Assessing the Employment Effectiveness of Small Business Financing Schemes: Some Evidence from Israel

Daniel Felsenstein

ABSTRACT. This paper presents an empirical assessment of the employment effects of two assistance schemes aimed at improving the accessibility of small businesses to capital. The first scheme is a revolving loan fund operating in two small towns. The second is a capital grant scheme aimed at promoting industrial activity in rural areas. Empirical data relating to the period 1986—89 is analysed for both schemes.

The employment effectiveness of the loan fund is analysed via the estimation of cost-per-job indices and the estimation of the 'deadweight' effect, i.e., employment that would have been created even in the absence of the financing scheme. For the grant scheme, the methodology implemented involves the use of regression techniques in order to isolate the effect of the financial assistance on employment generation. The results point to the cost-effectiveness of this form of assistance. From a public policy point of view, the need for targeting these type of schemes (both spatially and sectorally), is stressed.

I. Introduction

This paper presents a first-cut attempt to evaluate the employment effects of two separate schemes aimed at assisting small businesses. The issue of job-creation has become one particularly pertinent to Israel over the last two years in light of the large-scale immigration of Soviet Jews. Population projections call for the need to create half a million new jobs over the next 5 years and this will of course need a broad policy approach.

Government response so far has been a rather eclectic collection of proposed job-stimulating measures. These comprise a large variety of (supply-side) responses including subsidizing labour costs, subsidizing capital investment, large scale (Keynsian) infrastructure projects and attempts at stimulating entrepreneurship via the provision of small business loans and incubators.

It is on the latter issue that this paper focusses. An attempt is made to evaluate, ex-poste, two small financing schemes that predate the present wave of immigration but whose currency is likely to expand as a result of the employment challenges now facing the country. In view of these challenges the ability to assess various employment schemes becomes paramount. This paper presents empirical evidence generated from the operation of a loan fund and a grant scheme aimed at assisting small firms and also discusses some of the methodological problems involved in such an assessment. The analysis is very preliminary and limited in scope, highlighting only the short-term, direct employment effects of the schemes. However, it does provide an indication of the direction that further and more comprehensive work will need to take in the future in order to be able to discern the different employment effects of policy measures and allocate (sparce) public resources accordingly.

II. Assessing the employment effects of financing schemes

A key element in much regional and local policy activity dedicated towards supporting economic activity, is the ability to cause change in the local or regional employment structure: job creation (or retention), raising participation rates and reducing unemployment levels (Moore, Rhodes and Tyler, 1986; Coulson, 1990; Harris, 1991). One of the most frequently-used indicators for assessing the

Final version accepted on January 16, 1992

Development Study Center
POB 2355
Rehovot 76122
Israel

Small Business Economics **4**: 273—285, 1992.

effectiveness of these instruments are cost-per-job indices. However, as becomes apparent from Table I, a plethora of different policy instruments exist, differing widely in scale of operation (national or local) scope of operation (sector-wide or targeted), objectives (job creation or retention) and operating conditions (grants, loans, tax abatements etc). Furthermore, evaluations of the cost-effectiveness of these instruments also vary widely. A diverse variety of methods of estimation have been used resulting in a wide range of cost-per-job estimates. These include cost-benefit analysis (Willis, 1985) and financial accounting techniques (Howland, 1990). The estimates that result reflect this divergence in methodology. In the case of British regional and local policy instruments, these have ranged from estimates of £2,000 per job for locally oriented schemes (Robinson et al., 1987) to estimates of £73,000 for nationally oriented policies (Moore et al., 1986) (see Table I). This latter estimate however includes not just cost-per-job but also the costs incurred via the inter-regional movement of jobs.

This diversity precludes the possibility of comparison between studies in order to reach any meaningful conclusions as to the relative cost-effectiveness of different schemes. Where a single study has used a uniform methodology in order to compare a variety of schemes, the results have (unsurprisingly) pointed to the relative cost-effectiveness of small-scale, place-oriented schemes. These schemes however generally have high 'deadweight' rates in that they would have been executed even without the assistance (Wren, 1987). However, as Storey (1990) has recently pointed out, comparisons of the employment effectiveness of different schemes should really compare cost-per-job at the margin rather than compare indices of average cost-per-job. From a policy point of view, resources are used most effectively when the marginal costs of different schemes are equalized.

Furthermore, from a theoretical point of view, the effect of financing schemes on employment generation is indeterminate (Swales, 1981; Krmenec, 1990). The effect of capital incentives on employment generation can take on one of two forms. On the one hand, the incentive can result in substitution between factors of production. In this case, capital utilization will increase at the expense of labour (the substitution effect). No extra employment will thus be generated. On the other hand, if a firm operates efficiently at a fixed cost level, a financing scheme will reduce costs allowing for a higher level of output at the given cost level (the output effect). It can be shown, that if as a result of the financing scheme the output effect is greater than the substitution effect, the capital assistance will result in employment creation. If the opposite is the case, the effect of the financing scheme is indeterminate; it can theoretically cause either employment growth or contraction.

