FEDERAL RESERVE BANK of ATLANTA

SBA Guaranteed Lending and Local Economic Growth

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Abstract: Increasingly, policymakers look to the small business sector as a potential engine of economic growth. Policies to promote small businesses include tax relief, direct subsidies, and indirect subsidies through government lending programs. Encouraging lending to small business is the primary policy objective of the Small Business Administration's (SBA) loan-guarantee program. Using a panel data set of SBA guaranteed loans, we assess whether SBA guaranteed lending has an observable impact on local economic performance. We find a positive and significant (although economically small) relationship between the relative levels of SBA guaranteed lending in a local market and the future per capita income growth in that market.

JEL classification: G38, H81, O16

Key words: small business, economic growth, loan guarantees, credit rationing, relationship lending

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SBA Guaranteed Lending and Local Economic Growth

> The essence of the American economic system of private enterprise is free competition. Only through full and free competition can free markets, free entry into business, and opportunities for the expression and growth of personal initiative and individual judgment be assured. The preservation and expansion of such competition is not only to the economic well-being but to the security of this Nation. *Such security and well-being cannot be realized unless the actual and potential capacity of small business is encouraged and developed. It is the declared policy of the Congress that the Government should aid, counsel, assist, and protect insofar as is possible the interests of small-business concerns in order to preserve free competitive enterprise, to insure that a fair proportion of the total purchases and contracts for supplies and services for the Government be placed with small-business enterprises, and to maintain and strengthen the overall economy of the Nation.* [1]

The promotion of small businesses is a cornerstone of economic policy for a large number of industrialized countries. Public support for small enterprise appears to be based on the widely held perception that the small business sector is an incubator of economic growth, a place where innovation takes place and new ideas become economically viable business enterprises. In addition, policymakers routinely point to small businesses as important sources of employment growth – even though economic studies find little evidence to support this claim. It is not surprising, then, that there is widespread political support for government programs, tax breaks, and other subsidies aimed at encouraging the growth and development of small business in the United States, and increasingly, around the world.

A particular area of concern for policymakers is whether small businesses have access to adequate credit. After all, a lot of small firms are relatively young and have little or no credit history. Lenders may also be reluctant to fund small firms with new and innovative products because of the difficulty associated with evaluating the risk of such products. These difficulties are classic *information* problems—problems obtaining sufficient information about the parties involved in a transaction—and they may prevent otherwise creditworthy firms from obtaining credit. If information problems are substantial, they can lead to credit rationing, that is, loans are allocated by some mechanism other than price. If small businesses face credit rationing, the next Google, Microsoft, or Starbucks might wither on the vine for want of funding. To the extent that credit rationing significantly affects small business credit markets, a rationale exists for supporting small enterprises through government programs aimed at improving small business access to credit.

One specific government intervention aimed at improving the private market's allocation of credit to small enterprises is the Small Business Administration (SBA) guaranteed lending program. SBA loan

[1] See Public Law 163, Section 202.

guarantees are well established, and their volume has grown over the past decade. Nearly 20 million small businesses have received direct or indirect help from one or another of the SBA's programs since 1953. The SBA's current business loan portfolio of roughly 219,000 loans is worth more than $45 billion, making it the largest single financial backer of small businesses in the United States. Over the period 1991 to 2000, the SBA assisted almost 435,000 small businesses in obtaining more than $94.6 billion in loans, more loan volume than in the entire history of the agency before 1991. No other lender in this country has been responsible for as much small business financing as the SBA has during that time (SBA, 2004). These lending numbers are remarkable when one considers that SBA loan guarantees are aimed at that segment of small business borrowers that presumably would not otherwise have access to credit. It is interesting that the dramatic growth in SBA loan guarantees over the past decade has occurred at a time when advances in computer and communications technology have substantially reduced information costs in the economy. To the extent that technological innovation has improved the information efficiency of credit markets—especially small business credit markets—this increase in SBA guaranteed lending has occurred at a time when the benefits of SBA guarantees should be declining.

The rationale for SBA guarantees appears to be that credit market imperfections can result in small enterprises being credit rationed—particularly for longer-term loans for purposes such as capital expansion. If SBA loan guarantees indeed reduce credit rationing in the markets for small business loans, then there should be a relationship between measures of SBA activities and economic growth. And, this is what we find. In particular, we find a positive (although small) and significant relationship between the level of SBA lending in a market and future income growth in that market. Overall, our empirical results are consistent with a positive social welfare impact of SBA guaranteed lending.

The remainder of the paper is organized as follows. In section 2 we provide a brief review of the academic literature on credit rationing and relationship lending. This literature is consistent with the hypothesis that information problems in lending markets are particularly severe in the small enterprise credit market and hence provides a rationale for SBA loan guarantees. An overview of SBA lending programs is presented in section 3. Section 4 outlines the data, our hypotheses and empirical strategy. The results appear in section 5. Finally, our conclusions and future research questions are outlined in section 6.

2. The economics of credit markets

The economic justification for any government-sponsored small business lending program or loan guarantee program must rest on a generally acknowledged failure of the private sector to allocate loans efficiently. Absent such a clearly identified problem with private sector lending to small businesses, the

SBA's activities would simply seem a wasteful, politically motivated subsidy to this sector of the economy.

