Small-Scale Entrepreneurship and Access to Capital in Peripheral Locations: An Empirical Analysis

DANIEL FELSENSTEIN AND ALIZA FLEISCHER

ABSTRACT This paper presents an analysis of a public assistance program for small-scale entrepreneurship in peripheral areas. Public assistance compensates for market inefficiencies where the decision rules of financial institutions discriminate against otherwise viable small firms in capital markets. Lending institutions perceive high risk in providing debt capital when little information is present. Using empirical data from Israel, the determinants of this risk are estimated and the role of location in creating this information asymmetry is stressed. These results empirically establish that (1) location matters in determining the risk profile of the firm, (2) locationally targeted programs can reduce the information asymmetries that make peripheral firms unattractive to lenders, and (3) these programs can also generate positive welfare effects. Finally, there is speculation on the potential role of ICT (information and communications technology) in increasing the visibility of small firms in remote locations and creating a more symmetrical flow of information.

Introduction

One area of public policy towards small firms that has received much attention relates to the provision of finance. Much public effort in small firm assistance is aimed at bridging the capital gap. There are many sources for the failure of private capital markets to provide capital to small firms. New entrepreneurs are said to be unknown quantities with unproven track records (Peterson and Rajan 1994). The unit transactions costs of providing finance to small firms is very high and small firms often have higher risk projects which increase the probability of failure (Binks et al. 1992). As can be seen, much of this is based on the risk that credit institutions perceive in small firms. The result is an asymmetric flow of information in which borrowers know more about their ability to pay than do lenders. In such a situation, lenders will opt to minimize risk by rationing credit. If by so doing, viable projects are overlooked, a market failure arises.

Daniel Felsenstein is a senior lecturer in geography, and Aliza Fleischer is a lecturer in agricultural economics and management, at the Hebrew University of Jerusalem.

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Institutional sources of finance such as banks will only gather information on a small business venture to the extent that the marginal benefits from the information equalize the marginal costs of acquiring it. Assembling information on smaller, newer, and remotely located firms requires greater gathering costs. Even if they are viable ventures, the cost to the bank of acquiring information on small firms located in the ‘wrong’ place (i.e. in a remote location), or started by the ‘wrong’ kind of entrepreneur (i.e. a new immigrant with little experience) or of the ‘wrong’ vintage (i.e. with little proven success), is likely to mitigate against their receiving debt finance.

However while marginal private costs may outweigh benefits, this does not necessarily mean that there are no social benefits from assisting entrepreneurial endeavors. In fact, the case for public support is based on the fact that in its absence, socially profitable investments will not be made. These investments may not seem profitable when valued at market prices but are viable when valued using an alternative or shadow price. This would seem to suggest that a suitable approach to assessing the social value of these investments is by subjecting them to a cost-benefit test.

The aim of this paper is to illustrate how the need for public intervention in promoting small-scale entrepreneurship arises in the first instance, and to evaluate the effects of this intervention. The case is made that an asymmetric flow of information between small businesses and lending institutions leads to market failure in the provision of finance to small firms. One of the sources of this information asymmetry is the relative location of the business (Mason and Harrison 1993; Shaffer and Pulver 1985). Based on empirical data drawn from a targeted assistance program for small-scale entrepreneurship in Israel, the paper estimates those factors determining the perceived risk of lending to small firms. Special attention is given to the contribution of the type of location on the level of perceived risk.

After establishing that location matters in creating the firms’ risk profiles, the paper proceeds empirically to test whether locationally targeted programs can reduce the information asymmetry that makes peripheral firms less attractive to lenders. It is illustrated that welfare effects of public policy are greatest in those areas of highest disadvantage and an approach, *inter alia*, that estimates the distributional effects of public support and not simply its aggregate impacts such as extra jobs incomes is presented. Thus both equity (welfare) and efficiency (redressing market imperfections) are addressed. The paper then concludes with a discussion of the way in which ICT (information and communications technology) may be used by small firms in remote locations to generate greater visibility and thereby mitigate the worst excesses of information asymmetry.
Entrepreneurship, Information Asymmetry, and the Public Policy Response

One of the chief sources of market failure affecting small-scale entrepreneurship arises when capital markets fail to promote activity that can have net social benefits. Due to imperfect information flows, banks and other lending institutions may restrict capital to certain kinds of economic activity. Information asymmetry will prevent ostensibly viable projects from being undertaken. Small firms are particularly susceptible to this kind of market imperfection. Banks find it hard to gather information on enterprises that have no proven record, on entrepreneurs who have no history, and on firms that are located in remote locations. Obtaining all the information to make an informed decision is often expensive and thus the distribution of information between the firm and the bank is asymmetric: the firm always knows more about its ability to repay than does the bank. Faced with these considerations, banks will operate a strategy of credit rationing (Jaffee and Rossell 1976). Stiglitz and Weiss (1981) in a seminal article have shown that information asymmetries are further exacerbated with a rise in interest rates. In such a case, stronger firms are likely to pass-up the finance offered, leaving only the higher risk firms (the adverse selection problem). In addition, the bank will find itself dealing with more risky projects due to other firms under-performing (the moral hazard problem). In response it can either raise interest rates (use the price mechanism) or simply refuse outright to fund projects.