III. Methodological issues in evaluating employment effectiveness

Various thorny methodological issues also confront any ex-post evaluation of employment effectiveness. It thus becomes necessary at the outset to identify some of these issues and point out the limitations that they impose. The issues can be outlined as follows:

- *separating out the direct effects of the assistance from the indirect effects* in order to reach a reliable estimate of employment generation. Estimating the direct (net) effects of a particular instrument is especially difficult in the case of multi-channel funding and in the case where macroeconomic conditions have a pronounced and identifiable effect on employment. Regression techniques are usually used in this instance to 'isolate' the instrument's effect.
- *the time-span taken for evaluation*: on the one hand, the longer the time span taken, the harder it is to isolate the effects of the scheme (Howland, 1990). On the other hand, evaluation after too short a time-span can misrepresent the success/failure of the scheme.
- *accounting for savings to the Treasury*: employment creation means a reduction in the amount of welfare transfers executed (unemployment benefits etc). These savings should be taken into account in cost-per-job estimates but rarely are due to the obvious estimating problems involved.
- *estimating multiplier/accelerator effects of the scheme*: Turok (1988) estimated the local employment multiplier as ten percent of the number of new jobs created. However, with

TABLE I
Cost-per-job indices as reported in various studies of regional and local policy

Study	Policy instrument	Method of estimation	Estimated cost-per-job (£)
1. Turok (1988)	Local Fund for Assisting Industry and Commerce	1	6,500[a]
2. Robinson et al. (1987)	Regional Development Grant	3	9,100
Robinson et al. (1987)	Regional Selected Assistance	3	3,500
Robinson et al. (1987)	Local Authority Assistance	3	2,150
3. Moore et al. (1986)	Regional Employment Premium	4	73,000
Moore et al. (1986)	Regional Development Grant	4	25,000[b,c]
Moore et al. (1986)	Regional Selected Assistance	4	17,000
4. Marquand	Regional Development Grant	5	9,000[d]
		5	3,000[e]
5. Stern (1986)	Enterprise Allowance Scheme	6	2,300
6. JURUE (1987)	Urban Programme Projects	1	2,300 grants 1,500 loans
7. PACEC (1988)	Enterprise Zones	7	9,000[f]
8. Monk (1991)	Enterprise Boards	7	6,000
9. Howland (1989)	UDAG — Revolving Loan Funds (Rural Areas)	2	$3—4,000
	EDA — Revolving Loan Funds	1	$4,750

Method of estimation

1. Gross Investment divided by number of new jobs.
2. Estimated size of subsidy embodied in the project divided by number of new jobs.
3. Regression analysis: 'isolate' effect of project/instrument.
4. Shift-Share Analysis and Regression.
5. Discounted Value of the Subsidy (at 5% and 10% rates).
6. Unemployment payments divided by the estimated difference in unemployment rates before and after the operation of the scheme weighted by displacement and deadweight rates.
7. Employment effects measured via firm survey and employment multipliers from I-O tables. Net employment effect divided by total expenditure on scheme.

[a] 1987 prices.
[b] Gross Treasury Cost including expenditure on projects that failed and those that received multiple funding.
[c] 1981 prices.
[d] 10 year job-life estimate — Net Treasury costs.
[e] 20 year job-life estimate — Net Treasury costs.
[f] On-zone effect; off-zone estimate — £23,000.

locally targetted schemes in small areas there are also likely to be multiplier effects outside the area which are harder to quantify.

— *the type and quality of employment created*: the stress placed on quantitative assessments of employment sometimes tends to overlook the quality of the jobs created (Gregory and Martin, 1988). These qualitative issues refer to type of work, its stability and skill base.

— *differentiating between employment creation and employment retention*: the preoccupation with estimating cost-per-job indicators often serves to obscure the fact that some employment 'creation' is simply employment that has been retained due to the assistance offered via the scheme. This raises the question of the contribution of the scheme to securing employment that market forces might well have eradicated.

— *establishing the counter-factual position*: the

question 'what would have happened without the scheme?' is a cardinal issue in all policy evaluation. The most direct method is to simply collect responses to the question from recipients of the scheme. Studies indicate that the 'deadweight' rates on this basis stand around the 50% mark (Robinson et al., 1987; Turok, 1988). Other methods include identifying a sub-set of observations (firms) with characteristics similar to the recipients of the scheme but who have not received assistance and comparing the employment-generating performance of the two groups (Wren, 1988). A further approach involves using multi-variate modelling in order to establish the counter-factual position. On a sectoral level, Moore et al (1986) used shift-share analysis and time trends in order to establish the counter-factual position and on this basis estimated cost-per-job indices for regional policy.

— *establishing the extent of 'displacement' and 'substitution' embodied in scheme*: the overall employment impact of the instrument being evaluated is likely to be affected by (a) the extent to which new employment created displaces employment elsewhere in the economy and (b) the extent to which new jobs substitute certain employees at the expense of others (Stern, 1988).

IV. Data and method

We analyse here the employment effects of two small firm financing schemes operating in Israel. In both instances the evaluation is concerned with:

(a) establishing the employment generated by the scheme;
(b) estimating the resultant cost-per-job; and
(c) attempting to estimate the amount of employment generated by deadweight assistance.