Many economists, most notably Joseph Stiglitz and Andrew Weiss (1981), contend that private lending institutions may indeed fail to allocate loans efficiently because of fundamental information problems in the market for small business loans. These information problems may be so severe that they lead to credit rationing and constitute the failure of the credit market. Stiglitz and Weiss (1981) argue that banks consider both the interest rate they receive on the loan and the riskiness of the loan when deciding to make a loan. But the lack of perfect information in loan markets may cause two effects that allow the interest rate itself to affect the riskiness of the bank's loan portfolio. When the price (here, the interest rate) affects the nature of the transaction, it is unlikely that a price will emerge that suits either the available buyers or sellers (that is, no price will "clear the market"). The first effect, adverse selection, impedes the ability of markets to allocated credit using price by increasing the proportion of high risk borrowers in the set of likely borrowers. The second effect, moral hazard, reduces the ability of prices to clear lending markets because it influences the ex post actions of borrowers.

The adverse selection effect is a consequence of different borrowers having different probabilities of repaying their loan. The expected return to the bank on a loan obviously depends on the probability of repayment, so the bank would like to be able to identify borrowers who are more likely to repay. But it is difficult to identify such borrowers. Typically, the bank will use a variety of screening devices to do so. The interest rate that a borrower is willing to pay may act as one such screening device. For example, those who are willing to pay a higher interest rate are likely to be, on average, worse risks. These borrowers are willing to borrow at a higher interest rate because they perceive their probability of repaying the loan to be lower. So, as the interest rate rises, the average "riskiness" of those who are willing to borrow increases, and this may actually result in lowering the bank's expected profits from lending.

Similarly, as the interest rate and other terms of the contract change, the behavior of the borrower is likely to also change. For instance, raising the interest rate decreases the profitability of projects which succeed. Higher interest rates may thus induce firms to undertake riskier projects – projects with lower probabilities of success but higher payoffs when successful. In other words, the price a firm pays for credit may affect its investment decisions. This is the moral hazard problem.

As a result of these two effects, a bank's expected return may increase less rapidly than the interest rate; and, beyond a point may actually decrease. Clearly, under these conditions, it is conceivable that the demand for credit may exceed the supply of credit in equilibrium. Although traditional analysis would argue that in the presence of an excess demand for credit, unsatisfied borrowers would offer to pay

a higher interest rate to the bank, bidding up the interest rate until demand equals supply, it does not happen in this case. This is because the bank would not lend to someone who offered to pay the higher interest rate, as such a borrower is likely to be a worse risk than the average current borrower. The expected return on a loan to this borrower at the higher interest rate may be actually lower than the expected return on the loans the bank is currently making. Hence, there are no competitive forces leading supply to equal demand, and credit is rationed.

Importance of lending relationships

Kane and Malkiel (1965) come to a similar conclusion about the possibility of banks rationing credit. But they also suggest that the extent of credit rationing depends on the strength of existing customer relationships; the size, stability, and prospects for future growth of deposits; and the existence of profitable future lending opportunities. That is, loans may be rationed to current and prospective borrowers in accordance with the cohesion of the existing relationships along with expectations about the future profitability of those relationships.

Petersen and Rajan (1994) extended the notion that relationships are important factors in determining credit rationing. They suggest that the causes of credit rationing, adverse selection and moral hazard, may be more prominent when firms are young or small. However, through close and continued interaction, a firm may provide a lender with sufficient information about, and a voice in, the firm's affairs so as to lower the cost and increase the availability of credit. These authors also suggest that an important dimension of a relationship is its duration. Conditional on its positive past experience with the borrower, the bank may expect future loans to be less risky. This should reduce its expected cost of lending and increase its willingness to provide funds.

Petersen and Rajan (1994) suggest that in addition to interaction over time, relationships can be built through interaction over multiple products. That is, borrowers may obtain more than just loans from a bank. Borrowers may purchase a variety of financial services and also maintain checking and savings accounts with the bank. These added dimensions of a relationship can affect the firm's borrowing cost in two ways. First they increase the precision of the lender's information about the borrower. For example, the lender can learn about the firm's sales by monitoring the cash flowing through its checking account or by factoring the firm's accounts receivables. Second, the lender can spread any fixed costs of producing information about the firm over multiple products. Petersen and Rajan (1994) report that both effects reduce the lender's costs of providing loans and services, and the former effect increases the availability of funds to the firm.

Berger and Udell (1995) also study the importance of relationships in the extension of credit to small firms. They find that small firms with longer banking relationships borrow at lower rates and are less likely to pledge collateral than are other small firms. These effects appear to be both economically and statistically significant. According to Berger and Udell, these results suggest that banks accumulate increasing amounts of this private information over the duration of the bank-borrower relationship and use this information to refine their loan contract terms.

3. Small Business Administration loan guarantee programs

SBA loan guarantees may improve credit allocation by providing a mechanism for pricing loans that is independent of borrower behavior. By reducing the expected loss associated with a loan default, the guarantee increases the expected return to the lender – without increasing the lending rate. In the absence of adverse selection, lenders could simply offer loan rates to borrowers that reflected the average risk of the pool of borrowers.[2] With the guarantee in place, the lender could profitably extend credit at loan rates below what would be dictated by the risk of the average borrower. The reason for this is that the guarantee increases the profitability of the loan by reducing the losses to the bank in those instances when the borrower defaults. To the extent that the loan guarantee reduces the rate of interest at which banks are willing to lend, external loan guarantees should help mitigate moral hazard. After all, lowering the lending rate increases the number of low risk borrowers applying for credit which, in turn, increases the likelihood that the average risk of firms applying for loans is representative of the pool of borrowers. Hence, external loan guarantees help mitigate adverse selection. Moral hazard behavior of borrowers is also mitigated because the lower lending rates afforded by external guarantees reduce the bankruptcy threshold and thereby increase the expected return of safe projects vis-à-vis riskier ones. Thus, in theory, SBA loan guarantees should reduce the probability that a viable small business is credit rationed.