The factors associated with this kind of market failure are ostensibly firm size, vintage, entrepreneurial experience, location, and so on. Taken together, they comprise the level of risk associated with the firm (Binks et al. 1992). Taken individually, the size factor is probably the primary element in determining the finance needs of the small-scale enterprise. In order to grow, the small firm (which is invariably under-capitalized) needs a relatively large investment in relation to its existing capital base. For the banks, however, the unit transaction costs of serving small firms, coupled with the high probability of default, do not make for an enticing proposition. Further exacerbating the situation is the fact that the small firm is unlikely to have acceptable assets to offer as collateral on a loan. In addition, new entrepreneurs with little experience in presenting business plans and seeking finance for a project with no proven sales and uncertain markets, further add to the relative cost of providing finance.

Location in remote or peripheral areas also influences the chance of securing finance (Mason and Harrison 1993), although recent work suggests that distance is less of a barrier than in the past (Petersen and Rajan 2000). When the banking system is highly centralized, the range of options and financial services available at a non-central location is likely to be limited. Local banks that are part of a centralized structure often have little discretionary power and any non-standard referrals or requests will be dealt with by officials removed from the realities of
the local area. Where the banking system is highly regulated, conflicting outcomes can be postulated. On the one hand, a high level of competition and a cap on bank size can refocus a banks’ attention on the needs of local areas and communities. On the other hand, it can cause a shift of funds which invariably means a net outflow from weaker to stronger areas. In terms of the volume of supply of financial instruments, small and remote places are disadvantaged with respect to more centrally-located areas. Finally, a centralized financial system means inter-regional flows of funds. The direction of this flow is invariably to those areas where returns are greatest. In the case of economically marginal areas, this flow will be uni-directional, thereby lessening the amount of funds available for investment locally.

There is also a suggestion that the history of lender-borrower relations is important in determining the level of risk, serving to lessen imperfections in the capital market (Sharpe 1990). Over time, the bank establishes a stock of information on the small firm. This allows it to internalize some of the rents generated by more established clients. These increased rents serve as an implicit subsidy for new borrowers who are offered capital at favorable rates that belie their first-timer status. In this way the evolution of information asymmetries serves to reallocate capital to newer and less experienced firms.

The public policy response to the imperfections in the provision of capital to small-scale entrepreneurship has been wide and varied. A vast plethora of programs has emerged on both the supply and demand sides ranging from traditional debt-based instruments such as loans and guarantees, through credit enhancement and capital access programs, to equity and information-based schemes (NCUED 1989). The assessment of this activity has been equally varied. Much effort has gone into estimating the gross impacts of programs, whether in terms of cost of capital (Howland 1990, Camino and Cardone 1999), utilization rates (Cowling and Clay 1994), new firm formation and survival (Harrison and Mason 1986; Hart and Scott 1994; Mensah 1996), employment impacts (Howland 1990; Monk 1991), or new taxes (Chrisman and Katrishen 1994).

Loan and guarantee programs have been a particularly popular response to information asymmetries between banks and small businesses. As they cannot fully monitor and evaluate small firms, the risk-aversive response of the bank is to raise interest rates for all small firms, thereby covering any potential losses they might incur through including risky firms in their portfolio. Banks also insist on collateral for debt financing and often the small firm simply does not have enough assets to secure the finance (Binks and Ennew 1997). Guarantee programs overcome these constraints by reducing risk to the lender and increasing financial instruments available to the borrower. Over time, other benefits have been appended to these programs, including creating a more involved borrower-lender relationship and thus greater information flows,
employment generation, and economic diversification (Mensah 1996). While regional welfare issues have not been specifically addressed, studies of the spatial distribution of guarantee programs in the UK have shown that they follow the national distribution of economic activity. They seem to have simply added further financing options in those areas with well developed financial markets (Harrison and Mason 1986; Cowling 1997).

Less attention has been focused on the welfare and distributional effects of public policy directed towards small firms. Given the market failure that causes discrimination against small firms, this is surprising. It would seem that a prime motive for assessments of public policy would be to examine whether these programs help in redressing this situation. Simply counting new jobs, subsidy sizes, taxes, and firm formation rates does not go far enough (Courant 1994). Assuming the existence of marginal social benefits associated with small firm assistance programs, it would seem necessary to subject these schemes to a welfare-based evaluation. This would try to ascertain whether they are reaching the ‘right’ population (i.e. those subject to discrimination) and furthermore, whether they are making a difference to them.

This approach to evaluation requires that serious attention be focused on the change in income distribution arising from the public support. Aside from the data requirements for such an exercise, the methodological issues are also formidable. Not surprisingly, few studies have adopted this approach, preferring instead to concentrate on the intuitive and easily digestible issue of new jobs and increased tax revenues from new firms. While the few exceptions to this rule that exist differ considerably in terms of method and scope, each does look at the distributional impacts of public policy responses to the finance gap in economically marginal and depressed areas. Furthermore, all are concerned with the need for incorporating the opportunity costs of labor or capital for projects that may not seem viable when valued at market prices but are viable when alternative or shadow prices are considered. Thus, the impacts of job creation in distressed areas are examined through estimating the social costs of capital subsidies and charting their distribution (Dewar and Hagenlocker 1996). In other studies, employment impacts are translated into tax (Sridhar 1996) and income benefits (Felsenstein and Fleischer 2000) in distressed areas using a cost-benefit framework in which the opportunity cost of labor is considered using reservation wage estimates.