Part I

The first scheme analysed is a *revolving loan fund* targeted at two specific towns and aimed at reducing the cost of capital to local businesses. This fund operates in the small peripheral towns of Kiryat Shmona in the north of the country close to the Lebanese border and Ofakim in the south at the approach to the Negev desert. It is aimed at stimulating local economic activity and employment in both places. The scheme is capitalized by both public (Jewish Agency-philanthropic) and private (local bank) sources. The size of the funds in each town, criteria for eligibility, loan terms etc are not identical but their overall objectives are very much the same. The basic profiles of the two loan funds are presented in Table II.

The loans are heavily oriented to manufacturing activity (Table III) although in Ofakim a parallel fund for commercial activities operates. Most of the recipients of the loans are established businesses that use the loans for fixed capital investments (Table IV). These investments however are assessed by the loan fund managers in terms of their expected employment generating potential and only proposals with a commitment to generate jobs are accepted.

The data for this evaluation is based on all the loans disbursed over a three year period in both towns; from inception (1986) until 1988. In all, 95 loans were made over this period. Data on the Kiryat Shmona fund was obtained from a published source (Attir and Blubstein, 1988) which includes data on the number of jobs generated as a result of receipt of the loan. The data on the Ofakim loan fund was generated on the basis of individual loan files. The employment attributable to each loan was established on the basis of the files and with assistance from the local loan fund manager.

In addition, in order to be able to assess the deadweight effect of the loans, a follow-up survey was conducted in 1989 amongst those who had received loans over the period 1986—1988. Of the 95 initial recipients, 40 were identified and contacted (approximately 20 in each town). The remaining 55 businesses were generally difficult to contact or unwilling to co-operate and in addition some of them had closed. Consequently, the potential for sample bias amongst those that did respond, should be noted.

It should be noted that in the case of the loan funds the methodology employed does not directly attempt to estimate employment creation and is based on the figures provided by the loan funds. While the primitive head-count assessments made by the funds do not take into account substitution and displacement effects we accept these basic

TABLE II
Profile of the loan funds, 1986—1988

	Ofakim	Kiryat Shmona
1. No of loans	63	32
2. Average loan size	$9,970	$13,400
3. Value of total loans disbursed	$608,300	$428,000
4. Purpose of loan (%)		
Operating capital (Start-up, debt, working capital)	11	31
Fixed capital (expansion, machinery)	89	69
5. Average repayment period (months)	21	12
6. Loan Terms		
Interest I	5.5%[a]	1.5% + LIBOR[c]
Interest II	10.5%[b]	
Linkage	C-O-L Index	C-O-L Index
7. Recipients by Economic Sector (%)		
Manufacturing	44	44
Services to manufacturing	3	7
Commercial	27	31
Other services	26	19
8. Number of Jobs Attributable	123	91
9. Capitalization Base	$600,000	$350,000
10. Ratio Public (Jewish Agency): Private (Bank) Funding	3:1	2.5:1
11. Defaults	0	1
12. Size of subsidy embodied in Scheme	$210,720	$209,312
13. Cost-Per-Job	$1,713	$2,300

[a] For 50% of loan value; rest = Prime + 1%.
[b] For 75% of loan value; rest = Prime + 1%.
[c] For 71% of loan value.

figures with all the reservations involved. This is because first, most loans are disbursed for the purposes of expansion of existing activities and thus there seems little likelihood that all the employment generated by a new start-up will be attributed (falsely) to the fund. Second, for most of the recipients the loan is the only source outside the regular banking system for financing the expansion and thus the employment generated is likely to stem from the loan received. For these reasons the data on employment creation is treated as a given factor.

The main methodological thrust is thus with respect to establishing cost-per-job. For the loan funds, this involves estimating the size of the subsidy embodied in the scheme. This subsidy is taken as the difference between the actual cost of the loan and the alternative cost to the borrower on the open market (see Howland, 1990). The cost per job is simply the subsidy divided by the number of jobs attributable to the scheme.

This is a pure accounting procedure, the steps for which are outlined in Table V. Initially the dollar interest rate (d) is calculated. This depends on the loan terms and these differ across the two places and even within Ofakim itself two different loan terms are offered (for manufacturing and commercial activities). After that, the effective shekel interest rate (i) is calculated in order to take into account the effect of inflation on a loan held in dollars but lent in shekels. The alternative cost (i^*) is taken as Prime + 1.5%. These three rates form the basis for estimating the difference between the actual cost of the loan and the alterna-

TABLE III
Distribution of loans by economic sector

Sector	%
Manufacturing	42
Services to manufacturing	4
Commercial	26
Other services	28
	100

n = 105

TABLE IV
Distribution of loans by purpose

Purpose of loan	%		%
1. Start-up capital	15		
2. Debt/working capital	2	Working capital	17
3. Machinery	63		
4. Expansion/infrastructure	6	Fixed capital	83
5. 3 + 4	14		
	100		100

n = 106

tive cost. The steps for this procedure are outlined in Table V, expressions (4)—(8).