Because relationships may be more costly for small businesses to establish relative to large businesses, and because lack of relationships may lead to severe credit rationing in the small business credit market, some form of government intervention to assist small businesses in establishing relationships with lenders may be appropriate. However, the nature of intervention must be carefully evaluated. SBA's guaranteed lending programs may well be a reasonable intervention as they serve as a form of substitute for small business collateral. The program also reduces the risk to the lender of establishing a relationship with informationally opaque small business borrowers. Finally, the SBA loan guarantee programs may improve the intermediation process by lowering the risk to the lender of

[2] This is because each loan made would reflect a random draw from the pool of borrowers. If the bank made a large number of small loans to borrowers in the pool then the bank's loan portfolio would have the same risk and return characteristics of the pool of borrowers.

extending longer-term loans, ones that more closely meet the needs of small businesses for capital investment. It is interesting to note that the problem of long-term credit for small businesses was one of the primary reasons stated by Congress for establishing the SBA.

The legislation that created the Small Business Administration was enacted on July 30, 1953.[3] By 1954, the SBA was already making direct business loans and guaranteeing bank loans to small businesses, as well as making loans to victims of natural disasters, working to get government procurement contracts for small businesses and helping business owners with management and technical assistance and business training. Recognizing that private financial institutions are typically better than government agencies at deciding on which small business loans to underwrite, the SBA began moving away from making direct loans and toward guaranteeing private loans in the mid-1980s. Currently, the SBA makes direct loans only under very special circumstances. Guaranteed lending through the SBA's 7(a) guaranteed loan program and the 504 loan program are the main form of SBA activity in lending markets.

The 7(a) loan program is the more basic and more significant of these two programs. Its name comes from Section 7(a) of the Small Business Act, which authorizes the agency to provide business loans to American small businesses. All 7(a) loans are provided by lenders who are called participants because they "participate" with the SBA in the 7(a) program. Not all lenders choose to participate, but most American banks do, as well as a number of nonbank lenders. The inclusion of nonblank lenders expands the availability of lenders making loans under SBA guidelines.

7(a) loans are available only on a guaranty basis. This means that they are provided by lenders who choose to structure their own loans according to SBA's requirements and who apply for and receive a guaranty from SBA on a portion of this loan. The SBA does not fully guaranty 7(a) loans. The SBA guaranty is usually in the range of 50 to 85 percent of the loan amount, and the maximum guaranty is $1,000,000. The lender and SBA share the risk that a borrower will not be able to repay the loan in full. The guaranty is a guaranty against payment default and does not cover other contingencies such as imprudent decisions by the lender (such as underpricing of the loan, failure to enforce loan covenants, or failure to perfect a lien on collateral) or misrepresentation by the borrower.

The 504 loan program is a long-term financing tool for economic development within a community. The 504 program provides growing businesses with long-term, fixed-rate financing for major fixed assets, such as land or buildings, through a certified development company (CDC). A CDC is a nonprofit corporation set up to contribute to the economic development of its community. CDCs

[3] The act that created the SBA is Public Law 163.

work with the SBA and private-sector lenders to provide financing to small businesses. There are about 270 CDCs nationwide. Each CDC covers a specific geographic area (SBA, 2004).

Typically, a 504 project includes a loan from a private-sector lender covering up to 50 percent of the project cost, a loan from the CDC (backed by a 100 percent SBA-guaranteed debenture) covering up to 40 percent of the cost, and a contribution of at least 10 percent equity from the small business being helped. The SBA-backed loan from the CDC is usually subordinate to the private loan, which has the effect of insulating the private lender from loss in the event of default. Generally, a business must create or retain one job for every $50,000 provided by the SBA. The maximum SBA debenture is $1,000,000 for meeting the job creation criteria or a community development goal and $1,300,000 for meeting a public policy goal. Current public policy goals recognized by the SBA are: business district revitalization, expansion of exports, expansion of minority business development, rural development, enhanced economic competition, restructuring because of federally mandated standards or policies, changes necessitated by federal budget cutbacks, expansion of small business concerns owned and controlled by veterans, and expansion of small business concerns owned and controlled by women (SBA, 2004).

4. The questions, empirical strategy, and data

Our empirical research focuses on SBA guaranteed lending. Of course, this is only one of the several ways the government promotes small business lending. For example, Federal Home Loan Banks are authorized by Congress to accept small enterprise loans as eligible collateral when they extend subsidized advances to banks. This provides an incentive to banks to extend credit to small firms because it reduces the cost of funding their small business loan portfolios.[4]

We chose to study the impact of SBA guaranteed lending programs because this is where the empirical evidence is likely to be strongest concerning the impact of government intervention in small business credit markets. This conclusion is based on three observations. First, SBA loan guarantees are more likely to resolve the agency problems that give rise to credit rationing in these markets than most other approaches, like that of the Federal Home Loan Banks. Second, SBA guaranteed lending programs encompass all types of small business lenders, from community banks and thrifts to bigger banks. And, third, the SBA guaranteed lending programs are relatively large and have operated for a long time—more than a half a century.

We take as our maintained hypothesis that credit market frictions—primarily in the form of costly information and verification of a small firm's projects—can lead to socially suboptimal credit allocation.

