

# Factors Influencing Take-Up Rates on the Loan Guarantee Scheme

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**ABSTRACT.** This paper uses time-series analysis to model explicitly the take-up rate of the UK Government's Loan Guarantee Scheme over the 1980s. In doing so we consider the rationale for the scheme in the context of empirical and theoretical research into the financing of small businesses and in particular the nature of the small firm/bank relationship. To begin we discuss the history and evolution of the scheme from its inception in 1981. A theoretical model is then outlined in which LGS funds are used to maximise the utility of capital constrained entrepreneurs.

Using this framework we find that the UK Government can do much to influence the levels of both take-ups and failures of firms on the scheme by directly altering the parameters. The scheme's apparent success as a [relatively] cost-effective job generation package suggests more could be done to extend the scheme to aid more start-up firms and those existing firms wishing to expand.

**KEY WORDS.** Finance, loan guarantee scheme, small firms

## Introduction

### Introduction

The Loan Guarantee Scheme (LGS) was introduced in June 1981 on a pilot basis and has maintained a key role in the government's small firms strategy ever since.<sup>1</sup> Since its inception, the LGS has undergone a series of adjustments in its operation and eligibility criteria. Accordingly the "success" of the scheme has also fluctuated over time. The most recent changes to the scheme were implemented in June 1993. This paper seeks to look at the likely impact of these changes in the light of the past performance of the scheme, and more importantly, consider the likely role the Scheme can play in future small firms policy.<sup>2</sup>

## About the loan guarantee scheme

### 1.1. Why a loan guarantee scheme?

There exists a long standing belief that the financial markets – the "Big Four" high street lending banks in particular – do not fully serve the needs of the UK's Small and Medium Sized Enterprises (SMEs).<sup>3</sup> The Wilson Committee (1979) found that raising finance remained a problem for both the smallest firms and business "start ups". The Committee stated that despite the clear additional risk a bank was taking in lending to small firms, the interest rate premium of an average 2 per cent placed on a small firm loan over and above the rate charged to a large firm was unduly excessive. The Committee recommended the introduction of some form of government based guarantee scheme, stating:

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- (a) "The first [justification of such a scheme] would be if there were reason to believe that competition between the banks in this area was insufficiently ineffective to ensure that viable small businesses always had the necessary access to sufficient funds on reasonable terms."
- (b) "The second [justification] would be it were felt that the public return from the activities of small firms was greater than the private benefit because of for example, their importance to job creation. In the latter case it would also follow, that some public subsidy was justified"<sup>4</sup>

The conclusions of the Wilson Committee led directly to the formation of the Loan Guarantee Scheme, whereby the government guaranteed a high proportion of a small firm loan obtained from a participating bank. In return, that small firm pays to government an interest rate premium at a rate

Final version accepted on November 15, 1994

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additional to the bank's own "base-plus" small firm rate.

The National Audit Office (1988) thus identified three stated government objectives for the scheme. Firstly, to facilitate an increase in the numbers of both business start-ups and expansions by bridging the "equity gap" between bank and firm. Secondly, to encourage banks to change their lending "culture" i.e. to shift the basis of their lending decisions from the available security and assets of the small business and instead to look more carefully at actual business *prospects*. As such, the LGS was intended to have a far more wide ranging impact than simply the quantity and value of guaranteed loans alone. Finally the scheme was introduced to provide a cost-effective job/wealth generation package.

Before considering the actual operation of the scheme, it is worth briefly considering in more detail the economic rationale underpinning the perceived need for intervention in the financial markets.

### 1.2. *The lgs and the financial markets*

SMEs obtain finance from a variety of sources including personal contacts, family, commercial sources and from the public sector via grants and "soft" loans. Finance can be obtained in the form of either equity or debt. For small firms, however, there has long been perceived difficulties in obtaining equity finance, particularly in amounts of less than £100,000.

Such difficulties frequently stem not so much from market 'failure' but rather from an information asymmetry between investor and entrepreneur. For example, the investor's costs in evaluating and appraising the project are often high and fixed. Thus from the investor's point of view potentially profitable projects become increasingly marginal once these costs are taken into consideration. Furthermore, ex ante principal-agent problems may arise as the investor seeks to monitor the actions of the entrepreneur.<sup>5</sup> Thus 'market failure' in the provision of equity finance often results from prohibitive costs facing an entrepreneur in trying to obtain equity finance coupled with a lack of awareness of equity sources.<sup>6</sup>

Thus whether on grounds of cost or for reasons

of market 'failure', equity finance is often beyond the reach of small firms; consequently debt finance becomes the primary source of capital. Again, however, an asymmetry is present – the lender having to accept all of the downside risk in the event of default<sup>7</sup> whilst, in the event of firm success – gaining none of the additional returns.