Part 2

The second instrument analysed is a *capital grant scheme aimed at promoting economic activity in rural areas.* This scheme is funded and administered by the Rural Settlement Department of the Jewish Agency, a quasi-governmental body involved in populating and promoting economic activity in rural areas.

The profile of the grant scheme (Table VI) shows that average grant size and total value of grants disbursed is rather higher than under the loan fund. Furthermore, in contrast to the loan fund, most assistance is given to start-up companies. The distribution of grants by economic sector reveals a very heavy orientation to manufacturing.

For rural sector firms, these grants are invariably one component in a multi-channel funding setting. Rural manufacturing firms are eligible for other (central) government capital incentives; government grants (up to 38% of fixed investment), government guaranteed loans and tax breaks. These incentives however are generally contingent on approximately 30% personal investment and the rural sector grant scheme is often used to meet this condition when the rural entrepreneur has no personal funds. The grant scheme thus complements central government capital assistance. For rural entrepreneurs, the grant scheme is automatic and non-discretionary. They are eligible to a $35,000 grant by virtue of the fact that they live in a rural area. This sum may or may not cover the 30% personal funding needed to be eligible for central government assistance, depending on the size of the overall investment. Proposals for rural sector grants are screened by the Rural Settlement Department's screening agency (the Rural Industries Company) and on the basis of their recommendations the proposals are accepted or rejected. As a rule of thumb, the Department likes all prospective projects to be based on 20% personal investment by the entrepreneur but this is not a rigid criterion for assistance. In general, the prospect of employment generation is the overarching objective and if a project is a potential job-generator, the Rural Settlement Department is likely to offer assistance. Small scale proposals (< $8,000) are not screened by the company and are usually funded at the discretion of the various regional offices of the Rural Settlement Department.

In the case of a co-operative settlement (such as a kibbutz) that wants to set up a firm, the size of the rural sector grant to which it is eligible is computed on the basis of a formula based on the number members likely to be employed by the proposed project. Thus, the overall investment is generally much greater in co-operative settlement projects than in the small business projects originating in entrepreneurs from the non-co-operative, rural villages.

The data used for the evaluation of the grant scheme is based on figures provided by the Rural Industries Company, relating to the 130 loans made over the period 1986—1990. This data relates to the size of the rural sector grant, the size of overall investment, economic branch, purpose of loan and number of jobs generated.

TABLE V
Estimating subsidy size and cost-per-job

1. *Estimate Annual Dollar Interest Rate* for each loan (d)

Kiryat Shmona: $d = 0.71 \times (\text{Libor}(\%) + 1/5\%)$
Ofakim: (1) $d = 0.50 \times (\text{Prime} + 1.0\%) + 0.50 \times (5.5\%)$ (1)
(2) $d = 0.25 \times (\text{Prime} + 1.0\%) + 0.75 \times (10.5\%)$

2. *Estimate Effective Shekel Interest Rate* (i)

$$i = [(Re(100 + d))/(Rb\ 97)) - 1]\ 100 \quad (2)$$

Where:
Re = Effective Shekel Interest Rate at end of loan period
Rb = Effective Shekel Interest Rate at beginning of loan period

3. *Estimate Alternative Cost* (i*)

$$i^* = [(1.5 + PR)^{12} - 1)]\ 100 \quad (3)$$

4. *Estimate Total Annual Repayments of Borrower* (P)

$$P = A[i/1 - (1 + i)^n] \quad (4)$$

where:
A = Size of loan
i = Effective interest rate
N = Repayment Period (months)

(P) is a quantitative term. The relative term expressing total annual repayments is expression (4) without the size of the loan. This gives a relative term (R). Similarly, (i*) represents the alternative cost of the loan to the borrower on the open market:

$$P^* = A[i^*/1 - (1 + i^*)^n] \quad (5)$$

As in expression (4), (P*) represents the total alternative cost. Removing (A) will yield the relative cost (R*). The difference between the actual cost and the alternative cost gives the gross size of the subsidy (S) over a period N, monthly into the future (i.e. the repayment period).

$$S = P^* - P = A[R^* - R] \quad (6)$$

5. *Estimate the Project Subsidy Value Embodied in the Scheme* (T):

This gross size of the subsidy can be converted into present value (T).

$$T = A[1 - (R/R^*)] \quad (7)$$

6. *Estimate Cost-Per-Job (C)*:

The sum of present values for each loan (ΣT) gives us the total subsidy embodied in the loan scheme. Cost per job is thus:

$$C = \Sigma T/L$$

where L = total number of jobs attributable to the scheme.

In view of the problem involved in ascertaining the employment effects of grants made for the purpose of 'expansion' and 'debt capital' (the 'additionality' problem), this analysis is based on funding for start-up projects only. This reduces the effective number of observations to 74 but at least allows for the retention of some form of causality between the grant and employment creation.