[4] See Craig and Thomson (2003) for a more complete discussion of the FHLBs' role in supporting small firm finance.

To the extent that SBA guaranteed lending programs mitigate credit market frictions, there should be a relationship between SBA guaranteed lending and economic growth and development. Therefore, we test for whether SBA loan guarantees lessen credit market frictions by testing for whether measures of SBA guaranteed lending are related to local economic growth. Thus, our null hypothesis is that SBA guaranteed lending has no discernible impact on local market economic growth.

Data

To examine this SBA guaranteed lending and economic growth hypothesis we utilize data from three sources. Our first source is loan-specific data—including borrower and lender information—on all SBA-guaranteed 7(a) and 504 loans from 2 January 1991 through 31 December 2002. A breakdown of loan size, total credit and number of loans under each guarantee program is displayed in tables A1 through A3 of the appendix. Note that we have over 360,000 loans in our sample.

Our second source of data, on economic conditions, is from the National Bureau of Economic Research (NBER), the Bureau of Labor Statistics (BLS) and the Bureau of Economic Analysis (BEA) from 1991 through 2001. Our third source is data from the Federal Deposit Insurance Corporation's annual summary of deposit data (SUMD) files.

All of our data are aggregated to the local market level. We use Metropolitan Statistical Areas (MSAs) to define the relevant local market for urban areas and non-MSA counties as the local market for rural areas. We focus on MSAs and non-MSA counties because they provide a reasonable representation of a geographically distinct local banking market. We utilize this local market based unit of observation because the research question we seek to address is based on a market level phenomenon. That phenomenon is market failure, or credit rationing, in the small firm credit market. Hence, our data set consists of approximately 2200 local market observations per year over 11 years (1991 through 2001).

Empirical Strategy

To test our null hypothesis we extend the analysis of Craig, Jackson, and Thomson (2005), who use weighted least squares to estimate a regression model relating measures of local economic performance to past economic performance, measures of SBA loan guarantees, with controls for national economic conditions and local banking market structure. These authors estimate their models using stacked regression. We extend Craig, Jackson, and Thomson (2005) by estimating a similar regression model, equation (1), using classic Arellano and Bond panel regression estimation. Hence, unlike Craig, Jackson, and Thomson (2005), we are able to more effectively exploit the richness of the cross section and time series variation of our panel data. Our basic model is:

$$PICAP_t = \alpha_0 + \alpha_1 PICAP_{t-1} + \alpha_2 SBADEP_{t-1} + \alpha_3 EMPR_t + \alpha_4 NBER_t + \alpha_5 HERF_t + \alpha_6 SBAG_{t-1} + \alpha_7 SBA7A_{t-1} + \alpha_8 SBAM_{t-1} + \alpha_9 MDUM_{t-1} + \varepsilon_t \quad (1)$$

Equation (1) uses per capita income (*PICAP*) at the local market level to proxy for economic conditions. We are interested in how SBA loan guarantees affect changes in PICAP. Hence we include the lagged value of PICAP as a regressor. An alternative specification would be to use $\Delta PICAP_t$ (= $PICAP_t - PICAP_{t-1}$) as the dependent variable – omitting $PICAP_{t-1}$ from the right-hand side of (1). However, this imposes the restriction that α_1 equals zero which is rejected by the data.

The primary variable of interest on the right side of the equation is $SBADEP_{t-1}$ (the total dollar amount of SBA-guaranteed loans scaled by total deposits in the market lagged one year). We scale by total deposits instead of measures of total credit because we cannot construct measures of bank lending at the local market level. Market-level deposit data are available, however, from the SUMD data. And, total deposits should be highly correlated with lending. Additionally, using total local market deposits as an instrument for approximating cross-sectional differences in the level of total market lending is consistent with previous research such as Peterson and Rajan (1995).

We also include as controls for the impact of SBA lending: the share of SBA loans that are 7(a) loans (*SBA7AR*), the share of SBA loans provided to manufacturing concerns (*SBAMR*), and the SBA's exposure on the outstanding balances of the SBA-guaranteed loans (*SBAGR*). For those observations where SBA guaranteed loans are zero SBA7A, SBAM, and SBAG are undefined and we set their values to zero and set MDUM equal to one.[5]

The deposit market Herfindahl index (*HERF*) is included in equation (1) to control for the structure of the local market. Constructed at the market level using branch level deposit data from the SUMD database, HERF provides a measure of concentration, and presumably the competitiveness, of the local banking market. Finally, we include the employment rate (*EMPR*) for the market and a dummy variable for NBER recessions (*NBER* = 1 if the national economy is in a recession, 0 otherwise) to control for local and national economic conditions. The definitions of the variables used in the empirical analysis are in table 1. We extend the analysis by estimating equation (2), the model with year dummy variables to control for fixed effects in the panel.

[5] The alternative would be to throw out observations where SBA lending was absent, introducing sample selection bias into the results.

$$
\begin{aligned}
PICAP_t = {} & \alpha_0 + \alpha_1 PCIAP_{t-1} + \alpha_2 SBADEP_{t-1} + \alpha_3 HERF_t + \alpha_4 EMPR_t \\
& + \alpha_5 SBAGR_{t-1} + \alpha_6 SBA7AR_{t-1} + \alpha_7 SBAMR_{t-1} + \alpha_8 T1993_t \\
& + \alpha_9 T1994_t + \alpha_{10} T1995_t + \alpha_{10} T1995_t + \alpha_{11} T1996_t + \alpha_{12} T1997_t \\
& + \alpha_{13} T1998_t + \alpha_{14} T1999_t + \alpha_{15} T2000_t + \alpha_{16} T2001_t + \varepsilon_t
\end{aligned} \tag{2}
$$

To avoid the dummy variable trap we do not include a year dummy for 1992 and exclude the NBER dummy. As discussed below, because of the inclusion of lagged variables on the right-hand side of equations (1) and (2) and the need for an additional year of data to construct instruments for the right-hand side variables estimation is done over the 1992 to 2001 sample period.

