we adopted: basically, an attempt is made to develop a model explaining employment growth in a sample of both assisted and non-assisted small manufacturing enterprises, using assistance variables[*] as well as baseline characteristics as explanatory variables.

3. THE SURVEY: CLUSTERS AND PARTICIPATION

As outlined above, this study concentrates on the difference in employment growth between assisted and non-assisted small manufacturing firms. The data set used is based on a survey carried out in February and March 1993 in the province of Central Java, Indonesia.In the study, data covering 193 small manufacturing enterprises in six *desas* (villages) in Central Java are used.These villages are

[*] Our study includes other types of assistance as well, but this does not affect methodology.

sentra industri (clusters) in which BIPIK[**] promotion has been provided, while some other forms of assistance have also been received. Participation in the assistance programmes varied greatly among firms, but each cluster contains both firms who did participate and those who did not.Before proceeding to the outcomes of the impact analysis, we will take a look at some important descriptive statistics for the clusters in the survey sample.

Clusters specialize in a certain type of production (product). The sample thus consists of six clusters (of some 32 firms each), differentiated in the first place by their respective types of production.The six clusters are: (1) **Palm sugar** (*gula kelapa*) and (2) **Tiles** (*genteng*) in the *Boyolali* regency; (3) **Noodles** (*soun*) and **Metal casting** (*cor logam*) in the *Klaten* regency; (5) **Wooden furniture** (*mebel*) and **Weaving cloth** (*tenun*) in the *Jepara* regency.

For a detailed description of the socio-economic characteristics of the clusters, we refer to *Sandee* [*(1993a: 49-53), (1993b)*]. Here, we will concentrate on some averages per cluster. Average workforce sizes for the six clusters are presented in table 1, along with average annual growth rates of workforce, from the year of establishment until 1992.

Table 1 Workforce Size and Annual Growth (%) in Clusters[*]

Cluster / Industry	*Number of Workers (1992)*		*Annual Employment Growth (%) since establishment*	
	Mean	Std Dev	Mean	Std Dev
1. *Palm Sugar*	1.8	(.4)	- .3	(1.0)
2. *Tiles*	7.9	(2.6)	4.4	(3.7)
3. *Noodles*	8.0	(3.4)	.8	(2.9)
4. *Metal Casting*	28.8	(30.8)	4.7	(7.9)
5. *Wooden Furniture*	30.8	(22.7)	38.0	(70.3)
6. *Weaving Cloth*	38.0	(42.3)	55.5	(82.6)
Total	19.3	(27.0)	17.1	(48.7)

The figures in table 1 indicate that, apart from the relatively large size of the firms, the growth records are remarkable: notwithstanding the variance among (and within) clusters, the overall

[**]BIPIK is an integrated programme for small enterprise development. See Schipper (1994) for a more elaborate description of the organization and contents of the various assistance programmes.

[*] Annual growth rates, from year of establishment until 1992, have been calculated as follows: if L_t is employment at the year of establishment t and y is the firm age in 1992, the annual growth percentage g has been calculated using $L_t * (1+g)^y = L_{1992}$.

impression is one of rather high growth, with a sample average of some 17 percent annually. As explained in the footnote, growth percentages have been calculated on the basis of the firms' respective years of establishment, so the average growth rate does not refer to a certain period; if we compare this growth rate, however, to various other estimates of annual employment growth[**], it is fair to say that this is not a representative sample of small industries in Indonesia. As indicated by *Sandee (1993b)*, this bias towards the more dynamic clusters has been created on purpose. Keeping in mind that such a bias exists, this need not hinder an analysis of impact; one could, on the contrary, hypothesize that firms with favourable growth rates are more likely to use any supply of assistance effectively.

Despite the favourable sample growth rate, it should be noted that there are rather large deviations from the average rates, as the standard deviations (in brackets) show. The pattern of differing growth (and size) among industries is quite clear.

Clusters (1) and (3) (palm sugar and noodles) conform to the gloomy picture that has sometimes been painted about growth potential of small industries in general, i.e. one of stagnation or stability with slight growth. Clusters (2) and (4) (tiles and metal casting) have a more favourable development, with annual growth rates approaching Hill's estimate of 5% for the whole of Indonesia. We could describe these as average growth rates. The last two industries (furniture (5) and weaving cloth (6)) clearly have a very dynamic employment growth, as their high double digit rates show. Note that the higher average *levels* of employment are matched by higher average *growth rates*.