In view of the multi-channel character of the funding of rural sector economic activity, the methodology employed is based on an attempt to try and separate out the effect of the rural sector grants on employment generation from the effect of central government incentives. This is done on the basis of regression estimation. Using this technique the effect of the rural sector grants on the overall level of employment generation, can be isolated. On the basis of the regression coeffi-

TABLE VI
Profile of rural industry grants 1986—1990

	(Coefficient of variation in parentheses)
1. No of Grants	129
2. Average Grant Size (Th$)	68.4 (1.6)
3. Average Total Investment (Th$)	135.8 (1.4)
4. Average No Employees	7.3 (0.4)
5. *Purpose of Grant* (%)	
Start-Up	57
Expansion	32
Debt Capital	11
6. *Recipients by Economic Sector* (%)	
Manufacturing	82
Software + Office Services	10
Other Services	8
7. *Recipients by Rural Settlement Type* (%)	
Community Settlement (free market)	27
Moshav (mainly co-operative)	37
Kibbutz (co-operative)	26
Other	10
8. *Recipients by Geographic Area* (%)	
Galilee	26
Rest of Northern District	25
Central District	25
Jerusalem District	14
Negev District	10
9. Total Grants Disbursed 1986—1990 (M$)	8.7
10. Total Overall Investment 1986—1990 (M$)	13.7
11. Total Grants Disbursed to Start-Ups 1986—1990 (M$)	3.7
12. Total Overall Investment in Start-Ups 1986—1990 (M$)	7.1
13. Average Start-Up Grant (Th$)	50.4 (1.2)
14. Average Start-Up Total Investment (Th$)	100.4 (1.5)
15. Average No Employees — Start-Up	5.1 (0.9)

cients, cost-per-job can be calculated and the extent of the deadweight effect can be assessed.

It should be noted that this methodology does not deal with the problem of the displacement and substitution effects attributable to the rural grants scheme. These are very real issues that will have to be dealt with at a later stage.

The evaluation of the two schemes presented below is thus based on the following characteristics:

— an analysis of the *short-term effects of the schemes* — those effects estimable and observable after a 3—5 year time period.
— an analysis based only on the *direct effects* of the schemes — indirect (macro-economic) feedback effects are not dealt with.
— an analysis based on *micro-economic evaluation methods*. This analysis does not touch on those effects on wages, output and prices that arise from financing employment-generating schemes via changes in fiscal deficit, interest rates, etc.

V. Empirical results

V.1. *The revolving loan funds*

Loan funds have been analysed using a variety of techniques. These can range from descriptive analyses (NCUED, 1983) through statistical and financial accounting analyses (Mt Auburn, 1987, Howland, 1990) to cost-benefit analysis (Sazama, 1970).

This analysis of the loan funds utilizes financial accounting and statistical techniques and focusses on two main issues: (a) calculating the size of the subsidy embodied in the scheme and subsequently estimating cost-per-job indices and (b) estimating the deadweight issue. We will deal with each in turn.

(a) *Estimating subsidy size and cost-per-job*

These estimates appear in Table VII. As can be seen, while cost-per-job on the basis of total gross value of all the loans is close to $5,000, on the basis of estimating the size of the subsidy embodied in the scheme, these indices reduce to the vicinity of $2,000 per job. This is a very low figure although not one radically different to figures reported for similar loan funds in the US. These latter studies calculate cost-per-job as $3—4,000 (Howland, 1990) and nearly $5,000 (Mt Auburn, 1987).

Examining the loans on the basis of various categories such as by loan purpose, economic sector and size of loan, small differences in cost-per-job emerge. These indicate that at this level of economic activity, jobs in manufacturing are created at lower cost than jobs in services (a similar — surprising — finding was reported in the comprehensive Mt Auburn (1987) survey). Similarly, small loans create jobs at a lower cost than relatively large ones and the Ofakim fund is more cost-effective in creating employment than the Kiryat Shmona fund. Over time, and with the general lowering of interest rates in the economy (especially from 1988 onwards), the size of the subsidy became eroded as regular bank interest rates approached those of the fund. Despite this however, the fund continued to generate employment at a rate similar to previous years.

Caution however is necessary in interpreting these results. It is of course too simplistic to ascribe all employment created to the operation of the loan funds even if the recipients had no other sources of finance. Obviously, local conditions (unemployment rates, local tax levels) and macro-economic conditions (interest rates) have much to do with these results even if we cannot estimate their influence directly.

On the other hand it should also be noted that these low job creation costs are comparable to those reported in other countries for similar (low level) economic activities. Even if the job count is inflated and is reduced by half, the resultant cost per job figures ($4,000—$4,500 per job approximately) would still be very low. Furthermore, in most cases job creation involves the marginal cost of adding employment to already existing infrastructure in economic activities that are not heavily capital intensive. In addition, the loan funds are targeted, place-oriented schemes and such schemes are generally more cost-effective than wider ranging policy instruments (Robinson et al., 1987; Mt Auburn, 1987). Taken together, these factors might go some way in explaining the low cost-per-job figures estimated.