**Characteristics of the Program**

*The REP loan and guarantee fund.* The focus of the attention in this paper is on the Regional Entrepreneurship Program (REP)—a targeted program for small business support that operates in the peripheral regions of Israel. The period under investigation is 1993-1995, which were the most active years of the operation of the program. Established by the Jewish Agency (Israel’s largest
NGO) at the end of the 1980’s as a revolving loan fund, the REP program served for 3 to 4 years as a place-based program for the small firm population in two small, peripherally-located towns. The program assumed added significance in the early 1990’s with the mass immigration of Jews from the former Soviet Union. The prospect of mass unemployment accelerated the national government’s efforts in creating employment solutions for the immigrants flowing into the labor market. Promoting entrepreneurship and small business was viewed as a cost-effective solution in view of the short time frame and relatively low investment that this activity demanded.

In order to meet the challenges of the burgeoning labor market, the REP program expanded its remit and developed into a loan and guarantee fund serving all small firms in the peripheral northern and southern regions of Israel. The Jewish Agency enlisted a national commercial bank which administered the loans and controlled fund management. Interest rates and terms of repayment for the loans were fixed by a joint committee, while level of guarantees were determined by the bank. The program offered subsidized loans at interest rates approximately 3 percent below market rates over the period of study and guarantees for up to 40 percent of the value of the loan. While the bank executed the loan and administered the repayment schedule, the Jewish Agency provided the subsidy and the guarantee. Between 1993-1995, more than 700 projects were approved at a total value of over $18m. The terms of the loan and guarantee called for repayment over a 6 year period with roughly one year’s grace. While the loan ceiling was $75,000, the mean value of loans disbursed was closer to $25,000. Recipients of this support were in the main service-oriented firms (65 percent), with industry and tourism each accounting for another 15 percent of approvals and the remainder (5 percent) going to agriculture. On average, businesses founded by new immigrants accounted for 35-40 percent of all approvals, and new enterprises (rather than expanding firms) between 30-47 percent over the three year study period. Thus the focus of the assistance was directed to mainly new, relatively low-tech enterprises, located in peripheral regions, with a large proportion of new immigrant proprietors.

In parallel, the government set up a national small business assistance program that was ‘neutral’ in terms of spatial targets and offered loans at market rates but with guarantees underwriting up to 100 percent of the value of the loan. Over the study period the volume of this program dwarfed the REP fund with over 2,400 loan approvals at a total value of $195m. Borrowers could receive guarantees up to $180,000 with a payback period of 5 years and 2 years grace. These recipients were, on average, larger firms, heavily located in the more prosperous central regions of the country, more oriented to manufacturing, and with a much smaller emphasis on supporting new immigrants.

In order to avoid overlap between the two programs, the national program became the mainstream support instrument for small business finance while the
REP program evolved into a targeted program concentrating on the more disadvantaged sub-groups within the small business population. This included new firms, firms owned by immigrants, and firms located in the remoter parts of the country. In addition, over the period 1994-5, in the aftermath of the Gulf War in which Scud missiles landed on Tel Aviv, the program also assisted entrepreneurs and small businesses in deprived areas of the city that had suffered bombing damage and in some other distressed communities in the big cities. In general, the level of deprivation in those REP-targeted regions was much higher than in the country at large. For example, while unemployment rates nationally were 4-6 percent over the study period, the average in the targeted areas was closer to 12 percent.

The REP fund thus represents a public policy instrument with a particular welfare focus, aimed at redressing imperfections in the capital market that have caused economically viable small firms in the ‘wrong’ location or of the ‘wrong’ background to be screened out of the credit ‘decision rules’ of the banks. In common with other guarantee schemes, the REP fund provides debt capital. Previous work has shown that small firms in remote locations suffer most from constraints in this area (Shaffer and Pulver 1985). This evidence suggests that once the small business has exhausted all internal resources (proprietor’s savings and capital), the next step is to raise debt capital. Only after that will small firms look for equity investment.

**Determinants of perceived risk.** The risk profile of the small business determines the amount and terms of credit that it will receive from the lending institution. This perceived risk is based on the ability and cost of assembling information on the applicant. Firms that are smaller, newer, immigrant-owned, and peripherally-located are likely to be that much more inaccessible to banks and sources of credit. For reasons outlined above, it is hypothesized that the role of location would be particularly significant in formulating this risk profile. The more peripheral and remote the location, the more likely it is to suffer from the capital gap.