It should be noted carefully, however, that despite the above mentioned pattern, the standard deviations indicate a substantial deviation from the averages within clusters. It is clear, therefore, that industry type is an important factor determining the growth prospects for any (small) industrial firm, but variation among firms within an industry (cluster) needs other explanatory variables.

As is to be expected from the diversity of products in the sample, production characteristics vary widely among clusters. In order to present a brief overview, two of these characteristics are shown in table 2 (see next page).

Here, again, we can see a rather strong differentiation in average values according to industry type, which can be interpreted as differing production technologies. Metal casting clearly stands out, both in capital intensity as in labour productivity. A brief inspection of the figures suggests a relationship between productivity and capital intensity[*].

[**] Compare, for example, with Hill's estimate of 5% annual employment growth during the 1980's for the whole of Indonesia, and an annual growth of some 2.3% annually, calculated from employment statistics for Central Java as reported by Kanwil Perindustrian Semarang, see *Sandee (1993a: 18-21)*. At the same time, it should be mentioned, however, that the growth percentages mentioned here are averages which include firms going out of business or relocating, whereas the figures in table 6.1 only refer to (workforces of) firms which are still 'alive'.

[*] In this section, only an overview of cluster profiles is given; in the next section, we will have a closer

Table 2 Capital Intensity and Labour Productivity per Cluster

Cluster / Industry	*Capital Intensity (000 Rp per worker)*		*Labour Productivity (000 Rp per worker)*	
	Mean	Std Dev	Mean	Std Dev
1. *Palm Sugar*	35.7	(20.1)	419.6	(250.4)
2. *Tiles*	119.1	(165.9)	380.1	(239.6)
3. *Noodles*	489.5	(236.3)	9642.2	(4697.0)
4. *Metal Casting*	1108.4	(1164.6)	11460.1	(12396.6)
5. *Wooden Furniture*	175.3	(262.5)	5093.4	(6009.0)
6. *Weaving Cloth*	59.3	(128.1)	4240.5	(3465.0)
Total	329.8	(624.5)	5192.0	(7333.1)

Note: Capital Intensity is the value (in 000 Rp) of capital, tools, equipment owned by the firm, divided by the number of workers. Labour Productivity is the value of sales (in 000 Rp, 1992) per worker.

Once again, attention should be drawn to the standard deviations, suggesting a considerable spread around the mean values, and thus noteworthy differences in choice of technique within clusters. This diversity has already been mentioned by *Sandee (1993b: 11-12)*, who for example states about the metal casting industry: *"In this cluster one can find small firms employing not more than 10 workers, specialized in production of simple fences of cast iron, but one can also find large firms with more than 200 workers producing output for the national railways and the automotive industry"*. Diversity in production technology is also present in the cloth industry (e.g. handloom versus powerloom) and in the tiles industry, where some entrepreneurs have adopted the socalled 'handpress technology' while the majority of producers use traditional techniques.

Another dimension of the cluster profiles is presented by table 3 (see next page), in which some factors of a socio-economic nature are presented. The factors under consideration here are educational 'level', the question whether the manufacturing business constitutes the main activity for the respondents, and the age of the firm. While it may be difficult to identify a direct link between these factors and production, they can certainly help to describe the differences between clusters and

look at some possible statistical relationships.

help to explain them.

Two things are worth mentioning about the educational pattern. First, the ratio of standard deviation to mean values is relatively small, the interpretation of which is that the clusters are relatively homogeneous as far as the level of formal education, received by the entrepreneurs, is concerned. Secondly, comparison between this table and the previous one suggests, at first sight, a relation between the level of formal education and productivity of labour.