One response is for the lender (bank) to adjust interest rates to reflect risk, with above average risk projects being charged above average interest rates at least up to an upper limit (of risk). However, it may be the case that the bank cannot evaluate each individual project fully, whilst borrowers may know more than the potential lender about the risk inherent in their project. Thus, the lender may well respond to discovering that a portion of its lending portfolio is unprofitable by raising interest rates for an entire subset of loans. Furthermore, an entrepreneur who has successfully acquired finance for what is in reality a risky project has an ex ante incentive to further his potential returns against that loan by subsequently increasing the risk-return pay off. The increased risk of the [unlikely] increased returns being borne by the lender. Again the bank responds to this threat by raising interest rates to compensate for the risk of future defaults.

Thus the bank is said to respond to these two problems of adverse selection and moral hazard by "credit rationing", which in part implies setting interest rates such that demand for bank funds exceeds supply.<sup>8</sup>

### 1.3. *Empirical evidence*

Recent work on the bank/small firm relationship has tended to focus on the cost of finance and the role of loan collateral. However, as Cowling, Samuels and Sugden (1991) point out in their survey of relatively established small businesses, interest rate premiums on small business loans averaged less than 3 per cent over base rates which, the authors concluded, were hardly grounds for serious concern. Potentially more significant were collateral ratios which averaged around 2 times the loan value, results which are consistent with Keasey and Watson (1992) and Binks *et al.* (1988), who identified collateral requirements as a significant constraint on the ability of small businesses to borrow. Evidence such as this suggests

that for relatively established small businesses the ability to finance growth may well be constrained by the fact that their assets are tied up with existing loans.

For start-up businesses the problem is associated with the risk-return relationship. As Hutchinson and McKillop (1992) correctly point out, the relationship between the return that can be anticipated on an investment project and the risk surrounding the future viability of that project lie at the very core of the small business/bank relationship. Indeed, evidence from a tracking exercise of start-up businesses reported in Cressy (1993) suggest that there is a high incidence of default amongst such firms. Clearly more risky projects that are less likely to generate positive profits will attract higher interest rate margins to reflect this added risk to the bank. Thus for start-up firms the interest rate premium may be a significant constraint on their ability to raise bank finance.

It is with these issues in mind that the Department of Trade and Industry launched the LGS with the intention of "filling-in" gaps in the availability of loan finance for SMEs in the UK.

#### 1.4. The operation of the scheme

Under the LGS, a government guarantee is given on loans which the lender thinks are potentially viable but which do not meet normal lending criteria. Applications for LGS loans are made directly to participating banks who assess the viability of the proposed project. Final approval is then given by the department responsible, currently the DE. The borrower pays a premium to the DE that is additional to payments made to the lender. In the event of default, the bank is able to "call in" the proportion guaranteed by the government. The recovery of a defaulter's assets is the responsibility of the bank with a proportion of asset values equivalent to the loan guarantee going to the government.

For convenience the twelve years of the scheme's operation can be broken down into six broad time segments, reflecting adjustments in either the two parameters of the scheme (proportion of the loan guaranteed and interest rate premium) or in the LGS's rules and eligibility criteria.

TABLE I

| Phase | Duration             | Loan Guaranteed  | Premium (%) |
|-------|----------------------|------------------|-------------|
| I     | June 1981–May 1984   | 80               | 3           |
| II    | June 1984–Dec 1984   | 70               | 5           |
| III   | Jan 1985–March 1986  | 70               | 5           |
| IV    | May 1986–March 1989  | 70               | 2.5         |
| V     | April 1989–June 1993 | 70               | 2.5         |
| VI    | July 1993–           | 85 <sup>10</sup> | 2.5         |

#### 1.5. Adjustments to the LGS<sup>9</sup>

In addition to the above adjustments, the guidelines and eligibility criteria has also been adjusted over time. Examples of such adjustments include: –

- (i) From 1982 onwards, guidelines have made clear that banks cannot use the LGS scheme to reschedule debts, i.e. placing potential bad debts onto the scheme.
- (ii) Since 1983 borrowers under the LGS must be able to persuade the lender that they have a personal significant stake in ensuring the business is a success. Commitment of this type being either financial or more subjective, for example, future earnings foregone to go into full time self-employment.
- (iii) The additional emphasis in 1984 (and further in 1985) placed on the need for applicants to full commit personal assets before being eligible for consideration of an LGS based loan.
- (iv) Since 1985 there has been a requirement for borrowers to submit a structured business plan and also to provide quarterly accounts. However, NERA (1990) found that in a sample of 104 LGS cases, only 55% of submitted business plans reached what independent consultants considered to be an "acceptable standard".
- (v) In July 1993 the maximum size of eligible loan was raised from £100,000 to £250,000 and the scheme emphasised the advantages to firms taking part in the scheme of obtaining their loan on fixed rate terms by reducing the interest rate premium to firms taking out fixed interest rate loans.

In terms of eligibility, there is a stated overriding limit of 200 employees although other factors such as turnover, numbers of outlets and vehicles are also taken into consideration under various circumstances.