A further major hypothesis contends that in order for public policy to be acting effectively, it is expected that public assistance effecting a significant welfare change will be found in those locations whose firms are most likely to suffer from capital market imperfections arising from asymmetric information. It thus becomes necessary to estimate the amount of local welfare attributable to the REP program and the effect of the program on the local income distribution. Assuming that the program registers the highest welfare effect in those locations most affected by capital market imperfections, it can then be concluded that it is making a difference. This form of analysis goes beyond standard impact assessments of public policy. They typically measure gross change attributable to a program but fall short of stating who exactly benefits from this change.
The main thrust of the welfare-based analysis will be discussed below (*The Estimation Approach*). At this juncture however, in order to test the first hypothesis, it is necessary to establish the extent to which ‘type of location’ contributes towards the perceived risk profile of the firm. Type of location is a dichotomous variable with two categories: central city (Tel Aviv, Haifa, Jerusalem, or Beer Sheva) or peripheral location (small town and rural village: there are no large cities in the peripheral regions of Israel). It is expected that the level of risk, and therefore discrimination in capital markets, will be less severe amongst those small firms in central locations. Level of risk is measured by the amount of loan guarantee demanded by the commercial bank. This measures the perceived risk to the bank through financing small entrepreneurs in different locations. Results of a difference of means test indicate a statistically significant difference across locations. For example, the mean loan guarantee requested from firms in the peripheral northern and southern regions was 22.8 percent and 24.5 percent respectively, while the guarantee was only 16.6 percent ($F = 46.2, \alpha = 0.001$) from firms located in the central and Jerusalem regions. Similarly, when looking at differences across types of location (central city versus small towns and rural villages), again a statistically significant difference emerges ($F = 4.5, \alpha = .05$) indicating that the guarantee level favors small firms in the central cities.

The hypothesis about information asymmetry can be further supported by showing that for a small firm of given characteristics, the percentage of guarantee required in a small town or rural village is higher than that required from a firm located in central city, *ceteris paribus*. This is tested using a truncated regression model. This model was chosen since the dependent variable, (percentage loan guarantee) has a truncated distribution. For the purpose of the welfare analysis, the concentration is only on those firms for whom there is a justifiable case for public support, i.e. viable projects that are overlooked by existing sources of capital. The focus is not on non-viable projects, nor on those that could have received alternative private sources of funding. Both of these groups cannot be justified as targets for public policy. With the mean level of loan guarantee standing at 21 percent, those small firms below this mean are excluded (as they have alternative sources of funding) as well as all firms more than one standard deviation above this mean (they are so high-risk that they do not justify public support). The result is a reduction of about 25 percent in the number of observations available for analysis (roughly 550) and a truncated sample of small firms whose guarantee level is between 20 and 30 percent.

Due to the nature of this distribution, ordinary least squares estimation will generate biased estimates (Maddala 1983). In the truncated regression estimation procedure used here, $y_i$ is the percentage of loan guarantee the firm $i$ receives and $x_i$ is a vector of firm characteristics. The variables in $x_i$ include a
A dummy for the type of location, a series of industry dummies (manufacturing, services, tourism), and the number of workers by small business.

The General two-limit truncated regression model may be written as:

\[ y_i^* = x_i' \beta + e_i \]  

(1)

where \( y_i^* \) is a latent variable which is only observed if:

\[ \xi_i < y_i = x_i' \beta + \epsilon_i < \bar{c}_i \]  

(2)

where \( \xi \) and \( \bar{c} \) are the lower and upper truncation and \( y_i = y_i^* \) within the thresholds. The expected value of \( y_i \) conditional on being within the two thresholds is expressed by:

\[ E(y / x, \beta, \sigma) = E(y^*/\xi < y^* < \bar{c}, x, \beta, \sigma) \]  

(3)

Estimation of the regression model is done by maximizing the likelihood function with respect to \( \beta \) and \( \sigma \).

The estimation results in Table 1 show that of all the firm characteristics (size, sector, and location) only the coefficient of the location dummy is positive and significant. This means that given the firm characteristics as represented by the independent variables, the loan guarantee demanded from a small business located in a peripheral location is higher than that requested from a firm in a central location. A loan given to a small business in a peripheral location is considered higher risk and thus a greater premium is demanded.

**TABLE 1. DETERMINANTS OF PERCEIVED LEVEL OF RISK; RESULTS OF TRUNCATED REGRESSION MODEL**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Asymptotic t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PERIPH(^1)</td>
<td>2.35</td>
<td>2.18*</td>
</tr>
<tr>
<td>JOBS(^2)</td>
<td>0.24</td>
<td>0.36</td>
</tr>
<tr>
<td>MANF(^3)</td>
<td>0.08</td>
<td>0.03</td>
</tr>
<tr>
<td>SERVICE(^4)</td>
<td>-3.02</td>
<td>-1.38</td>
</tr>
<tr>
<td>TOURISM(^5)</td>
<td>-1.53</td>
<td>-0.54</td>
</tr>
<tr>
<td>Constant</td>
<td>24.98</td>
<td>11.6*</td>
</tr>
<tr>
<td>N</td>
<td>373</td>
<td></td>
</tr>
</tbody>
</table>

\(^*\) = significant at \( \alpha < 0.05 \) level

1. Location dummy; PERIPH=1 if firm is in peripherally located small towns and rural villages: 0 = other.
2. Number of new jobs generated as reported by firms.
3. Industry sector dummy. MANF=1 if firm is in manuf. industry sector; 0 = other.
4. Service sector dummy; SERVICE=1 if firm is in service industry sector; 0 = other.
5. Tourism sector dummy; TOURISM=1 if firm is in tourism industry sector; 0 = other.
The Estimation Approach

Having established the contribution of type of location to the risk profile of the small business and to the creation of a failure in the private market for capital, the obvious next step is to examine the consequences of the public policy aimed at correcting for this failure. At the outset, however, it is necessary not to overstate the extent of private market imperfections (Bartik 1990). While ex-post evaluation of public support can highlight imperfections in private markets and show viable small firms that were discriminated against by banks, the real issue is first, whether these could have been identified ex-ante and second, whether the outcome of public policy has really ameliorated the situation.