Table 3 Education, Main Activity and Firm Age in Clusters

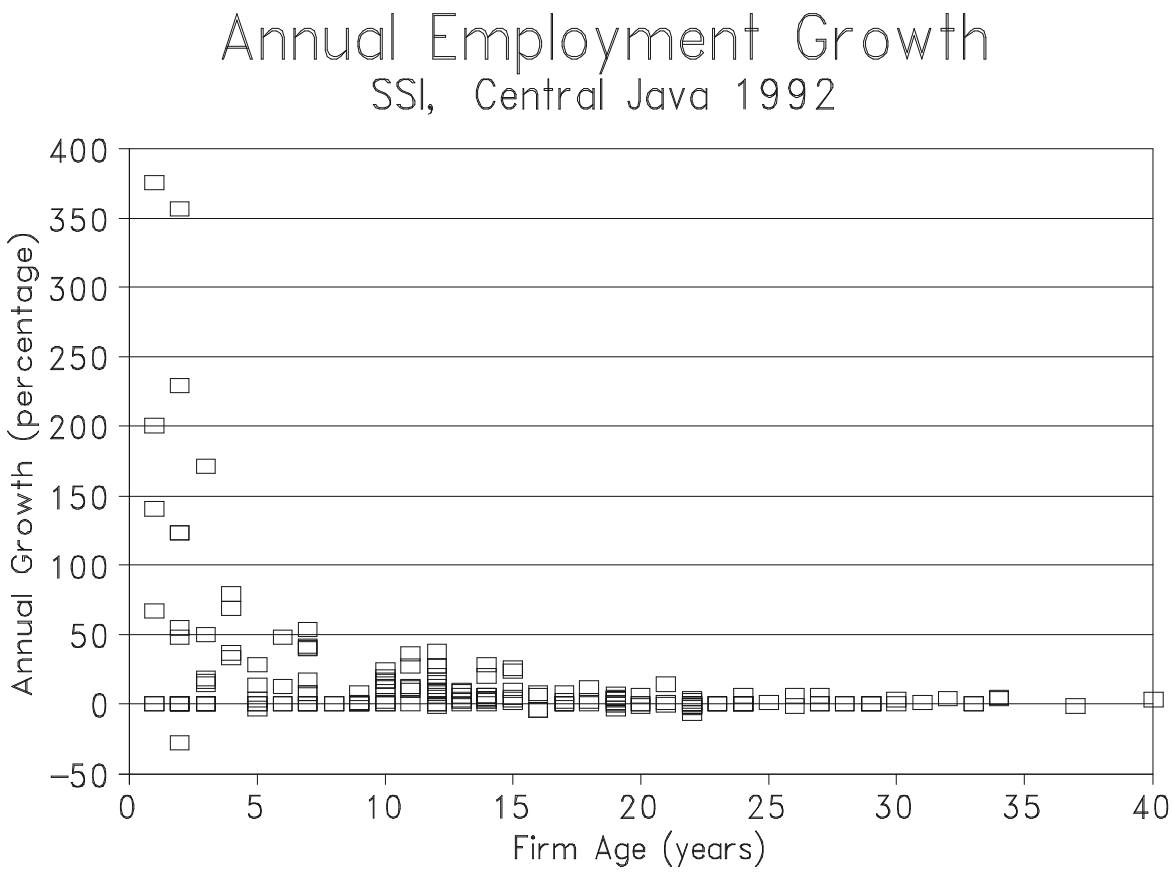
Cluster / Industry	*Educational level*		*Manufacturing main activity*	*Firm Age* (Years)	
	Mean	Std Dev	% - Share	Mean	Std Dev
1. *Palm Sugar*	2.75	(1.48)	21.9	15.0	(11.6)
2. *Tiles*	1.84	(.85)	90.6	17.5	(10.0)
3. *Noodles*	4.31	(2.25)	71.9	18.7	(8.2)
4. *Metal Casting*	6.16	(1.97)	100.0	22.3	(22.5)
5. *Wooden Furniture*	3.41	(1.73)	96.9	8.1	(5.7)
6. *Weaving Cloth*	5.48	(2.05)	84.8	10.2	(9.8)
Total	4.00	(2.32)	77.7	15.3	(13.3)

* 1 = 'never went to school'; 2 = 'did not finish primary school'; 3 = 'did finish primary school'; 4 = 'did not finish junior high school'; 5 = 'did finish junior (technical) high school'; 6 = 'did not finish senior high school'; 7 = 'did finish senior high school'; 8 = 'did not finish higher education'; 9 = did receive degree in higher education, cf. bachelors degree'.

The second factor presented in the table, i.e. the share of entrepreneurs indicating that their manufacturing business constitutes their main activity, is quite interesting, and is helpful when interpreting other averages for the clusters. Especially the low figure for the first cluster provides a clear distinction, and is an indication of the importance and (growth) perspectives of the industry for the entrepreneurs themselves.