(b) *The 'deadweight' issue*

On the basis of a survey of loan recipients, 53% answered positively to the question 'would you have gone ahead with the investment/project in the absence of loan fund support'. In terms of employment, this translates into 64% of jobs created by those responding to the question. This deadweight rate is similar to that reported in other studies (Robinson et al., 1987; JURUE, 1986). It should also be noted, that it was mainly the large businesses, in both towns, that considered the loans non-additional (i.e., deadweight).

An attempt is made to estimate the probability of a loan being 'deadweight'. In this instance the probability is estimated, using a logit model, as a function of characteristics of the borrower (age and education) and characteristics of the borrower's business (economic branch and market served). In view of the fact that the regression estimates are not directly interpretable, direct elasticities taken at the mean have been computed, following the formula outlined in Hensher and Johnson (1981, pp 57—60).

Other studies have shown additional factors to be important in predicting deadweight. Mt

TABLE VII
Loans: estimated cost-per-job indices

Estimation on Basis of Total Gross Value of Loans			
Gross value of all loans ($)			1,035,977
Number of jobs attributable to scheme			214
Cost-Per-Job ($)			4,841
Estimation on Basis of Size of Subsidy			
	Subsidy size ($)	Number of Jobs	Cost per Job ($)
General (All Loans)	419,868	214	1,963
Loan Purpose			
Operating capital	96,805	51	1,898
Fixed capital	323,226	163	1,982
Economic Sector			
Manufacturing	246,879	134	1,842
Other (Commerce, Services)	173,152	80	2,164
Size of Loan			
Up to $10,000	203,568	107	1,902
> $10,000	216,464	107	2,023
Location			
Ofakim	210,720	123	1,713
Kiryat Shmona	209,312	91	2,300
Year			
1986	176,587	64	–
1987	197,899	69	–
1988	45,456	65	–
n = 94			

Auburn (1987) for example, found that small loans given for the purpose of fixed investment are more likely to be deadweight than large loans and loans disbursed for the purpose of operating capital. However, in this analysis, technical problems with these variables precluded their use in the equation.

The probability of investing without loan fund assistance (P_{ij}) is estimated as:

$$P_{ij} = \underset{(0.14)^{(1)}}{-1.545} + \underset{(0.03)}{(-0.009)}\,AGE + \underset{\substack{(3.95)^{*} \\ [5.31]^{(2)}}}{0.515}\,EDUC + \underset{(2.50)}{(-2.524)}\,SECT + \underset{\substack{(5.14)^{*} \\ [-2.40]}}{(-0.063)}\,SALES$$

n = 39; * = significant probability at $p < 0.05$ level
x^2 for the model = 15.20 (4. d.f.)

(1) x^2 for the coefficients in round parentheses
(2) direct elasticities (at the mean) in square parentheses

where:
AGE = age of entrepreneur;
EDUC = number of years schooling;
SECT = economic sector: manufacturing (commerce and services); dummy variable, reference group in parentheses; and
SALES = percentage sales in local area (nearest city and surrounding rural hinterland).

The results point to the fact that loans given to more educated entrepreneurs operating in wider (and probably more sophisticated) markets, are more likely to be deadweight. It would appear that these businesses have either alternative sources of finance or do not really need the loan in the first instance. However, there would seem to be a strata

of small production-oriented businesses (witness the negative sign on the economic branch coefficient) in peripheral towns that serve the local (and rather primitive) market and that do not have access to alternative sources of finance. For them there might not be any alternative to the loan funds.

V.2. *The rural sector capital grants scheme*

Regression estimation is employed here in order to assess the employment effects of the scheme. This technique involves estimating an equation that predicts employment on the basis of the rural grants scheme and other variables and then re-estimating the equation this time without the term on the grants scheme. This allows for isolating the employment effects of the grants and on this basis cost-per-job estimates are derived. The coefficients of the equation also give a tentative indication as to the extent of the deadweight effect (Schofield, 1987).

(a) *Modelling the effect of assistance on employment*

The specific model utilized is based on that developed by Wren (1989) for the purpose of assessing the different employment outcomes of industrial assistance policies. The derivation of the model is not presented here but the specific form for estimation is presented as;

$$E_i = \alpha + \beta_1 GR + \beta_2 INV + \beta_3 CI + \beta_4 GINV + \varepsilon$$

where:

- E_i = Estimated employment for the ith project;
- GR = Capital grant (th $);
- INV = Total other investment (th $);
- CI = Dummy variable indicating the capital intensity of the economic branch (based on classification method used by Felsenstein and Bar-El 1989);
- GINV = Quadratic term accounting for the existence of non-linear relationship between assistance and employment creation. It is calculated as $\Sigma_i(GR * INV)^2$.

In view of the limited form of the data available, this model is based on the following (simplifying) premises. First, the estimation is based on assistance data relating to start-up projects only. Thus while purpose of project is generally a factor that affects the models parameters (Wren, 1989) the analysis of a single purpose (start-up), avoids this source of variation. Second, the capital intensity term is used here as a both predictor of negative employment effect (the more capital intensive the firm the less likely to generate employment) and as an indicator of establishment size. This latter relationship has been shown to exist empirically for Israeli industry (Felsenstein and Bar-El, 1989). Finally, it should be noted that only the direct and short term effects of assistance are estimated (we do not assume multiplier effects or do we know how long the created employment is retained).