In the present context this means looking at the effects of public support in different types of location. If more remote locations suffer from information failures and lack of exposure to private capital markets, it would be expected that public policy would be effectively targeting these areas and making a difference to the level of local welfare. Stating the objectives in this way means using a methodology that is capable of capturing welfare change and analyzing whether public support has contributed to a positive change in local income distribution. While public assistance in distressed areas has often been dismissed as pure redistribution (zero-sum effects), Bartik (1991) makes the case that because of the lower reservation wages in depressed areas, even redistributing employment is likely to elicit higher benefits per job than in low unemployment places. This is because the cost of leisure foregone is not really an issue for labor who in the alternative case would be unemployed. Thus benefits per job are likely to be higher than in more prosperous areas.

To examine these issues, an approach that expands simple cost-effectiveness analysis into a cost-benefit framework is developed. While a few studies have adopted cost-benefit for looking at the effects of public support, much effort is invested in articulating costs while benefits are simply taken as the welfare effects implicit in the size of the subsidy granted to different groups in the small firms population (Brent 1991). The approach here is somewhat different. Employment gains are translated into wage gains and these wages are then adjusted to account for the opportunity costs of labor at different levels. This method has been described in detail elsewhere (Felsenstein and Fleischer 2000) and the mechanics of creating this framework are outlined in Table 2.

The first step is constructing an employment account that is cognizant of the problems of double counting, deadweight employment, and displaced employment (Step 1). Without adjustment, these are likely to inflate the employment effects attributable to public assistance. Their treatment is standard practice in the analysis of the cost effectiveness of publicly-supported employment programs (Willis and Saunders 1988; Lenihan 1999). Program-generated employment figures are used and adjusted downwards to account for
TABLE 2. THE ESTIMATION FRAMEWORK

Step 1. Estimate Net Employment Account (Cost Effectiveness Analysis)

\[ \text{NE} = \text{TE} \left(1 - w - (1-w)\text{d}\right) \text{me} \]

**Variable Definitions:** \( \text{NE} = \) net employment; \( \text{TE} = \) total employment

**Parameter Definitions:** \( \text{me} = \) employment multiplier (1.66); \( w = \) dead-weight rate (0.24); \( \text{d} = \) displacement rate (0.64)

Step 2. Estimate Opportunity Costs Model

\[ Y_i = \alpha + \beta_1 \text{MART} + \beta_2 \text{EDUC} + \beta_3 \text{SEX} + \beta_4 \text{AGE} + \beta_5 \text{AGESQ} + \beta_6 \text{UNEMP} + \epsilon \]

**Variable Definitions:** \( Y_i = \) monthly wage for the individual in income group \( i \), \( \text{MART} = \) binary dummy variable for marital status (the reference group is ‘married’), \( \text{EDUC} = \) binary dummy for higher education (the reference group is ‘university educated’), \( \text{SEX} \) (reference group is ‘female’), \( \text{AGE} \) (in years) and \( \text{UNEMP} = \) unemployment rate at the individual’s place of residence.


\[ \text{NPV} = \left[ \left( \text{NE}.Y.\tau_i + Rm_\nu(v)\right) \cdot \left[ L \left( 1 + \beta_j + \delta_l + \alpha \right) + G \left( \delta_g + \alpha \right) + Rm_\nu(\lambda) \right] \right] \]

**Variable Definitions:** \( \text{NE} = \) net employment; \( \text{TE} = \) total employment; \( Y = \) monthly wage; \( R = \) revenue; \( L = \) loan value; \( G = \) guarantee value

**Parameter Definitions (values in parentheses):** \( \text{me} = \) output multiplier (1.77); \( \alpha = \) administration cost (0.012); \( \beta_j = \) default rate by year \( j \) (\( j = 1...3; \beta_1 = 0.10, \beta_2 = 0.07, \beta_3 = 0.048 \)); \( \nu = \) value added tax (0.17); \( \lambda = \) tax raising cost (0.006); \( \tau_i = \) labor opportunity costs by income group \( i \) (\( i = 1...3; \tau_1 = 1.00, \tau_2 = 0.50, \tau_3 = 0.25 \)); \( \delta_l = \) opportunity cost of loans (0.03), \( \delta_g = \) opportunity cost of guarantees (0.05).

The above factors. The derivation of the estimates for these deadweight and displacement parameters is dealt with in Felsenstein and Fleischer (2000).