The pattern of average firm age indicates that the clusters experiencing the most dynamic growth, furniture and weaving cloth are the ones which have been established most recently. In other words,

in the sample studied here, the most significant employment creation takes place in the first 15 years after establishment.Stated generally, it can be argued that an inverse relationship exists between employment growth and firm age. Growth rates are plotted against firm age in figure 2. Note that this figure presents results for enterprises from a variety of sectors. This sectoral variety influences the pattern observed here, because the average growth rates vary substantially among sectors and the same holds true for average firm age. This issue is discussed in section 6.



To conclude this section on cluster characteristics, some descriptive statistics on participation in assistance programmes - one of the main explanatory variable in the impact analysis - are presented in table 4. Assistance refers to various programmes (a number of which are provided through BIPIK; see table 5 for the types of assistance), in which firms could participate between 1987 and 1992. Note that the study focuses on this kind of *supply-side assistance*.

Two measures of participation are used, viz., 'intensity' of participation and the share of firms in a cluster that ever participated in any kind of programme. 'Intensity' is simply the number of times a firm received assistance (not necessarily different types of assistance); this variable runs from zero to six, which is the maximum number of 'programme contact points' for firms in the sample.

Table 4 Participation in Programmes

Cluster / Industry	*'Intensity' of Participation*		*Participation (y/n) per cluster (% of firms)*
	Mean	Std Dev	% - Share
1. *Palm Sugar*	1.19	(1.35)	56.2
2. *Tiles*	1.53	(1.04)	90.6
3. *Noodles*	2.47	(1.88)	75.0
4. *Metal Casting*	1.41	(1.27)	65.6
5. *Wooden Furniture*	1.03	(1.02)	68.7
6. *Weaving Cloth*	1.91	(1.92)	63.6
Total	1.59	(1.52)	69.6

With average intensities above one and participation shares above two third for most clusters, it can be concluded that participation is quite high: most firms have received some kind of assistance. However, remembering that the sample was selected from villages were BIPIK assistance was known, the fact remains that coverage is far from complete, as the figures indicate: almost every third firm did not receive assistance, and variation around mean intensities is considerable. However, as we are trying to find out whether (the amount of) assistance received influences employment growth in firms, this variance in the sample is of course necessary.

Differences in participation are also present with respect to the types of assistance: the last column of table 5 shows that credit is most popular (received by four out of ten firms). Technical training comes next, having particularly high participation in the metal casting and weaving cloth industries; marketing (promotion) also has quite high levels of participation. No firm received assets. It can be concluded that credit has by far the highest participation; *Sandee (1993b)* shows that the largest sums of credit are allocated to the sectors with large average workforces, viz., metal casting, furniture, and weaving cloth. The distribution of assistance among clusters does not show any clear

pattern. Non-participation is highest in the first cluster, lowest in the second, and in the other clusters it is close to the sample average.

Table 5 Participation in Programmes (% of total cluster)

	CLUSTER						
Programme	Palmsugar	Tiles	Noodles	Metal	Furniture	Cloth	Total
Credit	9.4%	53.1%	65.6%	9.4%	56.3%	45.5%	39.9%
Working Capital	18.8%	-	-	9.4%	9.4%	3.0%	5.2%
Equipment	-	31.3%	43.8%	-	3.1%	-	16.1%
Assets	-	-	-	-	-	-	-
Marketing	12.5%	12.5%	68.8%	25.0%	6.5%	15.2%	23.3%
Technical Training	25.0%	25.0%	-	50.0%	6.3%	49.0%	25.9%
Account. Training	-	9.4%	25.0%	9.4%	9.4%	36.4%	14.9%
Management Training	6.3%	9.4%	3.1%	37.5%	9.4%	39.4%	17.6%
No Partici-pation	43.8%	9.4%	25.0%	34.4%	31.3%	36.4%	30.4%

Having depicted briefly some of the main cluster characteristics here, it is clear that the sample is quite heterogeneous, with variables varying among clusters, indicating some industry related patterns, as well as among firms. One of the most remarkable industry related patterns concerns the distribution of growth dynamics, as presented in table 1. In the next sections, we will address the question whether these differences in firm growth can be accounted for by the differences in participation in assistance programmes.