As a response to criticism about where the loans were going, a minimum loan size of £5,000 was introduced in 1993 and a number of business activities became ineligible for LGS funds.<sup>11,12</sup>

### 1.6. Take up and default rates

Figure 1 highlights the substantial variation in the average number of loans authorised in the period up until 1992 (3rd quarter). The level of use of the scheme peaked at its highest level of over 500 loans issued per month during 1982, and fell below 40 loans per month in 1986. Although the average number of loans issued since then has remained somewhat higher than this low point, the average size of loan has tailed off considerably; from a little over £50k in 1986/87 to £25k in 1990/91<sup>13</sup> as the proportion of loans granted under £15 k steadily grew.<sup>14</sup>

Figure 2 graphs the two year default rate of the scheme<sup>15,16</sup>. Default rates appear high, however given the lack of a matched sample of firms allowing a comparison of LGS assisted and non-assisted firms together with a lack of detailed data concerning commercial banks' lending successes and failures to the small firm sector, it is impossible to accurately compare the relative performance of firms utilising resources made available under the LGS. A broad comparison can be made via analysis of VAT statistics which suggest that a failure rate of 40% over the first seven years of a loan (almost 50% of LGS loans going to new

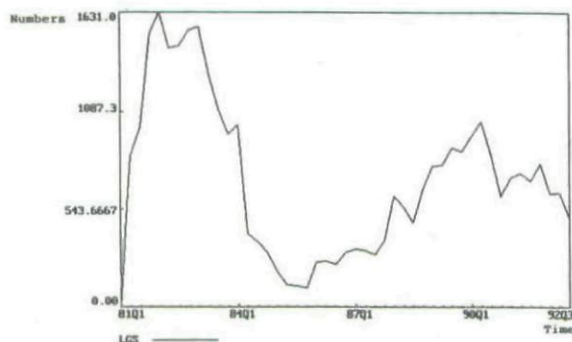


Fig. 1. Take-up of LGS-backed loans 1981–1992.

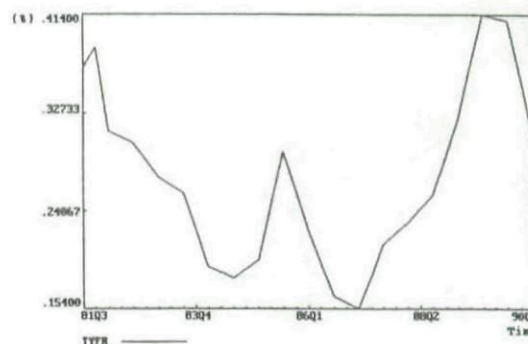


Fig. 2. The proportion of LGS-backed loans failing within 2 years of take-up.

ventures) is not significantly different than the failure rate of either new or established, small businesses,<sup>17</sup> despite the fact the LGS was intended for firms *unable* to meet the normal criteria for receiving bank funds because of a perceived "higher risk".<sup>18</sup>

### 1.7. Cost of the scheme

Of course, the failures of ventures set up under the LGS is at direct cost to the Exchequer, though the on-going nature of the scheme makes it difficult to assess total costs and revenues. However, up to the end of March 1993, over 33,000 loan guarantees had been issued with the total value of lending being £1011 million. Initially it was hoped that the scheme would be self-financing, with income from premiums exceeding defaults. The higher than estimated failure rate<sup>19</sup> has meant the scheme since its inception *has* been at a net cost to the Exchequer of a £138.5m.<sup>20</sup> Although there are no statistics collected concerning the actual numbers of jobs created, a review of the scheme undertaken in 1988 by the National Economic and Research Associates (NERA, 1990) found that in a sample of 106 LGS backed firms (start-up and existing) 310 full-time equivalent jobs were generated in the first year. Thus the official estimate of the cost of the LGS per person leaving the unemployment register is £450.<sup>21,22</sup>

Despite the scheme's apparent cost-effectiveness, the level of take-up has been low. During the initial phases the take-up of almost £500m of the above total lending was far in excess of expectations.<sup>23</sup> Tightening up of the rules, how-

ever, dramatically reduced demand. The subsequent relaxation under Phase IV of the scheme was expected to see the level of lending rise to £90m in 1986–7 for example. In fact the actual lending in this period was only £40m whilst the next two financial years saw lending under the scheme total £46m and £64m respectively, well below the forecast of around £130m per year. Below we aim to outline the quantifiable factors which have influenced the take-up of the LGS lending and to what extent the government can continue to use the scheme as an integral part of its “industrial strategy”.