Once a reliable estimate of net employment has been distilled from the initial figures of total employment, the next issue is to convert this job gain into wage gain and to distribute this gain across wage groups. All this wage gain cannot be treated as ‘new’ and it must be adjusted downwards on the basis of the opportunity costs of different wage groups. In addition, the weighting scheme used for the adjustment needs to be justified. Step 2 in the framework outlined in Table 2 provides this justification. A model is set up that links wages with a host of socioeconomic variables including unemployment. Opportunity cost
theory holds that high unemployment areas will be characterized by lower reservation wages or opportunity costs, at all skill levels (Jones 1989). Assuming the link between unemployment and wages is consistent and stable, the coefficients of the model will allow a direct estimate of the extent to which opportunity costs are lower in high-unemployment areas. Once this is established for one wage group in a peripheral area, the opportunity cost adjustment for the other wage groups is then scaled accordingly 1.

The final stage involves assembling a benefit-cost account that attempts to measure in common currency both market and non-market effects (Step 3, Table 2). A major premise here is that employment created is treated as a benefit and not a cost. This argument has been fully developed elsewhere and is couched in terms of the ‘job chains’ that the creation of a new job triggers-off in the labor market (Felsenstein and Persky 1999) 2. The welfare benefit of this job is the sum of all the incremental gains at each link in the chain. Benefits include opportunity-cost adjusted wages arising from new employment and taxes from business revenues stimulated. Costs comprise administrative costs for the program, defaults, opportunity costs of capital, and tax raising costs 3. These elements are summarized in Step 3 of Table 2.

**Empirical results.** Table 3 presents the results of the employment account. As can be seen, the net employment estimate is only 45 percent of the gross employment. Much of this reduction is due to the displacement effect, which on average is 64 percent. This is because of the service-sector orientation of much of the assisted activity which is more likely to serve local markets and displace existing economic activity. The total net employment sums to less than 1,000 jobs whose wage gains form the basis for the calculation of the welfare effects.

The summary results for the cost-benefit analysis are presented in Table 4. Type of location is now presented as three categories with peripheral location, subdivided into ‘small towns’ and ‘rural villages’. This facilitates a more detailed look at the geography of welfare impacts and distributional consequences of REP support. As expected, the results show that the program easily passes a cost-benefit test. A five-year lifetime is assumed for a REP-generated job. As REP assistance can be viewed as public investment through

### Table 3: The Employment Account

|                      | Cities | Small Towns | Rural Villages |
|----------------------|--------|-------------|               |
| Total (Gross) Employment | 724    | 885         | 413           |
| Adjust for Deadweight (1-w) | 550    | 673         | 314           |
| Adjust for Displacement (1-w - (1-w)d) | 198    | 242         | 113           |
| Net Employment (1-w - (1-w)d m_e) | 329    | 402         | 188           |
| N                    | 195    | 171         | 77            |
the medium of the private sector, the survival of the jobs generated by public policy is an issue in determining benefits (Mensah 1996). The longer the time span the larger will be the benefits of public support. Using a 5 percent discount rate, it can be seen that NPV values are well above 1.0 for all types of locations⁴. Net present values are highest for small towns, followed by the villages and then the cities. Most assistance in gross volume terms went to the small towns and thus gross volume of net benefits is highest there. The B-C ratio is highly positive for all locations ranging from 2.9 to 4.1. This seems to indicate that the fund is well targeted and may be reducing the information asymmetries that make peripheral firms more risky to lenders. However, this is hardly surprising as the program disburses loans which have to be repaid, the default rate is relatively low and the estimation approach used here counts wages on the benefits side, which means that benefits are stressed. This focus is justifiable however, in view of the welfare remit of the program.

The present values of direct and indirect jobs are also estimated (Table 4). Assuming the employment created has a five year life-span, regional benefits ranging from $22-26,000 per total (direct and indirect combined) job and $37-43,00 per direct job, can be expected. This represents the local wage and tax benefits and is highest in gross terms in the small towns followed by the villages and then the cities. Again, this indicates that the program does seem to be
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successfully reaching its target population and creating the greatest benefits in these communities.

The real issue however is not gross benefits created in the different types of location but the change in the wage distribution induced by the program. If the program has a real welfare impact it would be expected that this change would favor the less advantaged workers in the small firm population. Therefore it needs to be shown that the program elicits positive changes in the wage distribution in peripheral areas. Table 5 shows the wage distribution across three wage groups ranging from Group 1 (lowest wage) to Group 3 (highest). Detailed wages data by geographic location was obtained from the National Insurance Institute data file and was imputed by the national sectoral averages to give a wage by location by sector figure (see Felsenstein and Fleischer 2000 for complete details). Non-adjusted wages sum to nearly $37m with 43 percent of that figure going to the small towns, 38 percent to the cities and 19 percent to the rural villages (Table 5). Once the opportunity costs of labor are taken into consideration, these proportions change. In total, overall wages that are truly