5. The empirical results

Panel Estimation

Our econometric design is driven by several salient problems associated with our data. First, endogeneity is a serious concern for our model. For example, the dynamic nature of the model requires a lagged structure of the per capita income variable that is endogenous by empirical design. In addition, our policy variables are unlikely to be completely exogenous, at least contemporaneously. This is because the policy variables may be influenced by local characteristics that are also associated with per capita income. To address this endogeneity problem, we use a set of instruments. These instruments are mainly lagged values of the right-hand variables. Next, we use a two step method of estimation where our weighting matrix in the second stage is calculated according to Arellano and Bond (1991). Because of this we denote our estimation technique a classic Arellano-Bond technique, although we do not use the levels as instruments for first differences.

Many different lag structures for the instruments were examined, and generally the estimates that we report are robust to the specification of the lag length for the instrument set. With too many lagged instruments, we unnecessarily reduce the number of observations we could include from the beginning of the sample (because we did not have these lagged values.) With too few lagged values, we do not have enough identification with which to determine whether a coefficient is significantly different from zero. Nonetheless, there is a wide range of sets of lagged values of the instruments which yield essentially the same results that we report here. The results of Table 3 use an instrument set that includes contemporaneous to the right hand side variable (that is, if the right hand variable is a value that is lagged one period compared to the per capita income variable, then its first instrument is also lagged one period) along with two additional lags. Other sets that yield similar results include sets with more lags or a set that does not include the contemporaneous value but includes lags of two, three and four periods.

We corrected the standard errors for our estimates as suggested in Kleibergen (2004) and implemented in Bond and Windmeijer (2003). Note that this is especially important for those estimates that transform the variables by subtracting off their "within area" means. These estimates are more reliable because they are less likely to be biased by area-specific effects. One example of such bias is that historically low-income areas may receive relatively more of SBA guaranteed lending than other areas. And, the same factors that cause it to have a relatively low level of per capita income may also influence the growth rate of income in that area. Thus the area-specific effect will bias the estimate of the effect of SBA guaranteed lending downward.

Results

Our sample consists of local economic markets for which we have complete data over the sample estimation period (1992 through 2001). Equation (1) is estimated over the urban (MSAs) and rural (non-MSA counties) samples, as well as, the entire sample using the Arellano-Bond method and mean transformed data. However, as the data reject pooling of urban and rural markets, we only report the separate results for those two samples. Descriptive statistics for the variables used in the regression can be found in table 2 and the estimation results are presented in table 3.

The coefficient on the lagged SBA loan guarantee-to-deposit ratio is positive and significantly different from zero for both samples. This result is in contrast to Craig, Jackson, and Thomson (2005) who find a positive and insignificant relationship between SBA loan guarantees and future economic performance.[6] The differences between our results here and those of Craig, Jackson, and Thomson (2005) may be linked to the strong assumptions implicit in the stacked regression model they used. By taking greater advantage of the information in our time-series cross-section panel, the Arellano-Bond panel regression methods are able to more precisely estimate the impact of SBA loan guarantees on economic growth.

On the face of it, the small magnitude of the coefficient on $SBADEP_{t-1}$ – one basis point in the rural sample and 27 basis points in the urban sample – suggests that the effects of SBA loan guarantees may not be economically significant. However, judgments about the efficacy of SBA guaranteed lending on economic growth need to be viewed in the context of the magnitude of SBA activities. SBA-guaranteed lending is a small part of the total banking market—on average, less than $7.45 of loan guarantees for every $1000 of deposits (0.75 percent of market deposits). In other words, the small measurable economic impact of SBA loan guarantees on local economic growth would be expected given the limited role they play in the credit intermediation process.

[6] Craig et al. (2005) conjecture that "SBA-guaranteed lending may be too small economically for the data to yield a statistical relationship between it and per capita income."

It is important to note that the statistical significance of our SBA lending variable in the rural sample appears to be less sensitive to our choice of instruments and lag structure than in the urban sample. We suspect, however, that the sensitivity of $SBADEP_{t-1}$ to the econometric specification of the Arellano and Bond panel regression model is due to the relatively small size of the urban sample (2820 time-series cross-section observations).

For the urban (MSA) sample, the coefficients on $SBAGR_{t-1}$ (the SBA's exposure on the outstanding balances of the SBA-guaranteed loans) and $SBA7AR_{t-1}$ (the share of SBA loans that are 7(a) loans) are significantly negative, while the coefficient on $SBAMR_{t-1}$ (the share of SBA loans provided to manufacturing concerns) is insignificantly positive. These results are largely in concert with an explanation that says lenders are relying more heavily on SBA loan guarantees to make loans in more depressed urban markets—ones with lower per capita income.