### Theoretical framework and variable selection

With the task in mind, we can place the selected variables in one of two very broad categories, namely:

#### *Financial variables*

There is a large volume of literature dealing with the role of interest rates and collateral within the framework of small firm/bank lending contracts. The focus of the majority of these studies is the nature of the information asymmetries implicit in the relationship, see for example Sharpe (1990) and Besanko and Thakor (1987). Consequently the development of bank contingency contracts involving the posting of collateral play a major role. Empirical studies such as Binks *et al.* (1988) and Cowling *et al.* (1991) point to the potential for collateral requirements to constrain small firm borrowing. Black, de Meza and Jefferies (1992) report that a 10% rise in the value of owner-occupied housing stock leads to a 5% increase in new VAT registrations. At the self-employed level, Cowling, Mitchell and Creigh (1993) also identify house prices as a positive influence on self-employment. This suggests that collateral has an extremely important role to play in the financing of small businesses.

With respect to interest rates, both Robson (1991) and Cuthbertson and Hudson (1990) report that business survival falls as interest rates rise. Empirical evidence from Robson (1992) suggests that real interest rate rises have a negative effect on the rate of new VAT registrations and a positive effect on deregistrations over the 1980s. Certainly

the role of interest rates and collateral have been identified in both the theoretical and empirical literature as important determinants not only in the rate of new business formation but also in the survivability of existing businesses. Indeed, the Cambridge (1992) study argues that the availability and cost of finance for expansion is the key constraint for fast-growth and newer firms.

With this in mind we consider housing variables and other net financial wealth variables in addition to LGS specific parameters when investigating take-up rates. Our intention being to pick up potentially influential factors relating to new firm formation and potential constraints on the ability of existing firms to finance expansion.

#### *Demand – supply and cyclical variables*

In the short-run changes in economic activity are likely to feed through into self-employment and small businesses via demand-side effects. A cyclical upturn for instance, will increase the demand for self-employed labour and also for the products and services offered by smaller businesses. However, the flexible nature of small businesses means that, *ceteris paribus*, short-run cyclical changes are partially absorbed by increases or decreases in hours worked. This tendency will partially offset demand-side influences, making small businesses less responsive to such short-run changes.

The supply-side is somewhat more controversial, and is characterised by contrasting views on what factors generate the supply of people choosing self-employment or entrepreneurship as an employment option. Bogenhold (1985) identifies two opposing recruitment channels into self-employment, the desire for autonomy and economic necessity. There is a volume of literature that supports the recession-push hypothesis, see for instance Evans and Leighton (1989) and Storey and Johnson (1987), yet more recent work by Cowling *et al.* (1993) refutes the recession-push hypothesis, arguing that unemployment reduces flows into self-employment.

For existing businesses demand-side effects are likely to reduce the desire for firms to invest in new capacity. In this respect periods of low demand and high unemployment are likely to be characterised by a reduction in the demand for

investment capital from firms, although at the same time it is likely that the demand for working capital will rise as firms' cash-flows become squeezed. The role of expectations may be important for such businesses. At the tail end of recessions firms may be looking to invest in new capacity to cope with anticipated increases in demand, yet their existing asset bases may be diminished. Thus for such firms the capital constraint may be strong, particularly as banks tend to ration credit well into the early stages of an upturn in the economy.

### 2.1. Theoretical model

The specified model has its roots in basic utility theory in as much as individual or groups of entrepreneurs take decisions based on a desire to maximise their utility. To this end we assume that entrepreneurs will choose to start-up or continue in business if the utility they derive from doing so exceeds the utility derived from other alternatives. In this paper we assume the alternatives to be waged employment or unemployment. We neglect the influence of social utility such as the utility gained from being one's own boss due in part to difficulties in measuring such abstract issues and in part because this type of business person tends not to borrow and is content to replace a wage with an equivalent entrepreneurial income.

For our purposes we assume that entrepreneurs are motivated by the financial returns to being in business. As such entrepreneurs are assumed to earn a net income of  $Y$ , per time period, where :

$$Y = [b Q(K^*, \theta, \delta) + (1 - b) Q(K, \theta, \delta)]$$

where  $b = 1$  if firm/entrepreneur is unconstrained in the capital market and  $b = 0$  if constrained.

where  $K^*$  is optimal capital and  $K$  sub-optimal and,  $rK = f(k_b + K_{ocof})$  this reflects both the real cost and the economic cost.

where,  $K_b$  = bank borrowing and  $K_{ocof}$  = (opportunity of using) own savings

Here,  $Q$  is real business revenue which is positively related to  $K$ , the amount of capital invested in the business and  $\theta$ , which is the entrepreneur's ability to effectively manage the firm's resources, both financial and human capital.

$\delta$  is a demand parameter, and as such is also positively related to  $Q$ .

If capital is perfectly rationed to the particular business then:

$$K = \text{own savings or } K = K_s$$

Where capital is not rationed:

$$K = \alpha K_s + \beta K_b, \text{ where } K_b = \text{borrowing.}$$

It is important to note here the assumption that businesses of this size can only borrow externally from banks. Banks are assumed to pursue collateral based lending policies, hence the justification for the LGS. Implicit in our analysis is that banks are willing to lend under the LGS as the government acts as the guarantor for a large proportion of the loan, thus circumventing the problem of collateral. Given the LGS lending is a miniscule proportion of total bank lending to small businesses this is not an unfair assumption.