<table>
<thead>
<tr>
<th>Wage Distribution</th>
<th>Cities</th>
<th>Small Towns</th>
<th>Rural Villages</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Non-Adjusted Wages ($m)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group 1</td>
<td>–</td>
<td>0.87</td>
<td>0.89</td>
</tr>
<tr>
<td>Group 2</td>
<td>6.08</td>
<td>12.87</td>
<td>4.60</td>
</tr>
<tr>
<td>Group 3</td>
<td>7.78</td>
<td>2.19</td>
<td>1.52</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>13.86</td>
<td>15.94</td>
<td>7.01</td>
</tr>
<tr>
<td><strong>Adjusted Wages ($m)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group 1</td>
<td>–</td>
<td>0.87</td>
<td>0.89</td>
</tr>
<tr>
<td>Group 2</td>
<td>3.04</td>
<td>6.43</td>
<td>2.30</td>
</tr>
<tr>
<td>Group 3</td>
<td>1.94</td>
<td>0.54</td>
<td>0.38</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>4.98</td>
<td>7.84</td>
<td>3.57</td>
</tr>
<tr>
<td><strong>Welfare Change (%)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage before adjustment</td>
<td>–</td>
<td>5.47</td>
<td>12.69</td>
</tr>
<tr>
<td>Percentage after adjustment</td>
<td>–</td>
<td>11.10</td>
<td>24.95</td>
</tr>
<tr>
<td>∆</td>
<td>–</td>
<td>+5.63</td>
<td>+12.26</td>
</tr>
<tr>
<td>Group 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage before adjustment</td>
<td>44.00</td>
<td>81.00</td>
<td>41.34</td>
</tr>
<tr>
<td>Percentage after adjustment</td>
<td>60.00</td>
<td>82.00</td>
<td>64.00</td>
</tr>
<tr>
<td>∆</td>
<td>+16.00</td>
<td>+1.00</td>
<td>+22.66</td>
</tr>
<tr>
<td>Groups 1 + 2</td>
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<td></td>
</tr>
<tr>
<td>Percentage before adjustment</td>
<td>–</td>
<td>86.22</td>
<td>78.23</td>
</tr>
<tr>
<td>Percentage after adjustment</td>
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<td>93.01</td>
<td>89.32</td>
</tr>
<tr>
<td>∆</td>
<td>–</td>
<td>+6.79</td>
<td>+11.09</td>
</tr>
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</table>
attributable to the program are reduced by 55 percent to $16.4m. The resultant distribution across the different types of location shows that the more peripheral areas gain at the expense of the cities; the weight of the small towns in the wage distribution rises to 48 percent and that of the villages to 22 percent. This is at the expense of the cities whose relative size in the distribution drops from 38 to 30 percent. The most significant welfare change is expected to be within the wage groups themselves. Here the estimates provide support for the hypothesis that the more peripheral the location, the more REP assistance would be expected to elicit a welfare change. Looking at the lowest wage workers pre- and post-adjustment, it can be seen that the welfare effect in the villages (+12.26 percent) is more pronounced than in the small towns (+5.6 percent change). The hypotheses also lead to the belief that the welfare change in the small town sector would be greater than in the cities. However, due to an absence of lowest wage earners (Group1) in small firms in the cities, there is not data to test this proposition. Combining Groups 1 and 2 gives similar results, although with less pronounced changes before and after adjustment.

Looking at the medium wage earners (Group 2), it can be seen that the welfare change of largest magnitude was again in the rural villages (+22.6 percent), followed thus time by the change in the cities. This result is somewhat a misnomer due to the fact that amongst the small firms located in cities there is no representation of the lowest wage group and thus the medium group gains at the expense of the highest wage group for whom opportunity costs are also highest. In sum, the real welfare effects would seem to occur (as hypothesized) in those locations where information asymmetries, and hence market imperfections, are likely to be most pronounced. Those firms located in the rural villages are likely to suffer the most discrimination and have the least access to banks or other sources of information circulation and exchange.

Conclusions and Policy Implications

The above analysis has shown that a targeted program can cause change in the wage distribution in disadvantaged areas. This would seem to support the welfare effects of targeted public policy. As noted earlier, REP-type programs can be perceived as a form of public investment in entrepreneurship that is executed through the medium of private firms. As such, it is a ‘second-best’ or indirect public investment whose success is bound up with the survival of the firm (Mensah 1996).

This raises the question of the efficacy of this form of public investment. Could the information asymmetry and market imperfections that justify this public intervention, be addressed in an alternative way that is not based on second-best decision rules? Alternatively, could direct public investment in ICT infrastructure address the problem of information asymmetry and obviate some of the effects of credit market failure grounded in physical distance?
The literature on ICT utilization by small firms provides some initial insights. While much of this work looks at information technology as a way for increasing market share for firms located in peripheral areas, mention is often made of ICT easing the credit barrier in the growth of peripheral firms (Clark et al. 1995; Ilbery et al. 1995). Both of these issues are inherently problems of limited information. In the case of market share, the use of ICT generates greater visibility for the small firm, increasing both its internal flexibility and its external competitiveness (Levy and Powell 1997). In the case of the credit gap, there seems little a priori reason why ICT should not fulfill the same role. The use of information technology by small firms should increase their visibility to financial institutions and thereby increase their chances in the credit market. Recent work by Petersen and Rajan (2000) seems to support this contention. Over the last two decades, small firms have steadily increased their ability to obtain credit from geographically distant institutions, implying that peripheral location is becoming less of a disadvantage in access to capital. They interpret these findings as reflecting the increasing role of ICT in reducing information asymmetries between banks and small firms and increasing productivity on the part of credit institutions—again the result of widespread adoption of ICT.