5. DATA AND MODELING

In this section, we will try to find an explanation for differences in employment growth rather than differences in the absolute number of employees between firms. The use of *growth* in stead of *level* of employment as the dependent variable seems quite obvious; the fact that not all studies in the literature use the dynamic variable probably has to do with the problem of collecting adequate data. Ideally one would dispose of a time series covering all relevant variables for a number of years, for a constant sample of firms. As most (small industry) surveys do not collect such series, dynamic variables have to rely on recall data, as is the case in this study. Employment growth has been measured over the entire life of the firm, thus using (recall) employment data from the date of establishment. Although in some cases establishment of the firm was a long time ago, information concerning the firm birth need not be less trustworthy than information concerning a less specific

moment[*]. Assistance has been specified as a dichotomous variable (*partially diffused institutional innovation* in the words of Bolnick and Nelson). Baseline characteristics used in the regression analyses as explanatory variables included type of industry, use of capital, firm or entrepreneurs' age, level of education and, lastly, the question whether the manufacturing business was or was not the main activity of the respondent. This resulted in the estimation of the following regression equation, which has been illustrated in figure 3:

$$g_{empl,I} = f_1 (A_{p,i} / INT_i, I_{q,i}, H_i, M_i, \log K_i/L_i, F_i) \quad (1)$$

where

$g_{empl,i}$ = annual growth of employment (percentage) between year of establishment and 1992;

V_i = total value of sales for the whole of 1992;

L_i = number of employees in enterprise *i*, including the entrepreneur;

$A_{p,i}$ = dummy variable for assistance received by firm i, which equals 1 if the firm received assistance type *p*, 0 otherwise;

p = 1 means credit only

p = 2 means non-credit only

p = 3 means both credit and non-credit

p = 4 means no assistance received

INT_i = intensity of participation, or number of programmes in which firm i did participate

$I_{q,i}$ = 1 if enterprise *i* belongs to industry type (or cluster/desa) *q*, 0 otherwise;

q = 1: palm sugar (*gula kelapa*)

q = 2: roof tiles (*genteng*)

q = 3: noodles (*soun*)

q = 4: machinery (*cor logam*)

q = 5: furniture (*mebel*)

q = 6: weaving (*tenun ikat*)

H_i = 1 if entrepreneur attended or finished university, 0 otherwise;

M_i = 1 if manufacturing business constitutes main activity of entrepreneur, 0 otherwise;

K_i = capital stock (fixed assets in rupiah) in enterprise *i*;

F_i = *reciprocal* of firm age.

[*]Yet, it would have been better to use the employment growth of the firms both during and after the period in which the policy was applied. However, we did not collect data on employment for the year in which the assistance programmes started (1987), so that growth rates had to be calculated over the entire lifetime of the firm. The problem with the present variable is that it has been influenced by many factors operating before 1987, which are not included in the analysis.