If an entrepreneur is rationed due to a lack of collateral then:

$$Q < Q^*, \text{ where } Q^* = \text{profit maximising revenue.}$$

This is achieved when the firm reaches the MES, and assumes a competitive market environment i.e. the firm can sell all its output at the ruling market price.

That is to say that a business can start-up or continue in existence, but due to a less than optimal level of capital input will not be able to reach an efficient level of operations, and as such will always be at a relative disadvantage vis a vis unconstrained businesses.

$Q$  is related to a demand parameter,  $\delta$ , so that in periods of high demand (economic booms) revenue will be less affected by a lack of capital. Thus:

$$Q_r < Q_b \leq Q^*$$

where,

$$Q_r = \text{Net revenue in economic recessions.}$$

$$Q_b = \text{Net revenue in economic booms}$$

$$Q^* = \text{Profit maximising revenue.}$$

$\delta$ , the demand parameter, has both a macro component, determined by the general level of demand in the economy, and a firm specific component, of

mean zero, which is determined by the individual's human capital. Thus:

$$\delta = v + \xi; \text{ where } \Sigma \xi = 0$$

We note here that human capital and financial capital are interlinked, and to some degree are substitutable.

Thus we can derive an optimal level of capital,  $K^*$ , such that:

$$\Pi = \theta K^\alpha + \delta - rK$$

$$\pi_k = \theta \alpha K^{\alpha-1} - r = 0 \Rightarrow K^{\alpha-1} = \frac{r}{\theta \alpha}$$

$$\begin{aligned} K^* &= \left( \frac{r}{\theta \alpha} \right)^{\frac{1}{\alpha-1}} = r^{\frac{1}{\alpha-1}} \left( \frac{1}{\theta \alpha} \right)^{\frac{1}{\alpha-1}} = r^{\frac{1}{\alpha-1}} A \\ &= \left( \frac{r}{\alpha} \right)^{\frac{1}{\alpha-1}} \cdot \left( \frac{1}{\theta} \right)^{\frac{1}{\alpha-1}} = \left( \frac{r}{\alpha} \right)^{\frac{1}{\alpha-1}} \theta^{\frac{1}{1-\alpha}} \\ &= \beta \theta^{\frac{1}{1-\alpha}} \end{aligned}$$

the sign of the derivative w.r.t 'r' is obtained as follows:

$$K^* = \frac{1}{\alpha-1} r^{\frac{1}{\alpha-1}-1} A < 0 \text{ for } 0 < \alpha < 1, A > 0$$

and where:

$$A = (\theta \alpha)^{\frac{1}{1-\alpha}}$$

the sign of the derivative w.r.t 'θ' is obtained as follows:

$$K^* = \beta \left( \frac{1}{1-\alpha} \right) \theta^{\frac{1}{1-\alpha}-1} > 0 \text{ for } 0 < \theta < 1$$

$$\frac{\partial K^*}{\partial r} < 0, \frac{\partial K^*}{\partial \theta} > 0, \frac{\partial K^*}{\partial \delta} = ?$$

$$\beta = \left( \frac{r}{\alpha} \right)^{\frac{1}{\alpha-1}}$$

Here, the optimal level of capital is decreasing in r (interest rates), increasing in θ, and indeterminate in δ.

To be eligible for the Loan Guarantee Scheme the entrepreneur must be constrained in the capital

market by a lack of available collateral. That is, no business assets are available with which to post as security on a bank loan.

Thus, as previously stated:

$$\dot{K} = K_s$$

and,

$$K_s < K^*$$

We also allow for firms who cannot borrow the optimum amount as this exceeds their available collateral.

In this scenario:

$$K = K_s + K_B$$

but still,

$$K < K^*$$

For an entrepreneur the expected net present value of start-up or continuing in business for a finite time horizon (LGS loans are available for a maximum of 7 years), can be expressed as:

$$NPV_{B1} =$$

$$\sum_{t=1}^7 \frac{1}{(1+r)^t} \left( Q(K, \theta, \delta) - \left[ r \left( Kt - \frac{tk}{7} \right) + \left( \frac{K}{7} \right) \right] \right)$$

where  $K^* > K$ .

We note here that the survival of businesses is disproportionately increasing with age.

For an entrepreneur who successfully applies for an LGS loan, the expression is:

$$NPV_{B2} =$$

$$\sum_{t=1}^7 \frac{1}{(1+r)^t} \left( Q(K^*, \theta, \delta) - \left[ r \left( K^*t - \frac{tk^*}{7} \right) + \left( \frac{K^*}{7} \right) \right] \right)$$

where  $K^* > K$ .