However, unlike Craig, Jackson, and Thomson (2005), we do not find a higher share of loans to small businesses engaged in manufacturing in the more economically vibrant urban markets. The picture painted by our SBA lending structure variables is somewhat different for the rural (non-MSA) sample, where none of the coefficients on controls variables for the structure of SBA loan guarantees are significant. This is in contrast to Craig, Jackson, and Thomson (2005) who find that lenders in higher-income rural markets rely more heavily on SBA guarantees relative to lenders in lower-income markets. We find no such differences. For both samples the controls for economic activity—NBER dummy and *EMPR*—are significant with the anticipated signs. The coefficient on *HERF* (deposit market Herfindahl index) is positive but not significant for the rural sample. The coefficient on *HERF* is negative but not significant in the urban sample.

Panel estimation with year dummies to control for fixed effects

Equation (2) is estimated using Arellano & Bond Panel Regression method. However, in lieu of using mean transformed data, fixed effects are controlled for by including dummy variables for each year in the estimation period [except for 1992 which is captured by the coefficient on the intercept]. As the year dummies would capture the effects of recession years and to avoid the dummy variable trap we exclude NBER as a regressor. The panel regression results for the urban and rural samples appear in table 4.

As with equation (1) the coefficient on the $SBADEP_{t-1}$ is positive and significantly different from zero for both samples. However, there is a slight but statistically significant change in the coefficient on this variable. For the rural sample the coefficient on the lagged SBA-loan-guarantee-to-market-deposit ratio doubles to two basis points. For the urban sample the coefficient on $SBADEP_{t-1}$ is three basis points

lower, falling to just below 24 basis points. Qualitatively, the results are not affected by this alternative specification of the regression model. Our results consistently suggest that SBA guaranteed lending, as a share of overall local market credit intermediation, has a significant positive impact on local economic growth, albeit economically a small impact.

The primary difference in our results appears in the controls for market structure and for the structure of the SBA loan guarantees. The coefficient on the deposit market Herfindahl index (HERF) in table 4 is significantly negative for both samples, and of relatively the same magnitude. The difference in the behavior of HERF in tables 3 and 4 likely traces to the slow evolution of market structure through time and hence, HERF was likely a proxy for time-series fixed effects in equation (1). The addition of time dummies in equation (2) may have more precisely identified the time-series fixed effects allowing HERF to more cleanly proxy for cross-sectional difference of market concentration on income growth through time. The results in table 4 are in line with the industrial organization literature and may be explained in at least two ways. First, per capita income is higher in more competitive markets, and *HERF* is a proxy for market competition. Or, second, the negative correlation is the result of a set of market dynamics in which higher relative per capita income induces more commercial banks to enter the local market. Furthermore, considering the substantial fixed cost associated with market entry, markets with relatively larger aggregate income levels might also experience more entry.

The structure of SBA loan guarantees on economic performance in table 4 differs markedly from the results in table 3. First, for urban markets the coefficients on $SBAGR_{t-1}$ (the SBA's exposure on the outstanding balances of the SBA-guaranteed loans) and $SBA7AR_{t-1}$ (the share of SBA loans that are 7(a) loans) are negative but no longer significantly different from zero. For rural markets the coefficients on these variables are now significantly negative. For both samples the coefficient on $SBAMR_{t-1}$ (the share of SBA loans provided to manufacturing concerns) is positive and insignificant as before. Our table 4 results suggest that lenders in depressed rural markets rely more heavily on SBA loan guarantees and the structure of guarantees is not dependent on market conditions in urban markets. This is the opposite of what we found earlier. Hence, one should be careful about drawing inferences about the determinants of lender demand for SBA loan guarantees in urban and local markets based solely on the results in table 3 and table 4.

Overall, our regression results are consistent with the hypothesis that SBA guaranteed lending produces positive, albeit small, net social benefits. In contrast to Craig, Jackson, and Thomson (2005), we find consistent evidence that the level of SBA-guaranteed lending activity (per $1000 of deposits) is positively related to the growth of per capita income at the local market level – for both urban and rural

markets. This impact of SBA-guaranteed lending on growth appears to be small, as the largest coefficient on the $SBADEP_{t-1}$ regressor is 27 basis points.

6. Conclusions and extensions to the analysis

SBA guaranteed lending programs are one of many government interventions into markets aimed at promoting small business. The rationale for these guarantees appears to be that credit market imperfections can result in small enterprises being credit rationed—particularly for longer-term loans for purposes such capital expansion. If SBA loan guarantees indeed reduce credit rationing in the markets for small business loans, then there should be a relationship between measures of SBA activities and economic growth. This is what we find. There is a positive (although small) and significant relationship between the level of SBA guaranteed lending in a local banking market and future per capita income growth.

These results should be interpreted with caution for several reasons. First, we are unable to control for small business lending at the market level and hence, we do not know whether SBA loan guarantees are contributing to growth by helping to complete the market or are simply proxying for small business lending in the market. Second, we are not able to test whether SBA loan guarantees materially increase the volume of small business lending in a market – a question that is related to who captures the subsidy associated with SBA loan guarantees. Future research will seek to shed light on these types of questions.