(b) *Estimated results*

The estimated form of the above equation yields the following results:

$$E_i = 2.322 + 0.036GR + 0.020INV + \underset{(0.0001)}{} \underset{(0.0001)}{} \underset{(0.001)}{}$$
$$+ -0.445CI + -0.000042GINV \underset{(0.238)}{} \underset{(0.357)}{}$$

$n = 70$; $R^2 = 0.63$; $F = 28.14$
($p > F$ 0.0001).
probability of t-values in parentheses.

The coefficient on the constant term is significant implying that new start-ups will create 2.3 new jobs on average irrespective of assistance and project scale. Similarly, the co-efficients on the grant and 'other assistance' terms are also significant suggesting that increasing assistance will increase employment generation. However, the negative coefficient on the quadratic term serves to modify this observation. While it is non-significant it nevertheless suggests that this relationship might not be linear and that employment additions tail off with increasing size of assistance. Thus, beyond a certain level of assistance the marginal employment effects might be very small. In addition the coefficient on the capital intensity term is negative as expected but not statistically significant. Overall, the model only explains some two-thirds of the variation in small business employment. This method for determining the employment effectiveness of assistance therefore includes some large errors. In this respect, the cost-per-job figures may represent upper limits.

It should be noted that similar findings were

reported by Wren (1989) with respect to financial assistance at the start-up stage. His results also suggest some form of non-linear relationship between financial assistance and employment generation and capital intensity is also found to have a negative (but non-significant) effect on employment creation.

On the basis of the above equation it is now possible to estimate the employment creation effect net the effect of the grants scheme. This is done by simply substituting the above coefficients into the following equation in order to get (E_i^*). Thus,

$$(E_i^*) = 2.322 + 0.020\text{INV} + (-0.445\text{CI}) + (-0.000042\text{GINV})$$

To isolate the employment effect of the grant scheme we calculate ($\Sigma_\Delta E_i$) as,

$$\Sigma_\Delta E_i = \Sigma E_i - \Sigma E_i^*$$

This gives us the employment generation attributable to the grant scheme. On the basis of our estimation 132 jobs out of a total of 378 (35%) are attributable to the grant scheme.

(c) *Estimating cost-per-job*

Two approaches can be taken. On the basis of the above, the average cost-per-job is simply ($\Sigma GR_i / \Sigma_\Delta E_i$), i.e., the sum of rural grants disbursed, divided by the employment effect of the grants as isolated from the regression equation. The cost resulting from this estimation is $15,600 per job. However, caution needs to be taken with respect to this figure as it is based on an estimate derived from a model that does not have full predictive capabilities ($R^2 = 0.63$).

A second, more conservative approach is simply to take the reciprocal on the grant term of the regression equation (as done by Wren ,1989). This yields a rather higher figure of $27,100 per job (and $48,150 for the INV term). However, this only measures the rate of change in the grants in respect to the rate of change in employment ($\partial E / \partial GR = \beta GR$) and thus only relates to the growth phase in the relationship between size of grant and employment creation. This might be justified when bearing in mind that rural grants are generally a small part of overall investment ($< 30\%$) and that smaller amounts of assistance are probably more cost-effective than larger amounts with respect to employment creation. For larger levels of assistance, the rate of corresponding employment growth is likely to level off.

(d) *Estimating deadweight*

As noted above, the positive and significant constant term seems to indicate that on average 2.3 jobs are created irrespective of level or type of assistance. This would seem to indicate some form of deadweight effect which can be estimated by simply subtracting this figure from the number of actual jobs created in each case. In this instance, the number of jobs attributable to 'deadweight' assistance is in the range of 206—229 out of 378 (54—60%). This range results from the method of estimation used (accounting for negative figures or not). The result is very much in line with deadweight rates calculated elsewhere (Robinson et al., 1987) and with the figures estimated above with respect to the loan funds. However, the same disclaimer as above, with respect to drawing conclusions from the model coefficients, is relevant here.

VI. Conclusion

This paper represents a preliminary excursion into the field of assessing the employment effectiveness of different assistance schemes aimed at small businesses. It should be noted that the two schemes analysed are not comparable in terms of purpose, scope and type of assistance. Furthermore, estimating average costs does not allow us to say anything about the relative cost-effectiveness of each scheme which is measured at the margin (efficient allocation of funds between schemes occurs when marginal costs of the schemes are equalized).

The analysis does give an indication however of some of the problems involved in estimating employment effectiveness and especially the methodological issue of dealing with deadweight. The treatment of substitution and displacement, multipliers and measuring job quality and not just quantity, are all issues for further development.