*For start-up businesses*

Constrained:  $NPV_{B1} > NPV_u$ , where individual is previously unemployed

$NPV_{B1} > NPV_w$ , where individual is previously in wage employment

LGS

UnConstrained:  $NPV_{B2} > NPV_u$ , where individual is unemployed

and  $NPV_{B2} > NPV_w$ , where individual is in waged employment

The Scenario operates in a similar fashion where the individual is likely to find paid employment or enter into unemployment if an existing firm fails. We assume here that businesses that are constrained by inadequate capital are at such a disadvantage vis a vis unconstrained businesses that they are forced to shut down in the long run. If benefits are low then it is likely that the continuing in business option is preferable, and likewise for wages in employment.

#### *Existing firms*

If  $Q < rD + wL$ ,

where  $rD$  = debt repayments,  $wL$  = wage bill, then involuntary closure may occur.

We know that  $Q = f(k, \theta, \delta)$ , thus a lack of capital effectively reduces revenues and consequently the ability to survive in business by making the necessary payments on borrowing and to labour.

#### 2.2. *Analysing take-up rates*

In order to explain the movements in take-up rates over the period we have sought to define empirical counterparts to complement the theoretical discussion in Section 1.2. Clearly dynamics are an important feature of the decision to take-out a loan under the auspices of the LGS. For instance an individual or firm seeking to apply for an LGS loan may take some time to prepare a business plan or evaluate the proposed investment. There may also be a reasonable time delay between the initial approach to the bank and obtaining approval from the bank and the DE (or DTI in the first instance). Thus it is perfectly rational to assume that significant lags occur in the LGS entry decision. To reflect this, our analysis allows the dynamics to be determined by the data in the absence of an explicit theory.

The subsequent procedure followed was to start with an over parameterised distributed lag model, including relevant empirical counterparts to hypothesised theoretical variables. The model was then tested down to a data admissible (and parsimonious) form. This was achieved by evaluating the performance of the respective equations against the standard diagnostic tests for misspecification of equations. In addition to this we used

co-integration analysis to test for stationarity of the implied long-run model.

#### 2.3. *Results*

The final parsimonious form of the model is reported in Table II. Each of the explanatory variables considered<sup>24</sup> enters the final equation with the hypothesised sign. Dummy variables related to qualitative adjustments to the LGS were considered but omitted on the grounds of insignificance. Perhaps the most important finding of the model is that the two scheme parameters over which the government has direct control, namely the loan premium and the guarantee are both important explanatory variables and act – as one would expect – in opposite directions, the premium in a negative direction on take-up and the guarantee positively. The 1993 changes to the LGS which raised the guarantee to 85% (up from 70%) have raised LGS take-up rates to their highest levels ever. This is consistent with the long-run coefficient on the guarantee which implies a rise from 500 loans per quarter to in the region of 2000 loans per quarter, holding other factors constant.

TABLE II  
The Determinants of Take-Up Rates on the Loan Guarantee Scheme

| 1983Q2–1990Q4<br>DLLGS <sub>t</sub> = | Dependent Variable      |
|---------------------------------------|-------------------------|
| Constant                              | –0.50635<br>(–5.723)    |
| DLPREM                                | –0.4268<br>(–3.1715)    |
| DLLGS(–3)                             | 0.31415<br>(2.7894)     |
| DBOPT(–1)                             | –0.0069731<br>(–1.7465) |
| Long-run<br>Residuals                 | –0.50635<br>(–5.723)    |
| R <sup>2</sup> = 0.7033               |                         |
| DW = 1.8765                           |                         |
| Serial Correlation                    | Chi-Sq(4) = 5.6607      |
| Functional Form                       | Chi-Sq(1) = 0.77574     |
| Normality                             | Chi-Sq(2) = 0.9807      |
| Heteroscedasticity                    | Chi-Sq(1) = 0.011612    |
| Residual Correlation Test             | Chi-Sq(4) = 7.0609      |
| Arch Test                             | Chi-Sq(12) = 9.8424     |

The other main finding is that increases in the ratio of self-employed with employees to self employed without employees, that is to say an increase in average size of the self-employed firm, acts in a negative way on LGS take-up rates. This suggests that it is the very smallest of firms that are the most constrained in the capital market. Furthermore, it may suggest that the scheme has been more successful in the business start-up area than say, in helping established firms expand. This, of course, has implications for the conduct of the government's small firms policy. Increases in VAT deregistrations also exerted a negative effect.

#### 2.4. Cointegration analysis

Figure 1 provides strong evidence to support the presence of a unit root in the time series data for LLGS (log LGS take-up). The results reported in Table II are only valid if there is co-integration between LLGS and at least one other explanatory variable in the equation reported. To investigate this further Table III reports the results of the Augmented Dicky-Fuller (ADF) tests for the level of integration of the variables of interest. In the ADF test if the null hypothesis is rejected, that is that a variable is integrated to order,  $z \sim I(d)$ , then we accept that  $Z \sim I(d-1)$ . The statistics from the ADF suggest that the majority of the variables are  $I(1)$ , that is to say that they are stationary in first differences. However, one of the variables appears to be stationary, namely the log of the amount of the loan guaranteed.