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Table 1: Variable Definitions

Variable	Definition	Source
SBADEP	SBA Guaranteed Loans per $000 of deposits	SBA, FDIC SUMD
HERF	Deposit market herfindahl	FDIC SUMD
EMPR	Employment rate	BLS
SBAGR	Portion of total SBA guaranteed loan balances covered by SBA guarantee	SBA
SBA7AR	Portion of total SBA guaranteed loan balances that are 7(a) loans	SBA
SBAMR	Portion of total SBA guaranteed loan balances that are loans to manufacturing concerns	SBA
PICAP	Per capita income	BEA
MDUM	Dummy variable =1 if SBA guaranteed loans is zero, 0 otherwise	June Call Report
LNPI	Natural log of personal income	BEA
T*XXXX*	Time-series fixed-effects dummies for 1993-2001 = 1 if year = *XXXX*, 0 otherwise	

Notes: SBA -- Small Business administration, FDIC SUMD -- Federal Deposit Insurance Corporation Summary of Deposit Data, BEA -- Bureau of Economic Analysis, BLS -- Bureau of Labor Statistics

Table 2: Descriptive Statistics for Equation (1) Variables

Variable	N	Mean	Std Dev	Minimum	Maximum
PICAP	24872	18.9273	4.5517	6.09	58.70
$SBADEP_{t-1}$[a]	24872	7.4450	100.8813	0	8754.2
HERF[b]	24872	0.5309	0.2884	0.03	1
EMPR (%)	24872	93.9186	3.2051	61.47	99.30
NBER	24872	0.1810	0.3850	0	1
$SBAGR_{t-1}$	24872	0.6205	0.3536	0	1
$SBA7AR_{t-1}$	24872	0.6737	0.4263	0	1
$SBAMR_{t-1}$	24872	0.1149	0.2356	0	1
$PICAP_{t-1}$	24872	18.2244	4.3781	5.50	58.70
MDUM[c]	24872	0.2378	0.4257	0	1

Source: Small Business Administration, Bureau of Economic Analysis, Bureau of Labor Statistics, and authors' Calculations

Notes: a. Guaranteed small business loans per $000 of deposits.

b. The Herfindahl index has been normalized to a variable between 0 and 1.

c. For markets where there was no recorded SBA guaranteed loan information we set the value of the SBA lending proxies to 0 and set MDUM = 1 (0 otherwise).

Table 3: Arellano & Bond Panel Regression Estimation of Equation (1) using mean differenced data

$$PICAP_t = PICAP_{t-1} + \alpha_2 SBADEP_{t-1} + \alpha_3 EMPR_t + \alpha_4 NBER_t + \alpha_5 HERF_t + \alpha_6 SBAG_{t-1} + \alpha_7 SBA7A_{t-1} + \alpha_8 SBAM_{t-1} + \alpha_9 MDUM_{t-1} + \varepsilon_t$$

Dependent Variable: PICAP	NonMSA			MSA		
	Coefficient	**Std.Error**	**t-value**	**Coefficient**	**Std.Error**	**t-value**
$PICAP_{t-1}$	1.02700	0.00805	128.00**	0.99671	0.01143	87.20**
$SBADEP_{t-1}$	0.00010	0.00002	4.72**	0.00274	0.00098	2.80**
HERF	0.08172	0.06442	1.27	-0.12899	0.08348	-1.55
EMPR	0.05366	0.00541	9.91**	0.16689	0.02337	7.14**
NBER	-0.26369	0.03240	-8.14**	-0.37562	0.05659	-6.64**
$SBAGR_{t-1}$	0.03393	0.15100	0.23	-1.27771	0.27830	-4.59**
$SBA7AR_{t-1}$	-0.02380	0.04762	-0.50	-0.30439	0.08857	-3.44**
$SBAMR_{t-1}$	0.01619	0.03431	0.47	0.04666	0.07656	0.61
MDUM	-0.06414	0.15780	-0.41	-1.16220	0.28200	-4.12**
sigma		1.02741			0.51250	
sigma2		1.05557			0.26265	
Residual sum of squares		16148.06			655.32	
Total sum of squares		75807.26			22536.25	
Number of observations		17317			2820	
Number of parameters		2019			325	
Wald (joint): $\chi 2(9)$ =		131600**			102000**	
Sargan test: $\chi 2(13)$ =		16.86			42.91**	
AR(1) test: N(0,1) =		-11.53			-4.03**	
AR(2) test: N(0,1) =		3.809**			-1.44	

** -- significant at 1 percent; * -- significant at 5 percent
2-step estimation using DPD
Using finite sample corrected standard errors
Transformation used: within groups (deviation from individual means)

Table 4: Arellano & Bond Panel Regression Estimation of Equation (2)

$$PICAP_t = \alpha_0 + \alpha_1 PCIAP_{t-1} + \alpha_2 SBADEP_{t-1} + \alpha_3 HERF_t + \alpha_4 EMPR_t + \alpha_5 SBAGR_{t-1} + \alpha_6 SBA7AR_{t-1} + \alpha_7 SBAMR_{t-1} + \alpha_8 T1993_t + \alpha_9 T1994_t + \alpha_{10} T1995_t + \alpha_{10} T1995_t + \alpha_{11} T1996_t + \alpha_{12} T1997_t + \alpha_{13} T1998_t + \alpha_{14} T1999_t + \alpha_{15} T2000_t + \alpha_{16} T2001_t + \varepsilon_t$$