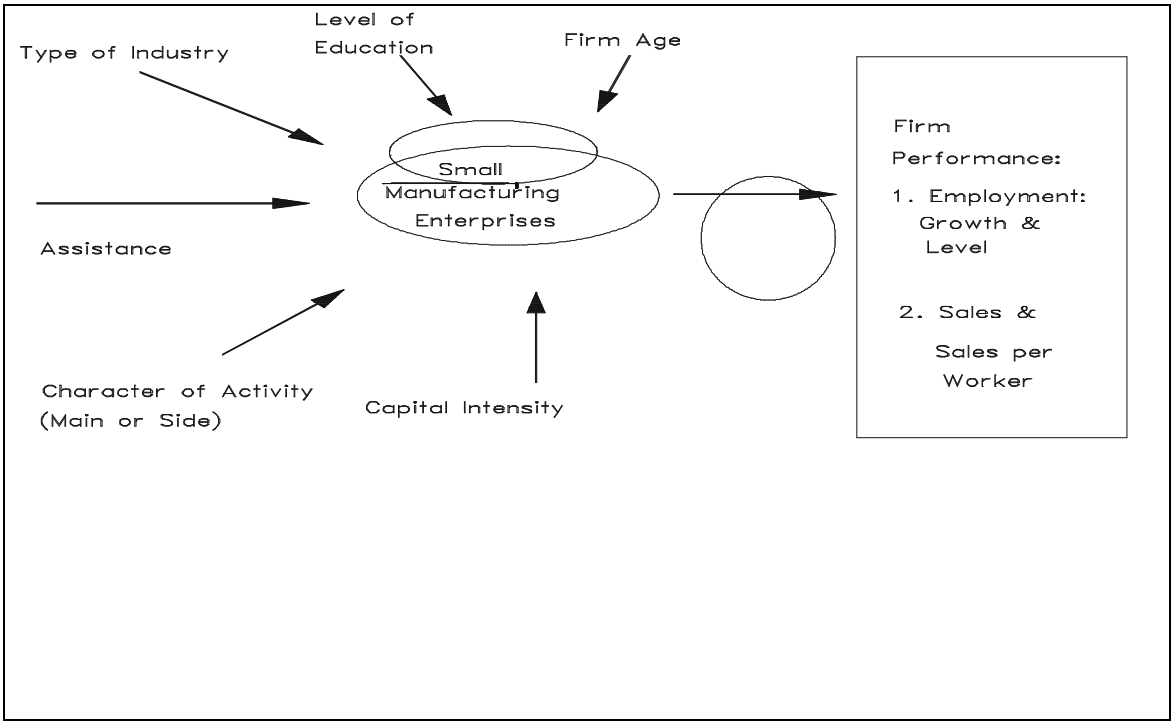


Figure 3

As the main question of interest is whether (a certain type of) government assistance does or does not influence firm performance, the analysis will focus primarily on $A_{p,i}$ and INT_i.

6. RESULTS

The regression results are given in table 6. As can be seen by the t-values, the conclusion reads that the assistance variables fail to show any significant correlation with *annual employment growth*. In other words, employment growth does not seem to be affected by the provision of assistance.*

* In a first regression, A_i has been used as the assistance variable; a second regression used intensity of participation as assistance variable. Note that this conclusion is contrary to the findings of *Pernia and Pernia (1986)*, who conclude that "*..government assistance to small enterprises seems to have a favorable effect on employment in these enterprises."* An important difference between the analyses, however, is that the conclusion of *Pernia and Pernia* is based on a correlation between the *level* of employment and assistance.

TABLE 6 - *employment growth: regression results*

Explanatory Variables	*coefficients*
Constant	-31.612
	(-2.500)
Capital Intensity	1.521
(log K_i/L_i)	(.249)
Higher Education	33.864
(H_i)	(3.037)*
Reciprocal of Firm Age (F_i)	133.356
	(7.934)*
Main Activity	17.118
(M_i)	(1.986)*
Credit only (A_1)	-8.647
	(- .800)
Non-Credit only	5.961
(A_2)	(.757)
Both Credit &	-2.005
Non-Credit (A_3)	(- .232)
{Intensity of Participation}	{ 1.051 }
	{(.512)}
Roof Tiles (I_2)	8.512
	(.726)
Noodles (I_3)	3.979
	(.297)
Machinery (I_4)	-8.241
	(- .573)
Furniture (I_5)	26.635
	(1.939)*
Weaving (I_6)	36.086
	(3.167)*
R^2	.482
F-value	12.935
N	192

* = significant, at the 5% level or better; t-values in brackets. Both types of assistance variables, A_i and INT (intensity of participation) have been tested in two separate regressions; the results for INT have been included in the table in brackets.

There are, however, a number of other variables that do show a significant correlation with employment growth. The reciprocal of firm age is a most significant variable: younger firms tend to have significantly higher growth rates than older firms. This points at considerable dynamics of new firms in rural areas. One should note however, that the result might also reflect relatively favourable economic conditions during the recent past compared with earlier periods (note the way the dependent variable has been measured). Of course the result does not mean that all young firms

have been succesful.[*] It says that - other factors being equal - young firms have higher average growth rates than firms that started at an earlier stage. Also 'higher education' and 'main activity' have a clear influence. This implies that, all other things being equal, those entrepreneurs who have attended university run firms displaying higher average growth rates. The same holds true for those entrepreneurs for whom the manufacturing business represents their main activity. Furthermore, the dummies for cluster 5 and 6 (furniture and weaving cloth) show a significant impact, implying that average growth rates are significantly higher in these clusters.

After the somewhat disappointing results regarding policy effects on employment growth, some other regressions have been carried out, this time using the level of employment and sales as dependent variables (details can be found in Schipper, 1994). Some of the assistance variables do show a significant correlation with the *level of employment* (1992): the assistance variables relevant here are A_3 (credit & non-credit) and intensity of participation.[**] Also, the regression results show a significant correlation between *sales* and assistance variables (A_2, A_3 and intensity of participation).