The above results show that first, low levels of assistance are particularly employment-effective but that this effectiveness might grow at a decreasing rate as the level of assistance grows. Second, the purpose for which the assistance is given (start-up, expansion, debt financing, etc) is likely to have an important effect on the employment effectiveness of the scheme. Third, the targeting of the

schemes seems to be an important component in their success. This targeting can be either spatial or sectoral. Spatial targeting (place-oriented schemes) are likely to be effective even if the number of places adopting such schemes increases. This is because the object of these schemes is not to discriminate between places in an effort to allocate a given resource (employment), but to expand that resource. Sectoral targeting could run the risk of incorporating the distorting effects associated with 'picking winners'. However, if the targeting is done on a broad sectoral basis (industry, commerce/trade tourism, etc) and is coupled with a spatial basis (e.g., assistance for the tourism sector in a certain place), then it would seem that the advantages of the small, targeted schemes can be preserved.

Acknowledgments

This research was funded in part by the Rural Settlement Department of the Jewish Agency. Thanks to Aliza Fleisher, Colin Wren and to two anonymous referees for valuable comments on an earlier version of this paper.

References

Attir, U. and D. Blubstein, 1988, *Kiryat Shmona Small Business Development Fund, Part 1, Summary of the First Three Years of Operation*, Kiryat Shmona, Project Renewal.

Coulson, A., 1990, 'Evaluating Local Economic Policy', in M. Campbell (ed.), *Local Economic Policy*, London: Cassell.

Felsenstein, D. and R. Bar-El, 1989, 'Measuring the Technological Intensity of the Industrial Sector: A Methodological and Empirical Approach', *Research Policy* **18**, 239—252.

Gregory, D. and S. Martin, 1988, 'Issues in the Evaluation of Inner City Programmes', *Local Economy* **2**(4), 237—249.

Harris, R. I. D., 1991, 'The Employment Creation Effects of Factor Subsidies; Some Estimates for Northern Ireland Manufacturing Industry', 1955—1983, *Journal of Regional Science* **31**(1), 49—64.

Hensher, D. A. and L. W. Johnson, 1981, *Applied Discrete Choice Modelling*, London: Croom Helm.

Howland, M., 1990, 'Measuring Capital Subsidy and Job Creation; the Case of UDAG Grants', *Journal of the American Planning Association* **56**(1), 54—63.

JURUE, 1986, *Assessment of the Employment Effects of Economic Development Projects Funded Under the Urban Programme*, Department of the Environment, London: HMSO.

Krmenec, A. J., 1990, 'The Employment Impacts of an Industrial Incentive; Differential Efficiency of the Industrial Revenue Bond', *Regional Studies* **24**(2), 95—104.

Marquand, J., 1980, *Measuring the Effects and Costs of Regional Incentives*, Government Economic Service Working Paper no. 32, London: Department of Industry.

Monck, S., 1991, 'Job Creation and Job Displacement: The Impact of Enterprise Board Investment on Firms in the U.K.', *Regional Studies* **25**(4), 355—362.

Moore, B., J. Rhodes, and P. Tyler, 1986, *The Effects of Government Regional Economic Policy*, Department of Trade and Industry, London: HMSO.

Mount Auburn Associates, 1987, *Factors Affecting the Performance of US Economic Development Administration Sponsored Revolving Loan Funds*, Springfield VA: National Technical Information Service, US Department of Commerce.

National Council for Urban Economic Development (NCUED), 1983, *Revolving Loan Funds*, Washington DC: National Council for Urban Economic Development, Information Service.

PA Cambridge Economic Consultants (PACEC), 1988, *An Evaluation of the Enterprise Zone Experiment in Northern Ireland, Department of the Environment*, Balfast: HMSO.

Robinson, F., C. Wren, and J. Goddard, 1987, *Economic Development Policies; An Evaluative Study of the Newcastle Metropolitan Region*, Oxford: Clarendon Press.

Sazama, G. W., 1970, 'A Benefit-Cost Analysis of a Regional Development Incentive; States Loans', *Journal of Regional Science* **10**(3), 385—396.

Schofield, J. A., 1987, *Cost-Benefit Analysis in Urban and Regional Planning*, London: Unwin Hyman.

Stern, J., 1988, *Methods of Analysis of Public Expenditure Programmes with Employment Objectives*, Government Economic Service Working Paper no 103, London: HM Treasury.

Storey, D. J., 1990, 'Evaluation of Policies and Measures to Create Local Employment', *Urban Studies* **27**(5), 669—684.

Swales, L. K., 1981, 'The Employment Effects of a Regional Capital Subsidy', *Regional Studies* **15**(4), 263—273.

Turok, I., 1988, 'The Limits of Financial Assistance; An Evaluation of Local Authority Aid to Industry', *Local Economy* **2**(4), 286—297.

Willis, K. G., 1985, 'Estimating the Benefits of Job Creation from Local Investment Subsidies', *Urban Studies* **22**, 163—177.

Wren, C., 1987, 'The Relative Effects of Local Authority Financial Assistance Policies', *Urban Studies* **24**, 268—278.

Wren, C., 1988, *Methodologies for Establishing the Employment Effects of Financial Assistance Policies*, paper presented at ESRC Urban and Regional Economics Seminar Group, University of Newcastle.

Wren, C., 1989, 'Factors Underlying the Employment Effects of Financial Assistance Policies', *Applied Economics* **21**(4), 497—513.