It would therefore seem that ICT can make a difference in the area of small business credit that traditionally has been both informationally and geographically sensitive. ICT, however, does not just breach the information gap, it also changes the way the business of borrowing is transacted. On the one hand, it impersonalizes the act of gaining access to capital, downplaying the role of personal contacts with local bankers and stressing the technical functions that can be routinely performed by communications technology. On the other hand, it forces greater exposure of the small entrepreneur. Technologies that effect this change in level of visibility are the Internet which helps the small firm generate exposure, electronic data interchange (EDI) which allows the financial institution greater information for decision-making, and direct on-line access which would increase the flow of information between the small firm and the bank.

The question then arises whether discrimination exists against peripheral small firms in their access and use of these forms of ICT. Some see ICT developments as the great equalizer. If ICT allows peripheral firms greater access to financing this can lead to more competition, innovation, and opportunities for those previously subject to discrimination (Petersen and Rajan 2000). Others suggest the existence of a digital divide within the small firms population in general (La Rovere 1998), and between small urban and rural firms with respect to certain types of information technologies such as the Internet, in particular (Premkumar and Roberts 1999; Smallbone and North 1999). This is ascribed to the less developed technology infrastructure in peripheral areas and to the cost of delivering effective ICT service and support.
to remoter locations. Alternative evidence, however, implies that the digital divide separating the technology ‘haves’ from the ‘have-nots’, is not between the cities and the peripheral areas. Rather, it exists within the large urban agglomerations themselves, separating those populations with easy access to ICT from those disadvantaged inner city communities with little access (Glaeser 1994). Geographic proximity does not seem to be an issue here: Wall Street and the South Bronx form a single contiguous geographic area but are totally separate worlds in terms of access and use of ICT.

The costs and benefits of targeted capital programs versus an ICT-based approach to alleviating the credit gap, need to be compared in a systematic framework. Little work exists on this issue and this is a challenge for future research. The empirical findings presented above have suggested that targeted credit programs do make a difference in terms of welfare effects and redistribution. Public policy encouraging the use of ICT amongst small firms may well achieve similar results in terms of generating visibility and mitigating some of the worst excesses of information asymmetry. While they may encourage market forces to operate more efficiently, what is less certain, however, is whether the welfare effects will be similar. With evidence increasingly showing unequal uptake and diffusion of information technology amongst small firms, great care is needed to ensure that the promotion of ICT does not serve to further marginalize already marginal small firms.

NOTES
1. The justification for these weightings has been dealt with at length elsewhere (Felsenstein and Fleischer 2000). The approach adopted here is to use opportunity cost theory that links the level of unemployment to reservation wage levels (Jones 1989). Reservation wages are often used empirically to measure opportunity costs and represent the minimum compensation necessary for entering employment. Empirical studies have estimated these as close to the actual wage, although variation exists in the actual estimated levels (Gordon 1973; Jones 1989; Sridhar 1996). Reservation wages and opportunity costs also vary considerably across skill levels. High skilled jobs will have high opportunity costs. At this level, labor markets are likely to clear at wage levels close to national levels. Low skilled jobs on the other hand will have low opportunity costs. For this labor, few alternatives exist short of welfare or transfer payments. Labor markets are not likely to clear nationally or regionally.

From the above it follows that high unemployment areas will be characterized by lower reservation wages or opportunity costs, at all skill levels. The empirical question is to estimate the size of the adjustment that accounts for local unemployment levels. To this end, a link needs to be established between local wages and local unemployment rates. Based on wages data taken from the National Survey of Income data file for 1994, a model is estimated as follows:
This model regresses a host of socioeconomic attributes on monthly wages. The most significant attribute is the highly significant and negative effect of local unemployment. This result is stable and consistent across all alternative and reduced forms of the model. It suggests that an increase of 1% in unemployment results in a reduction of $44 in wages. Over the period of the analysis, the study regions had an unemployment rate of 12% which was 8% higher than the national average. This translates into a monthly wage reduction of some $362, over 25% of the average wage at the time.

The implications of this are that while at the highest wages levels, reservation wages equate actual wages nationally, in the distressed areas under study here, they are in fact some 25% lower. Having established this link between unemployment levels and wage levels for the highest income group (Group 3), we simply scale the income adjustment for the two lower income groups accordingly. For Group 2 it is assumed that reservation wages are 50% of actual wages and therefore half of all income gain can be credited to the program. For the lowest income category (Group 1), it is assumed no employment alternatives exist (zero opportunity cost) and thus all program generated income is given full credit.

2. The ‘chain’ model of local labor markets characterized by unemployment describes a situation whereby a worker’s move into new job A, frees up a previous job (B) to others. When a worker moves up the jobs ladder, s/he opens up opportunities all down the ladder as a ‘musical chairs’ reaction is set in motion. As long as the chain is not truncated (by in-migrants, new entrants, or simply job destruction), this ripple-through effect will continue down to the bottom rung. At each step up the chain, workers move closer to their fully employed status.

3. It should be noted that there may be additional social costs in the case where firms’ net profits are less than the subsidy. However, in the absence of data on net profits to firms in the program, it was not possible to take this into consideration.

4. Ten-year estimates are available on request from the authors

REFERENCES