A static OLS regression of LLGS on the variables that appear on the right hand side of equation 1 produces an ADF statistic of -4.90, which suggests that there is co-integration.

#### LONG-RUN ESTIMATES

LVATDR LPREM LRSEWE GUARLOG  
LLGS -2.5174 -0.22697 -7.7562 11.5951  
 $R^2 = 0.82507$  ADF = -4.90 Sample 1983q2-1991q1.

The results of the ADF test are supported by the results obtained from Johansen's Maximum Likelihood Procedure, which calculates the co-integration likelihood ratio test based on maximal eigenvalue of the stochastic matrix. For Johansen's

TABLE III  
ADB Tests for order of integration  $H_0: Z \sim I(0)$

| Variable (Z) | Without Trend |
|--------------|---------------|
| LLGS         | -2.5502       |
| LPREM        | -1.6705       |
| GUARLOG      | -3.7538*      |
| LVATDR       | -2.2722       |
| RSEWE        | -0.14170      |

Notes: Test statistics based on regressions with four lags of dependent variable. Sample period 1982Q2-1990Q4.

\* denotes test significance at 5% level (Mackinnon, 1990, critical values).

Johansen ML Procedures (Trended case, with trend in DGP). Cointegration LR Test based on Maximal Eigenvalue of the Stochastic Matrix.

Cointegrating Vector:

LLGS LVATDR RSEWE LPREM

Additional  $I(0)$  Variables.

GUARLOG

List of Eigenvalues in descending order.

| 0.57108 | 0.40961     | 0.25061   | 0.0066205            |
|---------|-------------|-----------|----------------------|
| Null    | Alternative | Statistic | Critical Value (90%) |
| $r = 0$ | $r = 1$     | 26.2413   | 24.734               |
| $r = 1$ | $r = 2$     | 16.3364   | 18.598               |

Cointegration LR based on Trace of Stochastic Matrix

| Null    | Alternative | Statistic | Critical Value (90%) |
|---------|-------------|-----------|----------------------|
| $r = 0$ | $r = 1$     | 51.7268   | 47.21                |
| $r = 1$ | $r = 2$     | 25.4855   | 29.68                |

ML Procedure there is strong evidence to support the fact that there is one co-integrating vector present, among the list of regressors. On this basis equation 1 is likely to yield the most reliable estimates of both the short and long-run parameters of the relationship between LGS take-up rates and its determinants.

#### Conclusion

The main objective of the paper has been to try and identify the factors responsible for the changes in take-up rates on the Loan Guarantee Scheme. The evidence suggests that the most important factors in determining take-up rates are the scheme parameters itself. Whilst increases in the premium

act as a significant deterrent on take-up rates by raising the cost of borrowing to the firm, increases in the proportion of the loan guaranteed by the government increase take-up rates by effectively reducing the collateral constraint on small business.

The evidence suggests that the government can directly influence take-up rates on the Loan Guarantee Scheme through its ability to adjust the two parameters, the premium and the guarantee. To this end, bearing in mind that failure rates are comparable, if not better, than non-LGS businesses we would argue that an expansion of the scheme is justified and achievable by an adjustment of the scheme's parameters. The results also bring into question the role of banks. If LGS firms are at least as likely as non-LGS firms to survive then it suggests that without the LGS banks would be missing out on a potentially profitable market. Furthermore, without the LGS there would be a significant number of existing businesses that would be forced to cease trading despite being viable in the long-run and a good deal less start-up businesses.

Thus we feel the government has left the LGS to wither away somewhat, with the level of take-up being somewhat disappointing. Certainly there is a case to be made for publicising the scheme more widely.

To sum up the LGS has provided a good service to the small business community and has gone a long way to fulfilling its stated objectives. With this in mind an expansion of the scheme is warranted and justifiable.

### Acknowledgements

The authors would like to thank David Storey and Robert Cressy for helpful advice and comments on earlier versions of the paper.

### Appendix 1

#### Variables

|           |                                                                                                                                                                                                                                                                     |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GUARLOG:  | The natural logarithm of the percentage of a loan issued through the LGS Scheme which is guaranteed by the government (see page 7).                                                                                                                                 |
| DGUARLOG: | The rate of change [with respect to time] of GUARLOG above.                                                                                                                                                                                                         |
| LGS:      | The number of LGS loans issued in each quarter between 1983 q2 and 1990q4.                                                                                                                                                                                          |
| LLGS:     | The natural logarithm of LGS above.                                                                                                                                                                                                                                 |
| DLLGS:    | The rate of change (with respect to time) of LLGS.                                                                                                                                                                                                                  |
| PREM:     | The interest rate premium charged on LGS loans additional to the banks' own small firm interest rate (see Page 7).                                                                                                                                                  |
| LPREM:    | The natural logarithm of PREM above.                                                                                                                                                                                                                                |
| DLPREM:   | The rate of change (with respect to time) of LPREM.                                                                                                                                                                                                                 |
| SEWE:     | The ratio of self-employed WITH employees against individually self-employed as recorded in the <i>Employment Gazette</i> .                                                                                                                                         |
| RSEWE:    | The rate of change (with respect to time) of SEWE above.                                                                                                                                                                                                            |
| LVATDR:   | The natural log of the total number of enterprises cancelling their VAT registration in a quarter. "Deregistration" can refer to, for example, business failure/bankruptcy, voluntary closure or turnover falling below that necessary to legally register for VAT. |
| DBOPT     | The rate of change in business confidence measured by the CBI Survey of member firms.                                                                                                                                                                               |