This result is a bit peculiar: one the one hand we have seen that promotion does not affect firm growth, but it does have a correlation with firm size. It should be stressed, however, that the observed correlation is a *static* one: the interpretation reads that relatively large workforces in the sample correspond with relatively frequent participation in programmes. As assistance variables do not show any correlation with growth, but do seem correlated to size, in terms of labour force and sales, an alternative interpretation of the results presents itself. This brings us to what has been termed *non-randomness* by *Pernia and Pernia*, in their study on the effects of government support to small scale industries in the Phillipines [*Pernia and Pernia (1986:643)*]. It is quite probable, that in the distribution of assistance a 'natural' bias exists in favour of the larger enterprises; in other words, the probability for an enterprise to actually receive assistance is not distributed equally among small firms, but is related to their size. Explanations for this phenomenon might be that larger firms are better informed about programmes and thus have easier access to them. Participation is not only a matter of *willingness*, but also of *opportunity*: it may well be that the civil servants and/or the village officials have a size bias in their selection process with respect to the firms that are allowed to participate in the small scale industry programmes. Note that Sandee (1995) finds that social factors may also play an important role in innovation adoption in rural small scale industry. Also, larger firms may be have more clearly defined plans which need funding, and may be considered more credit worthy than others. And, entrepreneurs in smaller firms may simply not have the time or personnel, needed to attend different kinds of training.

Whatever the explanation may be, it is important to keep in mind the possibility of this *"reversal of causality: participation in programmes does not lead to high growth, but high growth* (or large size) *leads to participation in programmes"* [*Rietveld in Sandee (1993a:77)*]. Moreover, as assistance does not seem to be correlated to growth, but is correlated to size (employment level,

[*]Note for example, that firms that started but went bankrupt before the survey are not observed.

[**] Note that *this* conclusion is in line with the one reached by *Pernia and Pernia (1986)*, and with the findings of *Sandee (1993)*.

sales) this interpretation is at least as good as the original one.

We will now test the reverse causality idea in two ways. First, we can use intensity of participation as a dependent variable in a regression analysis. Formally, this would mean the estimation of the following regression equation:

$$INT^*_i = f_5 (g_{empl,i}, L_i, \log V_i, I_{q,i}, H_i, M_i, F_i) \quad (5)$$

where INT^*_i is the intensity of participation (number of times participation in a programme took place) of the i-th firm, divided by the number of years the firm existed since 1987.[*] Most independent variables are similar to the ones used in the previous regressions, but here $g_{empl,i}$, L_i and V_i (past employment growth, level of employment and (log) sales in 1992 respectively) have been added, in order to test the reversal of causality.[**]

This can also be done using a probability model, trying to assess whether certain firm characteristics significantly influence the probability for an enterprise to receive assistance, which would imply the use of a discrete choice model, such as the logit model. The dependent variable in the equation is dichotomous (say, 1 if assistance has been received and 0 otherwise). The equation for the logit model reads:

$$Pr_i (y = 1) = f_6 (g_{empl,i}, L_i, \log V_i, I_{q,i}, H_i, M_i, PT_i) \quad (6)$$

where

$Pr_i (y = 1)$ = the probability that firm *i* will receive assistance of any type.

The independent variables have been used before, except for the last one. PT_i is the number of years a firm existed since 1987, the year since which the assistance has been offered. This variable thus accounts for the variance in probability, due to the difference in years of establishment.

[*] Assistance has been offered since 1987; the intensity variable has been corrected, in order to take into account the number of years a firm has been able to receive assistance. In this way, the dependent variable actually measures the intensity of participation per 'relevant' year of existence, and thus a higher intensity of participation as a result of more years of existence has been corrected.

[**] Analytically, it would be more correct to take the firm size for 1987, since we are looking at participation since that year. However, as we do not have employment data, employment in 1992 is taken as a proxy for firm size during the whole period. Firm size in 1991 has been tested also, and this yields practically the same results as presented in table 8.

The results for both equations are presented in table 7. **Intensity of participation** (corrected, INT^*) is influenced significantly by the number of workers in the firm (L_i), the importance attached to the manufacturing business by the entrepreneur (M_i), and the reciprocal of firm age (F_i, negative sign); also, there are significant differences between industries.