Dependent Variable: PICAP	**Non MSA**			**MSA**		
	Coefficient	**Std.Error**	**t-value**	**Coefficient**	**Std.Error**	**t-value**
$PICAP_{t-1}$	0.98531	0.00615	160.00**	1.04660	0.00387	270.00**
$SBADEP_{t-1}$	0.00021	0.00003	7.91**	0.00237	0.00082	2.90**
HERF	-0.08306	0.02105	-3.95*	-0.08966	0.04191	-2.14*
EMPR	0.02682	0.00271	9.88**	0.03074	0.00479	6.42*
$SBAGR_{t-1}$	-0.25500	0.11550	-2.21*	-0.01956	0.20790	-0.094
$SBA7AR_{t-1}$	-0.11590	0.03671	-3.16*	-0.00536	0.06875	-0.078
$SBAMR_{t-1}$	0.02219	0.02902	0.77	0.06178	0.06018	1.03
MDUM	-0.39869	0.12130	-3.29**	-0.01833	0.22060	-0.0831
Intercept	-1.00442	0.20350	-4.93**	-2.79637	0.47540	-5.88**
T1993	-0.40890	0.03103	-13.20**	-0.37070	0.03156	-11.70**
T1994	-0.24364	0.02672	-9.12**	-0.22369	0.02805	-7.97**
T1995	-0.56850	0.02748	-20.70**	-0.22529	0.03008	-7.49**
T1996	0.14953	0.02871	5.21**	-0.23357	0.03286	-7.11**
T1997	-0.13864	0.03027	-4.58**	-0.12430	0.03814	-3.26**
T1998	-0.01558	0.03337	-0.46	0.08663	0.03689	2.35*
T1999	-0.32124	0.03641	-8.82**	-0.47518	0.03915	-12.10**
T2000	0.08656	0.03581	2.42*	0.24188	0.04254	5.69**
T2001	-0.28454	0.04162	-6.84**	-0.75348	0.07019	-10.70**
MSADUM						
sigma		0.94090			0.46852	
sigma2		0.88529			0.21952	
Residual sum of squares		17133.03			684.67	
Total sum of squares		306858.77			84703.89	
Number of observations		19371			3137	
Number of parameters		18			18	
Wald (joint): $\chi 2(8)$ =		111400**			90720**	
Wald (dummy): $\chi 2(10)$ =		949.3**			817.9**	
Wald (time): $\chi 2(9)$ =		948.4**			811.1**	
AR(1) test: N(0,1) =		-10.74**			0.15	
AR(2) test: N(0,1) =		6.001**			-0.62	

** -- significant at 1 percent; * -- significant at 5 percent
Using finite sample corrected standard errors

Appendix: Characteristics of Loans Issued under the SBA 7(a) and 504 Loan Guarantee Programs

Table A1: Average SBA Loan $							
	Urban			Rural			Total
Year	504	7A	Total	504	7A	Total	Sample
1991	262,159	207,984	213,260	300,958	205,233	213,592	213,345
1992	302,788	244,221	249,582	316,912	232,181	238,305	246,923
1993	325,592	250,624	258,006	346,530	244,144	252,845	256,859
1994	341,261	205,738	218,756	334,919	184,367	195,604	213,855
1995	350,786	150,363	169,179	364,684	125,882	145,227	164,796
1996	376,730	190,938	213,915	341,966	145,963	168,762	206,933
1997	369,753	224,912	238,320	310,629	174,399	188,908	231,171
1998	385,883	236,159	253,764	308,272	199,479	212,395	247,994
1999	412,650	253,674	270,483	335,416	195,475	211,379	263,591
2000	427,095	260,575	277,788	343,140	197,743	213,899	269,633
2001	440,611	241,833	264,551	361,987	195,511	216,531	257,741
Sample	377,773	221,391	237,727	335,527	184,414	199,225	231,391

Source: United States Small Business Administration and authors' calculations

Table A2: Total SBA Loans ($000)							
	Urban			Rural			Total
Year	504	7A	Total	504	7A	Total	Sample
1991	168,044	1,235,636	1,403,680	58,687	418,265	476,952	1,880,632
1992	380,301	3,043,969	3,424,270	96,975	912,007	1,008,982	4,433,252
1993	564,577	3,978,656	4,543,233	148,315	1,125,014	1,273,329	5,816,562
1994	1,015,593	5,761,698	6,777,291	207,985	1,419,439	1,627,423	8,404,715
1995	1,165,310	4,821,247	5,986,557	234,127	916,799	1,150,926	7,137,483
1996	1,727,682	6,204,515	7,932,197	269,811	874,902	1,144,713	9,076,910
1997	1,219,816	7,273,196	8,493,012	199,424	939,313	1,138,736	9,631,748
1998	1,464,425	6,725,796	8,190,221	191,437	919,600	1,111,037	9,301,258
1999	1,521,028	7,908,288	9,429,316	175,423	797,344	972,767	10,402,083
2000	1,319,722	6,984,461	8,304,183	166,766	768,827	935,593	9,239,776
2001	1,238,118	5,266,396	6,504,514	185,699	694,065	879,765	7,384,279
Sample	11,784,617	59,203,858	70,988,475	1,934,647	9,785,575	11,720,223	82,708,698

Source: United States Small Business Administration and authors' calculations

Table A3: Total Number of SBA Loans							
	Urban			Rural			Total
Year	504	7A	Total	504	7A	Total	Sample
1991	641	5941	6,582	195	2038	2,233	8,815
1992	1256	12464	13,720	306	3928	4,234	17,954
1993	1734	15875	17,609	428	4608	5,036	22,645
1994	2976	28005	30,981	621	7699	8,320	39,301
1995	3322	32064	35,386	642	7283	7,925	43,311
1996	4586	32495	37,081	789	5994	6,783	43,864
1997	3299	32338	35,637	642	5386	6,028	41,665
1998	3795	28480	32,275	621	4610	5,231	37,506
1999	3686	31175	34,861	523	4079	4,602	39,463
2000	3090	26804	29,894	486	3888	4,374	34,268
2001	2810	21777	24,587	513	3550	4,063	28,650
Sample	31,195	267,418	298,613	5,766	53,063	58,829	357,442

Source: United States Small Business Administration and authors' calculations