(Note: Lag Structures refer to quarterly data)

#### Notes

<sup>1</sup> In an interview in the *Director* (May 1990), Tim Eggar, the then newly appointed 'Minister for Small Firms' signalled a shift in emphasis of this strategy away from encouraging small start-up firms to overcome an "equity gap" and towards assisting established firms to grow via provision of a range of consultancy and professional services.

<sup>2</sup> The above shift of emphasis is underlined firstly by these 1993 changes in the Scheme which, as will be shown below, seek to encourage existing firms to take out LGS loans. Secondly, by the recently announced replacement of the Business Expansion Scheme by the Enterprise Investment Scheme (EIS).

<sup>3</sup> The extent of this perceived "prejudice" against SMEs is

itself a matter of some debate. See for example Hutchinson and McKillop (1992).

<sup>4</sup> After over a decade of small firm research it is clear that whilst banks now offer a wider range of products which are marketed more aggressively than before, "competition" per se has not altered the lending criteria on which small firms depend for funds. It is equally clear, following Birch's (1979) seminal study, and more recent UK work undertaken by Daly *et al.* (1991), and European perspectives (Clay and Creigh-Tyte, 1994) small firms are becoming ever more important in generating employment opportunities.

<sup>5</sup> It is also not impossible to envisage a scenario whereby the entrepreneur does *not* wish to attract equity finance and dilute his holding in the firm.

<sup>6</sup> A number of schemes have emerged to overcome such information barriers and search costs. For example, Venture Capital Report aims to bring together entrepreneurs and potential investors.

<sup>7</sup> Assuming loans are not secured on assets.

<sup>8</sup> Credit rationing is thus a solution to the problem of using interest rates alone to clear the market, i.e. the equilibrium price of funds. If "equilibrium" in the pure economic sense was reached using interest rates, low risk low return projects are rejected in favour of entrepreneurs with high risk projects. Thus credit rationing takes on the form of refusing loan requests outright rather than using price alone.

<sup>9</sup> Note that successful applicants for a loan under the LGS within a designated Inner City Task Force area have been eligible for LGS funds on preferable terms – currently 85% guarantee and 2% premium.

<sup>10</sup> To firms trading two years or more.

<sup>11</sup> For example, retail, hairdressing, garages, taxi/cab firms all became ineligible. This restriction followed a widening of the scheme's potential scope in 1983 and more recently in 1990 when agricultural and horticultural activities also became eligible.

<sup>12</sup> Clearly these more recent changes together with the more favourable terms on loans to existing firms with a proven survival record, reflect the government's policy shift away from start-ups and towards encouraging growth.

<sup>13</sup> 1990 prices.

<sup>14</sup> In January 1988 simplified procedures were introduced for loans up to £15,000 with the hope of increasing take-up of LGS funds.

<sup>15</sup> 70% of LGS defaults occur within the first two years.

<sup>16</sup> The default rate may underestimate the "failure" rate of LGS firms as several examples exist whereby failed businesses still repay LGS loans out of the recipient's subsequent income.

<sup>17</sup> Nevertheless, criticism of the high failure rates had threatened the existence of the LGS during its initial period of existence (Phases I and II), hence the tightening up of the schemes parameters in 1984 and subsequent tightening of the eligibility rules to ensure stricter vetting.

<sup>18</sup> Note that the probability of default rises as loan size falls and/or gearing rises – 71% of failures being businesses with a debt-equity ratio of 5:1 or more.

<sup>19</sup> In December 1984 the government confessed that whilst they had anticipated a failure rate of around 8%, the outrun at that time was 12.3% – for comparison, VAT deregistrations

run at a fairly constant figure of 11% of the total stock per annum.

<sup>20</sup> Of which £97m came in the first five years of the scheme.

<sup>21</sup> The 'Net Cost' of the scheme is calculated by taking payments where guarantees are called, less premia received any later recoveries.

<sup>22</sup> The 'Per-Job' cost then deducts the savings made in benefits, tax and National Insurance payments in the first year after the loan is made which are additional to those that would have occurred in the absence of a loan. The total number of additional jobs is estimated from various surveys of loan recipients.

<sup>23</sup> The original £150m budget allocated for the first three years was used up in only 12 months.

<sup>24</sup> See Appendix 1 for list of explanatory variables.

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