TABLE 7 - *intensity / probability of participation: regression results*

explanatory variables	*dependent variables*	
	Intensity	*Probability of Participation*
Constant	.058	-6.042
	(.471)	(3.369)
Employment Growth	2.297E-4	- .004
($g_{empl,\,i}$)	(.455)	(- .741)
Employment 1992 (L_i)	.002	.008
	(2.427)*	(.569)
Sales 1992 (log V_i)	.061	.968
	(1.478)	(2.166)*
Higher Education	.124	1.654
(H_i)	(1.624)	(1.340)
Reciprocal of Firm Age (F_i)	- .264	-
	(-2.259)*	
Years of existence since 1987 (PT_i)		.691
	-	(3.040)*
Main Activity	.122	- .105
(M_i)	(2.124)*	(- .179)
Roof Tiles (I_2)	- .115	.920
	(-1.533)	(1.065)
Noodles (I_3)	- .029	-1.663
	(- .285)	(-1.532)
Machinery (I_4)	- .302	-2.189
	(-2.746)*	(-1.990)*
Furniture (I_5)	- .288	- .809
	(-2.738)*	(- .719)
Weaving (I_6)	- .136	- .408
	(-1.298)	(-1.285)
R^2	.263	-
F-value	5.479	-
N	180	183

* = significant, at the 5% level or better; t-values in brackets.

For the logit analysis we find significant estimations for sales (log V_i) and firm age (number of years) since 1987 (PT_i); and again, there is a significant negative parameter for the metal casting cluster.*

Concluding this section on *'non-randomness'*, it is fair to say that there is at least some evidence suggesting that assistance is not distributed 'at random', but that size is a factor determining the probability for a firm to receive assistance.

The first analysis, an OLS-regression, shows that size in terms of employees is significantly correlated to the number of programmes in which firms participate. Again, the question of cause and effect is not really answered by the data. If we, however, add to this analysis the results from table 6, showing that growth is not significantly correlated to intensity of participation, it seems the conclusion should read that size (of workforce) explains intensity of participation in a programme rather than vice versa. In other words, assistance is not distributed equally among firms, but either tends to be provided to larger firms, or to be more often accepted by larger firms.**

The second analysis, a logistic regression, points in the same direction. In this case, however, size is defined in terms of sales.The conclusion here reads, that the higher the level of sales is, the more probable it becomes for firm i to receive assistance. This conclusion is in line with the hypothesis that assistance tends to be provided to the larger firms.

7. CONCLUDING REMARKS

Summarizing, the analysis of field data concerning six clusters of small manufacturing enterprises in Central Java yields the following conclusions.

1. Participation in assistance programmes does not have a statistically significant impact on **employment growth** in small manufacturing firms.
2. **Size** of firms, in terms of workforce and sales, does appear to be significantly correlated to participation in programmes. Stated differently, the distribution of assistance to firms appears to be correlated to firm size.
3. The conclusions under (1) and (2) strengthen the case for a **reversal of causality**: participation in programmes does not lead to high growth, but size influences participation in programmes.
4. Explanations for employment growth in firms often remain incomplete. The following variables are, however, significant explanatory variables for employment growth: **industry type**; **firm**

*Note that the employment and sales variables are highly correlated.

** *Rietveld* in *Sandee (1993a:71)* makes a distinction between *supply* and *demand* related reasons for not participating in programmes. A third reason for not participating is a lack of information about programmes.

age; **character of activity** (main or side); **level of education**.

Although the results of our analysis are not favourable on the effectiveness of assistance programmes, it would be too early to conclude that these policies should be abandoned.

First, we should note that the sample on which this research is based is of limited size.

Second, as we mentioned in section 5, our results may have been affected by the way growth rate has been measured (because of lack of data it is not based on an equally sized time interval for all firms).

Third, it is possible that firms do benefit from assistance programmes, but that these benefits are not reflected in employment growth, but for example in higher value added via changes in production processes leading to productivity gains, or via product innovations leading to higher quality products implying higher sales prices.

Fourth, assistance programmes may have a reach that is broader than only the firms being directly involved. Spill-over effects may occur leading to benefits for firms not directly involved. For example, technical advice given to entrepreneur A can easily be shared with entrepreneur B who did not participate. Similarly, entrepreneur C who receives credit can become an informal money lender so that the credit finally flows to entrepreneur D who formally does not participate. Such spill-over effects are quite probable in spatial clusters of small scale industry; they are even one of the reasons of existence of such clusters.

We conclude that the current research calls for a critical larger scale examination of the effects of assistance programmes. Points of attention for such an examination are:
a sufficient number of sectors and firms

- solid data (‘before’ versus ‘after’)
- also effects other than employment change should be considered
- solid methods should be used (hazard type approaches are promising; see Lancaster, 1990)
- spill-overs between firms should be taken into account
- differences between types of assistance should be investigated.

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